Architectural Design - Engaging Technology

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Architecture design studio - engaging technology

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ABSTRACT

The practice of architecture is a complex undertaking drawing on knowledge of and skills in history, theory, environment, human behaviour, services, structure, materials, construction, communications, law, management and more. Professional accreditation requires that all architecture programs recognize and address this diversity of topics within their curricula although the order, emphasis and content detail may vary widely between programs. However this material is dealt with, it is in the design studio that, ideally, all will be manifest in the work students present.

Assuming a sound knowledge and understanding of architectural technologies are essential to the creation of successful architecture it is suggested that these are seldom sufficiently acknowledged in the design studio.

Based on survey data from University of New South Wales (UNSW) architecture graduands, the first part of the paper reviews factors perceive by students to be significant to their performance in the design studio. In particular it draws attention to the role of the tutor and a perceived lack of recognition given to architectural technologies.

In the context of the survey findings, the second part of the paper reflects on two specialist elective technology/design courses available to senior students. The projects are specifically designed to achieve a greater recognition of structural and construction issues in both the design outcome and course assessment.

PREAMBLE

Architectural design and the associated design studio is core to any architectural education program. It holds pride of place in the minds of both students and staff and is consistently the public face of the program. The nature of the design projects, how they operate and what they elect to recognise and emphasise sets the focus and identity of a program as a whole.

How the design process develops in class can, in perhaps subtle but nonetheless significant ways, be as much a product of the studio tutors' personal preferences and biases as of the written intent of the project brief.

This paper identifies and discusses some factors that form the perceptions students develop and take with them from their studio experiences.

CONTENTION AND ARGUMENT

The argument of this paper is built on the premise that a knowledge, understanding and application of architectural technology is essential and integral to any successful design process and outcome. And that this relationship needs to be fostered for students in their design studio experiences. It is my contention that the technologies of construction, structure, services and environmental considerations seldom achieve appropriate recognition in either the students' design project development or subsequent assessment. In support of this argument I draw on survey data collected from ten years of graduates and graduands of the architecture program at UNSW. The data identifies some of the student perceptions and issues in the design studio process and assessment that militate against student engagement with architectural technologies.

STRUCTURE

The paper is framed as two discussions. The first identifies and reviews student perceptions of the studio experiences that colour; in particular, what is seen to be valued by staff in the assessment process. The second, with reference to specific case studies, suggests ways in which aspects of architectural technologies, in particular construction and structure can be incorporated and valued in studio projects and their assessment.

1. DISCUSSON 1: STUDIO PERCEPTIONS

Commencing in 1995 a colleague from the university counselling service and I undertook a survey of recent graduates and graduands from 1989/90 to 1996. The study was prompted by two events: the initial round of Course Experience Questionnaire [CEQ] data that showed our architecture program and other design based degrees rating poorly; and concerns about students presenting to the counselling service following their design jury experiences. The survey was subsequently continued with a further four cohorts of graduands [see table 1] (Murray 2002).

Graduation group	Session x Year	Number class total	RCEQ issued	returns on issue	% return on issue
Cohort A	1990	105	105	16	15.2%
Cohort B	1993	74	74	20	27.0%
Cohort C	2/95	59	59	17	28.8%
Cohort D	1/96	57	57	38	66.7%
Cohort E	2/96	46	46	36	78.3%
Cohort F	1/97	52	39	27	69.2%
Cohort G	1/98	51	44	22	50%
Cohort H	2/99	57	47	26	55.3%
Cohort I	2/00	51	51	46	90.2%
TOTALS		552	522	248	47.5%

Table 1: RCEQ survey numbers

The survey questionnaire, known as the Review of Course Experience Questionnaire [RCEQ] was in part designed to elicit students' views of their study experiences, course content, and transition to work. For this paper I draw on responses to questions related to performance in the design studio.

A. The Design Studio

In the context of the design studio, questions addressed two themes considered likely to influence student perceptions of design performance: the significance of personal and interpersonal behaviours [see table 2] (Murray 2002); and characteristics of the material presentation at the jury assessment [see table 3] (Murray 2002).

Issue	% agree
Getting along with your tutor during the session	80
Being able to argue the case for your design	47
Saying as little as possible in the 'jury'	20
Appearing to be confident in presenting to the 'jury'	83

Table 2: Student perception of criteria necessary to successful Design 'Jury' performance

Issue	importance given % agree	importance should be given % agree
Oral presentation	53	61
Visual presentation	79	70
Meeting tutors expectations	62	36
Quality of the design proposal	72	92
Conforms to design brief	40	76
'Buildability' of the design proposal	34	78

Table 3: Student perception of importance given to design assessment criteria

Neither set of results is particularly surprising but nonetheless presents a disturbing view of the assessment process or at least of how it is experienced and perceived by students. 'Image' is seen as highly significant both in the *'visual presentation'* and *'appearing to be confident in presenting to the 'jury''*. In marked contrast, the more pragmatic measures of *'conforming to the brief'*, *''buildability' of the design proposal'* and *'being able to argue the case for your design'* are perceived as being of little importance to the assessors.

