



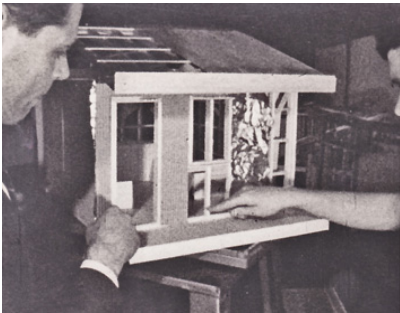
Document title: Architects' education: Can a mode of practice in the design professions be transferred to universities to become a teaching method? The case of the practice model (in teaching architecture).

Author/s: Ross Thorne and Terry Purcell,

Summary / abstract:

Periodically, some professional architectural courses conducted at universities are subject to pressure from practicing professionals long since graduated. The practitioners believe that the education of their employed underlings is poor and what is needed are more practitioners to teach at the universities. The practitioners believe that they can transfer their method of practice, and their use of consultants from allied professions, to the learning environment, and that this will be as, or more, effective in teaching than any of the researched methods as set down in the educational literature. The case of the practice model is, by and large, a case of ignorance, a case of teachers not learning to teach, and a case of experts not being able to describe their own competence.

The paper (which discusses the practice model of teaching and the associated semantics) shows that it is inappropriate for effective education, indicating that change is urgently needed in the education system for architects.



Key words: Architectural; Education; Professional Practice.

Illustrations:

Original publication date: 1994

Original publication source: Higher Education Research Development Society of Australasia (HERDSA), Conference Proceedings, Volume 17. In M. Pettivrove and M. Pearson, eds., A collation of papers presented at the Twentieth Annual National Conference of the Higher Education Research and Development Society of Australasia Inc held at The Australian National University, 6-10 July 1994.

Complete / extract: Complete

ISBN / ISSN: Unknown

Copyright owner: Ross Thorne & Terry Purcell

**Can a mode of practice in the design professions be transferred to universities to become a teaching method [in teaching architecture].
by Ross Thorne & Terry Purcell.**

Preface

Periodically, some professional courses, conducted at universities, are subject to pressure from the practising professionals, long graduated, and their professional institutes. The practitioners usually believe that the education of their employed underlings is poor and what is needed are more practitioners to teach at the universities. This situation is particularly prevalent in architecture, both in Australasia and abroad.

The practitioners believe that they can transfer their method of practice, and their use of consultants from allied professions, to the learning environment, and that this will be as, or more, effective in teaching than any of the researched methods in the educational literature. The case of the practice model is, by and large, a case of ignorance, a case of teachers not learning to learn to teach, and a case of experts not being able to describe their competence, that is, their procedural knowledge rather than the more easily identifiable semantic knowledge.

It will become evident from the paper (which discusses this practice model of teaching, and the associated semantics) that it is an inappropriate one for effective education, indicating that transition is urgently needed in architectural education.

Introduction

In changing from an apprenticeship system of training future architects to one of full-time tertiary institutional training (or education) the teaching framework has generally become some form of analogue of architectural practice. This is particularly noticeable in recent decades where there has been an emphasis on relevance. This paper describes three closely related and overlapping models observed by us as emanating from practice:¹ they are what we term the "practice model", which includes the "consultant model" and "research consultant model". In identifying these models and understanding them another facet of architectural "culture" needs to be raised, that is, the idiosyncratic use of particular words from the general language. (This idiosyncrasy is not limited to words only from general language but words and concepts from other disciplines (see Purcell, 1985).) Such models, in the form of simulations of practice, developed with care in stages of appropriate length (Odiorne 1985), may be satisfactory educationally; however, in the manner that they have existed up until now, these models do not take into account those aspects of expert behaviour that contradict or militate against good teaching and therefore against efficient and effective learning by novices (see for example Chi et al, 1988).

