PAPER 8.

PSYCHOLOGY AS A BUILDING SCIENCE

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Preamble

I have been allocated fifteen minutes and ten pages of typing within which to change the World.

Even allowing for the accelerating rates of technological advancement and shrinking time scales, this seems a tall order. I am also assured on good authority that my World, changed or otherwise, will evaporate if I fail to observe these limits!

Introduction

The timing and title of this conference are most appropriate - particularly the subtitle - to us at the University of Newcastle, because we have been giving the matter a lot of thought and taking advantage of a number of opportunities, and are putting our conclusions into practice.

We have not been considering Architectural Science in isolation, because we see it as an integral part of our Department's overall activity, all of which has been under comprehensive review. However, circumstances have nevertheless led to an even greater change of direction in our approach to Architectural Science than in most other areas.

In our deliberations, we have taken a hard look at our roles in the contexts of society, the building industry, the consulting professions, and the individual students, and we have considered these in relation to a time frame of ten years, because that is the time necessary for this year's student intake to become productive members of their profession and, we hope, of society.

This paper, therefore, analyses the (past and present) place of architectural science in society, identifies needs and opportunities for change, and outlines the Newcastle school's (present) responses. The paper then concludes by relating design to behavioural science in terms of opportunities for further (future) action.

Terminology

First, let me dispense with the term "psychology", even though it forms part of the title, because it often assumes connotations of isolated senses, the brain in isolation, and the individual in isolation, with secondary associations with clinical psychology. Instead, I choose to use the term "Behavioural Science", because it more-accurately projects the intended concept, that is the concept of behaviour of the WHOLE human, not just isolated bits and pieces. The concept also embraces GROUP behaviour, and the interaction of individuals and groups with their whole environments.

Analysis

So, What Is Our Place, and Is It Changing? Or Already Changed? In order to answer these, it is helpful to look in from outside.

Architectural Science is part of both the tertiary education system and the building industry. However, its part of the tertiary education system can also be considered part of the building industry, in its broadest sense, so avoiding obvious conflicts, at least for the present discussion.

The building industry is a service industry, and its activities and achievements are necessarily conditioned by the attitudes and activities of its market, which embraces the main commercial, industrial and government sectors of the community.

The consulting professions (architects, engineers, management consultants, etc.) within the industry also constitute a service industry and their activities and successes (or otherwise) are similarly conditioned by the attitudes and activities of their market, which is essentially the same as that of the whole industry, i.e. the commercial, industrial and government sectors.

By the same analogy, the professional schools and their departments, research facilities, and staffs (including Architectural Science in our case) are all parts of a service industry, and are dependent on the prevailing attitudes and activities of the community that uses the services.

Attitudes and activities, however, are nothing more than human behaviour and Architectural Science is therefore dependent on human behaviour for its activities and success.[1]

That, Therefore, Is Our Place, As It Looks From Outside. That is how others, in commerce, industry, and government see us.

Has Our Role Been Satisfactory? As ours is a service role, satisfaction is in the eye of the beholder. Certainly, the growth of Building Science as an accepted academic pursuit in the late 1960's and early 1970's indicated that it was providing just what was wanted - to fill the vacuum in training, research, and authorative advice, caused by the boom in commercial development and the adoption of new building materials and systems.

Also, however, because some very effective promotion was at work. Some of those "Promoters" are here, now, and even if they did not look or think like promoters, nevertheless they were, and the combination of the right service and good promotion provided the necessary "entrepreneurial factor", to generate and sustain expansionary activity. Without it, there would have been no expansion, and without it again, there will be decline, in conformity with life cycle patterns in most other fields of human endeavour.[2]

Has There Been A Change? Until recently, the whole community was conditioned to accept the application of norms, averages, and standards, and the evidence of impartial instruments to decide whether the temperature, humidity, noise levels and lighting were correct. Admittedly, some individuals always considered the standard conditions too hot, too cold, or too loud, in contradiction to the evidence, but were generally considered abnormal, or "just whingers", and were persuaded to accept the conditions or move on.[3]

1. Zeidler, E.H. : Healing the Hospital; pp. 2 et.seq.
2. Vesper, K.H. : New Venture Strategies; p.4.
3. Fox, A.R. : Man Mismanaged; p.29

This conditioning in favour of conformity has until recently extended throughout society, and included such assumptions as the discretionary power of employers, subjugation of employees, the work ethic, universal achievement-orientation, and so on. These are no longer universal.[1]

In general, Society has become more tolerant of individual differences, and more conscious of individual aspirations, likes and dislikes, cultural differences, and so on. This has been reflected in changes in the law (law reform), social welfare, industrial relations, and even accountants' procedures.