In the context of my argument these results give little encouragement to those looking to have the technologies of a design solution recognised or developed in the design studio. Equally, where students hold these perceptions they have little incentive to value the technologies of building, at least in the pursuit of marks. It is encouraging, if a little ironic, that the students believe these pragmatic measures should be given a significant weighting [Table 3].

It is not that presentation and image are unimportant but suggests that the studio culture that would develop around a program that matched the students' perceived desirable assessment criteria weightings would be very different to many we currently see.

B. Academe and practice – perceptions of technologies

A study of architectural practice undertaken by Cowdroy [1990] found that the subject area recent graduates learnt most about in their first six months of practice was construction. As summarised in Table 4 (Murray 2002) results from our surveys reaffirm and expand on this finding.

Issue x % of students agreeing	Key subject area								
	communications	construction	design	*environment	history	practice	structures	theory	AVERAGE
had difficulty coping with subject area	26	34	45	21	23	26	40	40	32
subject area perceived as important	92	95	97	87	75	81	86	83	87
subject area perceived as needing greater course weighting	47	72	58	40	27	44	44	30	45
had adequate subject knowledge for practice	74	42	86	65	63	44	52	71	62
subject area learnt most about in first months in practice	61	87	42	37	9	88	53	11	49

* for the UNSW architecture program over the survey period 'environment' included solar, thermal, lighting, acoustics and services

Table 4: Student agreement with course issue by key subject area

C. Comment

Students fully recognise the importance of design, interestingly feeling confident about their design abilities as they enter practice. While ranking construction of near equal importance to design within their studies the situation as they enter practice is very different, a significant number seeing themselves as ill equipped.

Much of the challenge and excitement of architectural design lies in the multiplicity of potentially successful, credible design solutions open to the designer. Equally, design is an activity fraught with uncertainty, particularly for those just commencing their studies leaving the student open to exploring new ideas but vulnerable to the persuasions of others. Schon [1987] nicely defined the process of learning to design as akin to suspending ones disbelief and launching oneself off a cliff over a giant swamp in search of something that you may well not recognise when you see it.

As the students have indicated, how well you get along with your design tutor is perceived as a significant influence in the determination of their design performance and assessment. Not necessarily a negative relationship, but it identifies the studio tutor as potentially highly influential in the development of a student's design values and approach. However tightly a studio project brief may be written and its studio progress monitored, each tutor will inevitably and appropriately stamp the design outcomes with something of their own character. Not of itself a problem but it emphasises the need to appoint tutors known to be sympathetic to the particular educational goals and focus of the studio program.

Underlying student perceptions of the adequacy or otherwise of their knowledge, and whether or not greater emphasis should be put on areas of apparent technology weakness in the curriculum, lies an inherent disjunction between the needs and reality of professional practice and that of a teaching environment. The university provides an environment well suited to the stimulation, exploration and testing of ideas, to examining the development and place of architecture in the broader world, to introducing the great diversity of knowledge, ideas and material that determines and impacts upon the making of architecture. It is not a good environment for simulating the pragmatic realities of building procurement, of engendering the imperative to make material, structural and construction decisions that are viable. In these areas the perceived and actual gap between academe and the profession is an inevitable reality.

So what can be achieved within the university? What should we be aiming to have our students take with them into their professional lives in the various areas of architectural technology? In the terms of my initial contention it is essential that studio projects and staff overtly recognise the importance of including architectural technologies as an integral part of the design process, and that this recognition is clearly evident in the assessment processes.

The following section discusses courses a colleague and I offer for design projects explicitly challenging students to develop and resolve the structure and construction of their design proposals.

2. DISCUSSON 2: TECHNOLOGIES IN STUDIO

As suggested, the university is generally unable to create the same imperative to resolve the technologies of a design as exists in practice. Technologies taught in isolation as discrete topics detached from the design process are of little value or relevance, an approach more suited to trade training. Successfully integrated with the design studio they can kindle the student's interest and enthusiasm.