Defining the models

The *practice model* in architectural design education assumes that students should attempt to design as an architect would develop a design in his/her practice, addressing all the relevant constraints that occur in practice and exploring the client design requirements or problem, by producing a series of potential designs. Some of the constraints are supplied through consultants who may range from social scientists, a number of types of engineers to interior fit-out consultants. Accordingly, the notion of a *consultant model*

in architectural design education is one where experts in a variety of disciplines are individually consulted by students in an advisory capacity about aspects of a design that would fall outside of the architect's expected expertise. In a learning situation from novice to graduate such consultation frequently includes aspects of architectural design practice that is within the future architect's expertise. As a result of recognising this variation, the term "research consultant" has been introduced at one Australian school of architecture. Therefore, the *research consultant model* adapts the architectural practice mode of operating with consultants to the educational environment. It utilises academic staff (experts) and part-time practitioner experts to advise students on aspects of architectural design that are both essential (and not essential) to the expected knowledge/skills outcomes of the course graduate. In other words, the staff-member or other expert becomes a research resource for the student but the word "research" here is not used in the academic sense (as will be later discussed).

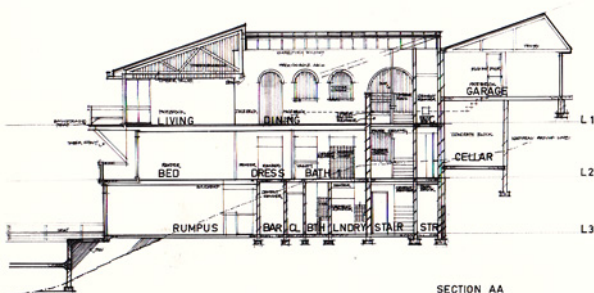
The Teaching Models

Architectural design is a very complex task; qualitative research has shown that few non-architects in Sydney understand what architects do, let alone the complexity of designing a building (Thorne, 1992). A survey of British architectural practice principals resulted in over 50 per cent of respondents agreeing that 21 areas of knowledge/skills are needed in the training of architects, almost all areas of which would be used in the design process and the translation of the design into a made object (Seidel 1993). Table 1 lists the 21 areas and percentage of respondents agreeing. Excluding "office management", "marketing" and "accounting", the remaining areas all contain knowledge/skills that have bearing on almost every architectural design thus indicating the complexity of the design process. Yet traditionally, the activity of "design" in schools of architecture has been pursued as a subject separate from the other 20 areas of knowledge/skills.²

The Practice Model

Replicating how a practice operates with the relevant constraints in developing designs may, at tertiary institutions, be able to be translated into simulation, provided the total training objective is broken down into many successive stages (Odiorne 1985: 76), or into problem-based learning as Maitland (1985) suggests is applicable to architecture. However, these structured approaches to learning have rarely occurred and pursuance of this model in an unstructured manner presents a number of dangers, including idiosyncratic use of the word "real", particularly in relation to the loosely used words "problem" and "project". One danger is that the novice student does not possess the skill in the activities of analysis and designing, thus the design process is considerably slower than a practitioner unless the students and/or tutors implicitly disregard some, or even a large number of relevant aspects of each design situation. Implicitly disregarding a number of relevant aspects provides tacit learning of an unstated set of biases about what should be paid attention to in particular design situations. That is, those aspects that are not omitted from reinforcement through the design process are likely to receive bias or emphasis in the learning of the student.

A typical teaching project at a University showing a long section of the building.



The second danger is that this simplification of real practice is likely to impede or omit any rigorous analysis of the nature of design situations, the design process and the relationship between the two, which forms the context within which the activity occurs. This then converts the practice model into what took place in

many architectural practices in the early twentieth century and had occurred in medieval religious, quasi-university institutions prior to that; that is, the master/apprentice, craft-based model which is inappropriate in the context of a modern university, because it is not based on an explicitly stated body of knowledge.