Commerce, industry, and government have had to acknowledge the changes, and to become more sophisticated, particularly in those areas of primary concern, i.e. financial management, labour management, and market (or popularity?) analysis. The result is that rapidly expanding proportions of staff at all levels are developing skills in human relations, and are becoming more discriminating in their attitudes.[2]

Do Their Attitudes Matter? Suppose that commerce, industry, and government were to stop seeing us, either because our service was not the one they wanted, or because our light was so well hidden that we were effectively invisible. If we are really dependent on their attitudes and activities, we will inevitably cease to exist, either because we are starved through neglect, or because no one is committed to our defence when the Razor Gang comes our way (as it surely will, sooner or later!) And, if they do happen to miss us, then EVERYBODY will have forgotten us, and we are likely to simply congeal!

How many of us, however, have ever considered that we are dependent on anything beyond our department, faculty, university, or grant committee for our existence? Not many, I suspect, which suggests that we have a collective image problem. That is, we do not see ourselves as others see us, and if we have delusions, we have problems.

Is Promotion the Answer? If we have a service to offer, but nobody knows about it, then we might as well not bother. If that service is not relevant to the prevailing demand, then it does not matter that no one except us knows about it. If however, it is relevant to the prevailing demand, but those in need are unaware of it, then that is a tragedy, because we are both missing out.[3]

How Relevant, Therefore, Is our Service to the Prevailing Demand? First, we have to ask what the demand is, and then see if our service is relevant.

What, Then is the Demand? Commerce, industry, and government in general know the corporate benefits of motivation, and know that staff, from the M.D. to the labourers, will not perform optimally (in whichever terms they choose to measure it) unless they are comfortable, have good morale, and are motivated, and that they will have neither motivation nor morale unless they are comfortable. What is more important, they are increasingly aware that staff will not be comfortable while, as individuals, they PERCEIVE that they are too hot, too cold, or that something is too loud, too far, too bright etc.

It is no longer adequate, therefore, for a consultant to produce instruments which indicate that the conditions are in "accordance with the standard". If an occupant's work is affected because he or she FEELS hot, cold, stuffy, etc, or cannot see, hear, etc, then management will want it "fixed", despite the best of instruments and their evidence, especially where a performance contract exists, or where union pressure is involved.

1. Fox, A.R. : Man Mismanaged; p.1
2. Fox, A.R. : A Sociology of Work in Industry; p.182
3. Vesper, K.H.: New Venture Strategies; pp. 4 et.seq

The Demand, Therefore, Is For A Service Which Satisfied Perceived Needs - i.e. which satisfies the industry's perceived needs by satisfying the occupants' perceived needs.

Is Our Service Therefore Relevant? A major portion of Building Science activity is concerned with energy conservation, daylight, supplementary lighting, optimal shading, thermal dynamics, acoustics, ergonomics, and so on under the convenient umbrella term "environmental issues", all of which are directly or indirectly concerned with the demands of human comfort. Even energy conservation, which may be directly concerned with resource conservation, is ultimately related to human comfort as the purpose for the use of the energy, and the determinant of the quantities of energy consumed. Furthermore, the standard criteria towards which they are oriented are measures of human comfort, expressed in terms of so many thermal units, etc., all of which have been derived from some procedural measurements of human comfort and tolerance.[1]

The "human" factor in these standards has, however, become submerged in the pursuit of technological advancement, and the maintenance of procedural conventions, such as single-variable experimentation, and the demands of objectivity, repeatability, and extrapolation. These conventions have been inherited from Building Science's Physics - and Chemistry-oriented origins, and in general are maintained by a residual dominance by these disciplines in the attitudes and modus operandi of the Building Science fraternity.

This dominance is UNDERSTANDABLE, given the historical background, and even NECESSARY in order to maintain scientific standards and respectability, but is LIMITING in relation to human factors, which are characterised by subjectivity, polyvariables and imprecise repeatability, and which are now society's and industry's most sensitive issues.

Therefore. The vacuum which exists in the 1980s is no longer the same vacuum as that of the 60's and 70's (which resulted from TECHNOLOGICAL advancement) - it is a different one, resulting from SOCIOLOGICAL advancement, and as our collective attitude is limiting in this direction, then our collective service is also limiting![2]

So. Either we must expect to forego expansion, and possibly accept recession, OR indulge in some aggressive promotional activity, OR we must change our service to bring it into closer alignment with the changed demand.[3]

However. We must be careful to avoid any suggestion of discarding the proverbial baby with the bathwater! Society's TECHNOLOGICAL advancement continues, and can be expected to maintain a demand for EXISTING services provided by Architectural Science, but can NOT be expected to maintain an INCREASING demand, nor even a SUSTAINED demand for existing services (unless some wonders can again be worked with promotional activity!).