AREAS OF KNOWLEDGE/ SKILLS OF ARCHITECT	per cent agreeing	AREAS OF KNOWLEDGE/ SKILLS OF ARCHITECT	per cent agreeing
building technology	96.6	client relations	79.3
schematic design	94.3	project management	79.2
brief preparation	93.8	production	78.3
specification and codes	90.9	interior design	77.9
communication	90.8	construction management	77.5
history of architecture	85.5	human behaviour	72.8
computer-aided design	85.5	computerization	67.8
structural & mechanic design	84.5	marketing	64.9
urban design & planning	81.1	research	61.5
office management	80.6	accounting	57.3

TABLE: Areas of Knowledge?Skills in which an architect needs training according to more than 50 per cent of principals in British architectural firms. After Seidel (1993)

N.B. From the same respondents, only seven areas received more than 50 per cent agreement that they had received adequate training in them.

A third danger for both the practice and consultant models, in particular, is the assumption by professionals and schools of architecture that the best people to teach design are practising designers. There is a large amount of recent evidence to indicate that practising professionals may make poor teachers (Thorne, 1985). Chi et al (1988) and Reimann and Chi (1989), in their reviews of human expertise, discuss how much of the skill and knowledge of experts (including professionals such as architects) becomes automatic and unconscious, difficult to recall or describe. It has been given the title of procedural knowledge. This is knowledge about how to do things, equivalent to riding a bicycle or driving a car. It is in contrast to semantic knowledge which is knowledge of facts and principles which are more readily recalled and described. Also, without being able to describe their expertise experts will automatically use "expert" language -- the language of their discipline -- to describe and analyse problems; but this will make no sense to the novice student who is in fact enrolled to learn the language, and more particularly, its meaning.

As would be expected, the architect teachers who attempt to use the practice model believe that "reality" is important. They use the word "real", usually coupled with "problem" or "project", which becomes a generic term for a design exercise to be undertaken by students. However, the word "real" is in fact misused. A "real design project" will have different meanings for students, their architect teachers, and outside observers. The design task being pursued

by the students is “real” to the students because they are actually spending time on it and are likely to produce a design to satisfy the task or exercise. Outside observers would also see this as being “real”. But architect teachers use the term when the exercise topic and requirements are identical to that which some architect’s client has requested of that architect. Included in this is a site of land designated by the client (what architect teachers term a “real site”). The architect’s client is also referred to as a “real client”, particularly if that person can attend a briefing session at the commencement of the exercise and a critical appraisal session after submission of the exercise. Of course, the person is a real client to the architect, but not to the students, but semantic accuracy, as has been shown, is not a forte of architect teachers.

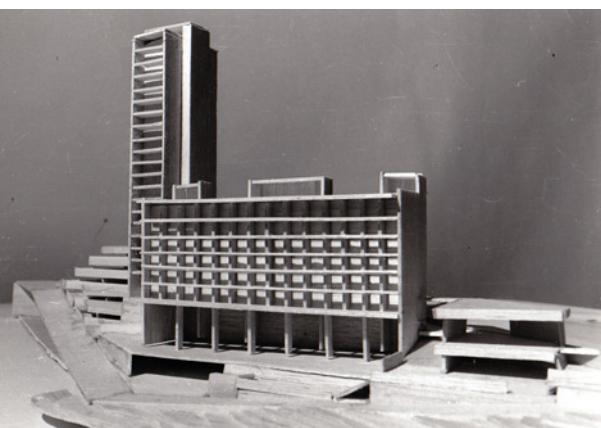
Students quite like this relationship to the real world because, without something like this to provide relevance for their design their work would be pursued in a vacuum. Another form of relevance would be to associate the twenty or so areas of knowledge identified by British practitioners as needed for training architects (Seidel, 1993) directly with and into the design exercises. This would provide practical experience in applying the knowledge and skills presented in subject/courses usually delivered by lecture, but it very rarely happens (see for USA, Anthony, 1991). The exceptions are at those few schools of architecture where an individual teacher has been responsible for providing a number of subjects, including design, where a conscious effort and structure is made to integrate the knowledge into design (as, for example, Thorne, 1988) or an effort has been made to pursue problem-based learning (Maitland, 1985).

Returning to the architect teachers’ concept of a “real project” with a “real site” and a “real client” it might be logically assumed that the exercise would be taught through a simulation of the real thing -- going through all the processes that an architect would do in practice to produce a design prior to someone else transferring it into a “real building”. But no; organising a thorough simulation would require such a complex structure of stages (many stages for junior students and fewer for senior students) and inputs, to take into account the various areas of knowledge, building bylaws and regulations and land zonings etc., as well as client needs, that the architect design teachers would say that it would inhibit the students’ creativity, or prevent them from making their personal artistic statement.³

The word “project” is another difficult word with multiple meanings mostly as transitive and intransitive verbs; but as a noun, it means “something that is contemplated, devised or planned; a scheme or an undertaking” (Macquarie, 1985). One may arise in the morning and say, “My project for today is to mow the lawn and trim the garden edges”. A design teacher may say to a class of students, “Your project for the next five weeks is to design a child care centre”. However, the word becomes transmuted from *to design* a child care centre, with the emphasis on the designing, to the emphasis on the artefact being designed -- that is, “your design project is a child care centre”. This conforms to the product orientation of most architect practitioners and design teachers, rather than the (more educational) process orientation.

“Problem”, in many ways, is a better word to use as it incorporates the question of doubt, uncertainty, or difficulty together with the notion of providing a solution, all of which most design exercises contain. But, anecdotally, architects, usually claim that the process

A Typical University student project.



of designing is not entirely a problem-solving exercise, although designs contain many solved problems. They seem to believe that the more important role is for “creativity” which they usually leave undefined, or claim that it cannot be studied. Neither do they show knowledge of the substantial research from a number of perspectives concerning the nature and basis of creativity (see, for example, Runco and Albert, 1990; Weisberg, 1993).

Rather than “project” or “problem” (which might imply teaching is by problem-based learning) a seemingly preferable term is design “exercise”: As “something done or performed as a means of practice or training, to improve a specific skill or to acquire competence in a particular field” (Macquarie, 1985), the word describes the activity of designing a particular artefact in a more neutral and comprehensive way than either the reasonably accurate “problem” or the less appropriate “project”. The word “program” might be used for multi-stage exercises, that is, a number of different exercises that can either exist on their own or build on each other to form a more complex whole.⁴

The consultant models

The difficulties associated with the practice model of architectural design education also apply to the consultant model since the former overlaps the latter. The “real project” syndrome remains as too do both the lack of utilising the knowledge/skills taught outside of the design activity, and the fear that precise structure, (devised to achieve learning outcomes) will impair creative expression. However, if the meanings of “consult” are analysed it will be seen that this model is also an inappropriate one that does not relate to its antecedent -- architectural practice.

There are two dictionary definitions of “consult” that are relevant to this discussion: the first is *taking counsel together*, to deliberate (about) to confer (about), to devise, to plan; the second meaning is that of *seeking counsel from*, to ask advice of, or to have recourse to, for professional advice. The definition for “consultant” is, unilluminatingly, “one who consults”, so a consultant model for education can be described as one where consulting takes place between an educator and a person being educated. The questions are ‘which of the two types of consulting takes place in the university environment?’ and ‘Are either appropriate for the person being educated (i.e. the student)?’ The following discusses the two meanings of “consult” in relation to these questions.

The first meaning assumes that each of the parties -- the student and consultant -- taking counsel together, has sufficient knowledge on whatever the topic might be in order to confer, devise or plan a course of action. This is the type of consulting done in traditional university tutorials in say, mathematics and languages where the tutors only elucidate at the level of knowledge expected of the students at the specific time of the tutorial. Whereas these tutorials are discipline-specific and the tutors know precisely with what knowledge the student should be conversant, this is not so in architectural design which is basically an activity. In practice, design draws on knowledge from a number of disciplines, but a design exercise selected for students to pursue, is frequently unrelated to the current level of student knowledge. Until now, in Australia, there has usually been no statement or syllabus that will describe the knowledge students are expected to have at any given stage in their degree course (the exception being described in Maitland, 1985). The design teachers (tutors) at best will only teach a small portion of that knowledge and not be aware of the remainder, and at worst,

are practicing architects who have little if any cognisance of what knowledge is taught and where it is taught. Thus the knowledge-developing subjects are taught in somewhat of a vacuum from the exercises that, in architectural practice, use that knowledge. As a result, consulting in the educational design situation, takes on the second meaning with the uninformed being given information, however this occurs, in an ad hoc or random basis to individuals as questions arise. This is similar to the consultancy that takes place, for example, between patients and their doctors, or most clients and their architects. What it does is provide experiential or tacit knowledge during the process of designing which cannot be defined, and may only come to consciousness again when a similar situation arises during another design exercise.