What Changes are Necessary? If the demand for existing services is expected to continue, albeit with less buoyancy than in the past, then clearly we should maintain them. However, if the demand is for a different emphasis (as it appears to be), then we should change our own emphasis. Then, if the prevailing demand is for an EXPANDED service, we should decide whether an expanded service is feasible, and, if so, whether it is appropriate to our own objectives. If the answers are positive, then these are the changes that are necessary!

1. Papanek, V. : Design for the Real World; p.117
2. Branzi, A. : The Hot House; p.142
3. Vesper, K.H.; p.147

Where Does This Fit Into The Building Sciences? If we consider the environment as embracing everything with which we interact, then we can logically include other individuals, social pressures, cultural factors, etc., as environmental issues, and we can then logically EXTEND the concept to include the "internal" environment of the individual.

How Relevant Are The Behavioural Sciences? The Behavioural Sciences have also moved on, from a preoccupation with threshold sensitivity and perception in the late 1960's and early 70's (to the great advantage of acoustics, lighting, and allied areas of Building Science at that time) to preoccupation with the learning processes in the late 70's, and on to the present, when the leading edge of research seems to be in the areas of creativity and imaginative perception, with obvious relevance to the Architects' profession, other design processes, construction management, client attitudes, and so on. They appear, therefore, to be highly relevant, particularly as their preoccupations seem to be so close to those of the Architects' profession.

Will This Compromise Our Credibility? The scientific community has become more tolerant of subjective research and its results[1], probably due to intense pressure for market research and increasing use of holistic approaches in medical research, which together have attracted the largest proportion of the World's research dollar outside space and arms research.

The Newcastle Response

As indicated at the beginning of this paper, the Newcastle school has already responded to this perceived need for change and these perceived solutions in several ways, some of which are within the specific province of architectural science, while others extend to the whole set of the department's undergraduate programmes.

At the department level, we have adopted the so-called "problem-based learning" approach to our undergraduate programmes, based largely on the model of our Medical School, which has attracted considerable interest in the development of this type of programme. This, in its own right, is a major commitment to a behavioural approach. First Year's programmes have been converted entirely to this approach, and other years are partially converted.

Management studies, in the senior years, has been developed with a strong behavioural framework over the past few years, initially due to awareness of the issues raised earlier in this paper, among some permanent and part-time staff with strong practice and management backgrounds. Developments in these programmes have reached very sophisticated levels, closely related to MBA practice, and have provided a strong platform of experience and precedent for extension of the behavioural science influence downwards into our undergraduate architectural science programmes in the B.Sc.(Arch.) course in years 1 to 3, as well as outward into the learning processes generally.

The undergraduate science programmes are currently being converted to the PBL format, which demands high levels of integration with other "subjects". In the process, they are also being converted to a behavioural approach. In the traditional architectural science areas, this means little more than promoting a different viewpoint of familiar (to us) material, and

1. Neale, J.M. & Liebert, R.M.: Science and Behaviour; Ch.1.

limiting the depth of study to that which is relevant to the scale of the PBL programmes. In the behavioural science areas, this means mainly the introduction of studies and workshops covering individual, interpersonal, and group behaviour, at the philosophical, theoretical, and practical levels, including, of course, the application of these in practice to stimulate the students' own morale, motivation, and interactive skills.

Our Management programmes have already introduced research in behavioural science into the undergraduate areas, and has produced a valuable collection of studies into architect/client/neighbour relationships, local government authoritarianism, and the multi-headed client syndrome. This applies quite advanced concepts in both the area under study and the methodology, and the students are highly stimulated by the enlightenment and the demonstrable relevance of their studies.

At the postgraduate level, work in progress includes some pioneering work in the areas of imaginative creativity, and the motivational forces at work in the industry.

Our work to date has already passed the novelty stage, and has attracted attention from outside. The (NSW) Board of Architects' Research project for 1984/85, into clients' perceptions of architects' performance, currently under way, indicates the importance the Board attaches to perception, and indicates some official confidence in our ability to undertake serious behavioural research - and so to win back a slice of the action previously lost to the management consultants.