In the preceding discussion the “consultant” is not necessarily an architect practitioner nor academic but may belong to another discipline, in which case there may well be a translation or applicability gap, that is, the answers may not be in a form that is directly translatable into physical elements and configurations, or the consultants language about the physical environment is different to that used by the designer (see Purcell and Heath, 1982).

As for the practice model, discussed before, neither is the consultant model, a simulation of actual practice. In practice, the consultant may provide some general information to the designer but, more importantly, the design is taken from the architect, it is studied in the consultant’s office without the author hovering over him/her (as occurs in the design studio), some calculations or considered analyses made, and recommendations written down and finally discussed with the designer. After the discussion and modifications are made to the design, the process may well be repeated once, twice or more times. As each student’s design will be a different but more or less valid solution to the design brief, the consultant’s task becomes one of having 30, 40, 50 (or however many students in one year) separate consultancies. This produces an impossibly time-consuming task which is one reason why architecture at universities in USA is costing as much as laboratory-based science courses but, at the same time, without any research output or provision of infrastructure, such as computers for teaching or research (EDRA, 1994).

The Research Consultant Model

A new version of the design studio consultant, at least in semantics, is the “*research consultant*” teaching model. The argument goes like this: Architects do “research”, i.e. gather information on the building type with which they are immediately concerned; they may resort to codes, standards, trade literature, chat to experts or walk their fingers through the yellow pages telephone directory. Because students perhaps do not know all these sources members of academic staff may act as information sources themselves and give directional guidance, thus becoming “research” consultants. Again, the whole is unstructured and unrelated to specific curriculum content given in the other subjects, a situation which also exists in USA (Anthony, 1991).

As will be noted, the use of the word “research” is idiosyncratic in a university context. Universities in USA and Australia have recently been reviewing research output of their various faculties and discovered that what is recognised as university research has been generally low in output and quality for schools of architecture. One Australian university brought in a consultant from USA

to advise on how research could be increased in its school of architecture, then appointed a practising architect, without research experience, head of the school, but the research output has not improved. Jesson (1994), when halfway through a project to discover how much and what research was being pursued in fifty US and Canadian schools of architecture, reported that it was barely significant, and the work being done was rarely being done by architect academics in the 25 schools so far investigated.

But practitioner-teachers, when confronted with this lack of research, often claim that they do research. What they do is non-academic personal research -- gathering information from existing sources in order for them to pursue their job, design a particular type of building (as journalists do prior to writing newspaper articles or primary school students do in collecting information for a project topic). At best, what might pass as quasi-scholarship in the university research stakes are the papers that assume a particular stance (ideology or belief) where references are sought to support the view from writers who describe similarly untested "theoretical" beliefs (such as famous architects or misunderstood European philosophers). In his overview of schools of architecture Jesson (1994) has looked at the subject matter of student dissertations in USA and Canada as a guide to what research is done in schools of architecture and found they were almost all devoted to topics of (perhaps questionable) theory and history of architecture (which are usually about building facts and architectural aesthetics omitting anything concerning, say, social significance).

With such a non-academic understanding of research, the research consultant can only provide facets of his/her own expertise, be a human library catalogue, or provide ad hoc fragments of personal experience as an architect.

An outcome of this model, and its view of research, is the implication for knowledge development in the discipline. As might be guessed, from the above, the word "knowledge" is also used in a non-rigorous manner. The general use of the word in university academic circles means that a discipline has developed its own knowledge-base through research and inquiry and argument, initiating theories and hypotheses and in some way testing or substantiating them according to the knowledge-environment available at the time. That is, the results might not be an ultimate "factual truth" but the aim has been to objectify the substantiation as much as the academic environment, at the time, permits. The essence of "creating" knowledge is to make it available in a readily accessible form (usually written). In other words it becomes explicit, semantic knowledge.

A problem with architecture is that, in this sense, it does not have its own knowledge-base. As the profession developed from the later 18th century towards a more conscious Art-orientation it divested itself of those more technical aspects of building engineering, and their respective knowledge-bases, now known as structural and mechanical engineering, and the physical sciences such as acoustics (Winton-Ely, 1977; Heath, 1994). But architect teachers frequently deny that the discipline does not have its own knowledge. They usually refer to the knowledge gained in practice -- through designing and seeing their designs built. This, of course, takes the form of *tacit or procedural knowledge*, exemplified in the beautiful photographs and plans of buildings, in glossy magazines, which may embody but do not make explicit the knowledge on which they are based.

A Typical University Project for an interior design.



In order to reinforce the claim that architects do have a body of knowledge the Committee of the Heads of Australian Schools of Architecture (CHASA) have devised a scheme of producing creative works as a substitute for traditional university research. Designs are submitted by academic staff across Australia for peer review. This, CHASA claims, will enhance and increase the body of architectural knowledge. But how? Certainly the tacit knowledge of the authors may be increased, but what does a brief verbal description (written after the event of designing) and some illustrations of the drawings do for a body of knowledge? What can non-architects learn from this when they are untrained in reading drawings? If anything, the designs may be considered untested theories of a particular building type, designed with specific criteria in mind, but which may not be explicitly stated in the public domain. But then most architectural designs, whether built or unbuilt, are virtually only personal untested theories or hypotheses, since so few are evaluated, that is, systematically tested to see whether the hypotheses are proved positive or negative.

Without such semantic knowledge-producing evaluations and with much of architectural knowledge being procedural knowledge, the implications for education are significant. If architects cannot describe their competence or knowledge (as noted, for example, by Pye, 1964; Schon, 1983; Heath, 1984) clearly structuring their teaching will be unlikely. Unless specifically trained to recognise and deal with these issues in an educational setting architects (and other experts) make inappropriate teachers.

Conclusion

The title asked the question, "Can a mode of practice in the design professions be transferred to universities to become a teaching method?" A view of how this currently occurs in schools of architecture identified what we termed the practice model with associated derivations, the consultant and research consultant models. It must be emphasised that these models are not consciously structured as educational models for effective learning. They have come about as a result of experts with a high degree of procedural knowledge believing that what they think they do in practice can be transferred to an educational setting without their being specifically trained to recognise the educational issues. For architecture, problems (and confusion) are possibly compounded by the idiosyncratic use of some words that may describe design exercises, and the knowledge that should be explicitly taught. In particular, there are the words "real", "project", "research" and "knowledge", the misuse, for many years, of the latter two perhaps confusing university administrators into assuming that the discipline of architecture was similar to other more research-oriented professional disciplines.

The deficiencies in the models described indicate that, before architectural education can improve at universities, both a knowledge-base and a system of training potential teachers needs to be established. They need to be taught, first, to recognise why experts may be inappropriate teachers and second, the best practices for effective student learning. It then may well be that a mode of practice can be used in a structured way in an educational setting, through inter-related fragments as simulations, or problem-based learning; but in the current manner it is simply an inefficient and rather ineffective apology for a teaching method.