The community has also started to notice this aspect of our work, and a major local sporting association has engaged us to undertake an analysis of its membership's collective attitudes to redevelopment of its premises, and to recommend appropriate development strategies, as this year's final-year management research project.

With Finite Resources, What Has Been Given Up?

As far as the undergraduate programmes are concerned, nothing has been given up. On the contrary, they have been substantially extended, particularly laterally, and we believe that they are greatly enhanced, even in the traditional architectural science areas, by the students' increased awareness of relevance to human needs.

The change is in the area of postgraduate research, which necessarily follows the interests of the staff, particularly in a small regional school such as ours. Until recently, the research interests of the senior staff was centred around acoustics and sun control, but was handicapped, in comparison with the larger schools, by inevitable difficulties in obtaining adequate capital facilities and staff. Consequently, the postgraduate research programmes remained in the shadows of the larger schools.

Smallness, however, can be a blessing, particularly when a change of direction is involved, and in this case was a distinct advantage. As the matter now stands, we have already established a specialisation which is in no one's shadow, is not subject to suspicions of unnecessary duplication, and in which we can maintain the highest standards.

Is This a Behavioural Sciences Takeover? Certainly not. No one else need take up the same challenge. Indeed, there is some merit in the argument for specialisation and against duplication, at least at the postgraduate level. Nor is approbation necessary, although it would certainly be very welcome! The fact is that we have already taken the initiative, and are quite confident that it is the most appropriate action to take at this time, in our case, and given our particular circumstances, opportunities, and aspirations.

The Design Connection

Design can be considered in terms of a process (of designing) and a product (the design), and the product can be considered in terms of both a mental image, complete but intangible, and a tangible end-product (the completed building, etc.).

In all respects, the process is one of creative behaviour (and the intangible mental design is arguably a special case of creative behaviour). In the case of a building, creative behaviour is part of the role of an architect, who produces the intangible image; the initiator (client, entrepreneur) of the project; the builder who creates the means of construction; and the trades specialists who create the tangible form. There are also others, of course, and among all of those involved, some have component roles and some have composite roles, but creative imagination is required on many planes.[1]

Furthermore, the whole complex of creative activity becomes effective and productive only when other behavioural processes, vis communication and group interaction, are working properly, and a simple demonstration will indicate how frail this is, and how complex and destructive the translation processes are, as the design is passed from one participant to the next.

This concept can also be extended to another level: that of the behavioural aspects of the imagination process (i.e. mental imaging), which is of course, central to the existence of architects, in particular. Anyone who has tried to explain to a student how to develop a more imaginative approach to design will have experienced the vacuum of understanding of these processes. That vacuum extends beyond our disciplines, and is currently at the leading edge of research in educational psychology.[2]

Architectural science has so far been primarily concerned with the tangible end product, and with contributing to the design processes only to the extent of providing advice and a wider and better selection of components.[3] More recently, this has been extended by work done in the development of EDP and CAD aids. However, while the benefit of these to the communication processes is undisputed, they cannot contribute to the TRANSLATION process until we know a lot more about the mental processes involved.[4]

1. Papanek, V.; p.4.
2. Ibid, p.343
3. Ibid, p.217
4. Branzi, A.; p.96

In architectural science's convential areas of interest, the contribution of behavioural science to the design process is largely in the development of awareness, understanding and holistic approaches to comfort criteria, perception, well-being, and so on, which condition the users' levels of satisfaction with their built environments (and is this not our ultimate objective?)

Conclusion

Should This Be Left to the Psychologists? Certainly not! Architectural science has always provided the links between scientific disciplines and architectural applications. In many cases it has sought and provided an architectural application for existing technology in another field (e.g. CAD, acoustics), but in most cases it has recognised the need for a solution in terms of established principles and procedures of various scientific disciplines, including the natural sciences (chemistry, physics, etc.), the life sciences (biology, physiology, etc.), the logic sciences (mathematics, astronomy), and the social sciences (history, demography, etc.). This paper simply expands our interest in the social sciences.

Does this Duplicate the Work of Those Specialising in the Behavioural Sciences? To a degree, perhaps, but no more than is the case with architectural science's involvements in EDP and CAD application, material science, structural mechanics, and so on, all of which are subjects of specialist interest in other disciplines.

The distinction is in the application. Behavioural science specialists (e.g. in departments of Psychology, Sociology) are necessarily concerned with generality of application, not specific application. Architectural science is concerned with specific application within the building industry, just as educationalists, economists, linguists, etc. are interested in the same areas of behavioural science, but are only specifically concerned with application in their particular areas.

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