End-notes

1. The models are identified after three decades of observing the behaviour of design teachers, discussing their “approach” to teaching, and even participating in their mode of teaching. Our interpretation of such teaching has been discussed with colleagues from other schools of architecture in Australia and USA who also recognise the same behaviours at their schools.
2. Few schools of architecture have pursued problem-based learning, but in Australia that at the University of Newcastle has, and this brings the knowledge areas into the design teaching (Maitland, 1985).
3. At the 25th Environmental Design Research Association Conference, San Antonio, March, 1994, in an Intensive Session on simply relying on design as the skill that differentiates architecture from other disciplines, Denis Jesson said that, from his research into schools of architecture in the USA, he noted that a number of architect teachers tell the students not to take into account building regulations and zonings in their designs -- and to avoid them wherever possible if it affects the “art” of their designs.
4. In Thorne, 1988, the designs are referred to as “exercises” for the work in Terms 1 and 2 for First Year, 1967, while the complex design for Term 3 is referred to as the “principal program”. Each stage is referred to as an “item”. There are a total of 18 items with individual submission dates for the term -- the culminating one bringing together all the previous items into a complete complex design.

References

- Anthony, K.H. (1991) *Design Juries on Trial: The Renaissance of the Design Studio*. New York: Van Nostrand Reinhold.
- Chi, M.T.H., Glaser, R. and Farr, M.J. (eds.) (1988) *The Nature of Expertise*. Hillsdale, NJ: Lawrence Erlbaum.
- EDRA (1994) Participants in the Intensive Session: Investigating the Knowledge Bases for the Design Professions at the 25th conference of the Environmental Design Research Association, San Antonio, Texas, March 16-20.
- Heath, T. (1984) *Method in Architecture*. Chichester, UK: Wiley.
- Heath, T. (1994) “Why Bank on Design?” Presentation at 25th Conference of the Environmental Design Research Association, San Antonio, Texas, March 16-20.
- Jesson, D.M. (1994) “Building Research in North American Universities”. Presentation to 25th Conference of the Environmental Design Research Association [EDRA] San Antonio, Texas, March 16-20.
- Macquarie (1985) *The Macquarie Dictionary*, Revised Edition. Dee Why, NSW: Macquarie Library.
- Maitland, B. (1985) “A Problem-Based Architecture Course.” In Boud, D. (ed.) *Problem-Based Learning in Education for the Professions*. Sydney: Higher Education Research and

- Development Society of Australasia [HERDSA], 163-167.
- Odiorne, G.S. (1985) *Strategic Management of Human Resources*. San Francisco: Jossey Bass.
- Purcell, A.T. (1985) "Ritualistic, rhetorical, reactionary: Architectural education and practice." *Architecture Australia*, 74, 5, 62-67.
- Purcell, A.T. and Heath, T. (1982) "The Two Communities: Is there a common focus for designer-researcher collaboration?" In Bart, P., Chen, A. and Francescato, G. (eds.) *Knowledge for Design*. Proceedings of the Thirteenth International Conference of the Environmental Design Research Association, Washington DC: EDRA Inc., 3-15.
- Pye, (1964) *The Nature of Design*. London: Studio Vista.
- Reimann, P. and Chi, M.T.H. (1989) "Human expertise." In Gilhooly, K.J. (ed.) *Human and Machine Problem Solving*. New York: Plenum, 161-191.
- Runco, M.A. and Albert, R.S. (1990) *Theories of Creativity*. Newbury Park, USA: Sage.
- Schon, D. (1983) *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
- Seidel, A.D. (1993) "A development profession searches for a knowledge base: Architects in the United Kingdom." *People and Physical Environment Research*, 43, 36-42.
- Thorne, R. (1985) "Does the employment of professional practitioners as teachers produce an educational paradox?" *Architecture Australia*, 74, 4, 48-51.
- Thorne, R. (1988) *Design Teaching Retrospective: 1967 Year 1 - 1970 Year IV*. University of Sydney: Department of Architecture.
- Thorne, R. (1992) "Community opinion on the design of Sydney's urban development: Who is responsible for design of its buildings and the spaces between?" Presentation at the 8th Conference on People and Physical Environment Research, Sydney, 30 September - 2nd October.
- Weisberg, T.W. (1993) *Creativity: Beyond the Myth of Genius*. New York: Freeman.
- Wilton-Ely, J. (1977) "The Rise of the Professional Architect in England." In Kostof, S. (ed.) *The Architect: Chapters in the History of the Profession*. New York: Oxford University Press, 180-208.