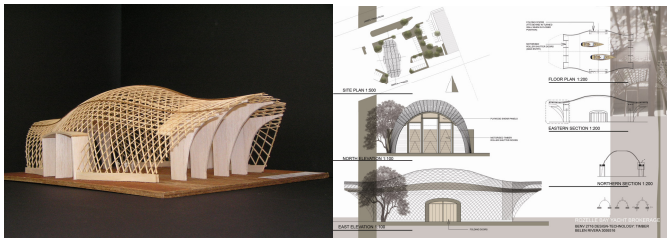
I deliver our 1st year construction courses and for four years set and coordinated a 2nd year design studio program. The design studio project briefs set material and construction/structural system requirements aligned with material in the associated technologies courses. The success of this integration varied but too often was overwhelmed by the challenge of resolving issues of plan and 3D form. Contributing to this problem was the perceived complexity of the project's accommodation brief and the seeming predisposition students have, at least in the early years of the program, to ignore the straightforward and the operationally measurable characteristics of a design problem. This latter issue is also evident in the case study projects and raises questions as to how best to sequence design/technology learning through the program.

A. *Case Studies*

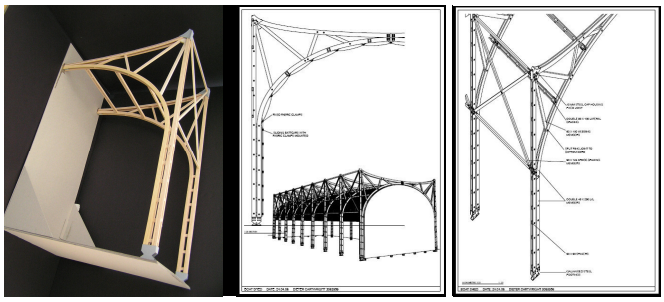
Working with a structural engineer colleague we have in the past six years offered two specialist courses specifically designed to identify and integrate structure and construction with the design process,. Both are elective courses available to 4th and 5th year students, one delivered as a technology course the other as a regular design studio program.

CASE STUDY 1: *"TECHNOLOGY SHED"*

With structural and construction interests as its driver the projects for this course are set with very simple accommodation briefs on simple, uncontroversial sites. Essentially the brief calls for the design of a beautifully crafted large timber shed. The program requires students to undertake a series of group research studies on aspects of timber as a material resource in addition to developing their individual designs. It also requires the extensive use of models and sets quite specific technical documentation requirements.



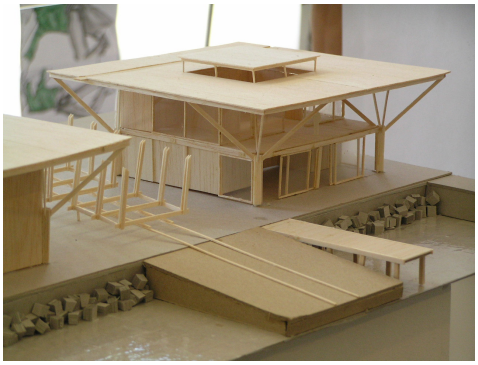
Project by Belen Rivera [2006] A fine grid shell structure effectively integrated with the frame structures of major openings.



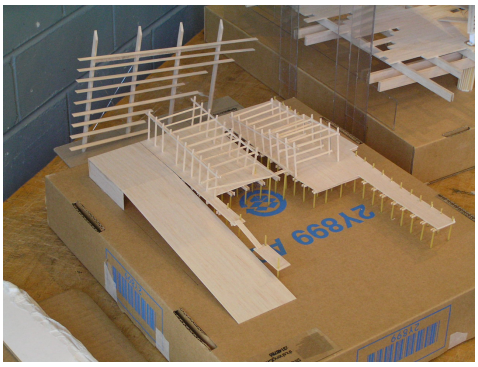
Project by Deiter Cartwright [2006]. A beautifully resolved 3 pin exo-structure with suspended membrane roof.

CASE STUDY 2: *"DESIGN SHED"*

A relationship with the Gifu College of Forest Science and Culture in Japan is the catalyst for this elective design program now entering its third iteration. By confining the major building material to timber there is, as in the previous case, an expectation that the students will take the resolution of their structure and construction to levels beyond that expected in most design studio projects. It also allows us to engage the students in researching the use and selection of appropriate timbers, their sourcing and matters of resource sustainability.



Project by Clancy Mears [2006]. An elegant simplicity of design, construction detail and structure built on a square module.



Project by S.S.Cheng [2006]. A well articulated integration of portal frames and highly effective external timber screen units.

B. *Observations*

There is a steady enrolment in these elective courses, an outcome consistent with the perceived importance and need for design construction opportunities in their studies recorded in the survey results.

Students choosing to enrol in these courses readily propose and consistently work through the design and resolution of innovative and challenging technological proposals. In some cases it is inexperience that 'allows' the more challenging proposals to emerge but this is more than off set by the students' sheer persistence in looking for credible outcomes.

The students present us with significant challenges in trying to encourage their creativity while 'inventing' with them technical solutions that achieve a credible level of 'buildability' for their proposals.

The students' projects successfully capture and demonstrate the powerful nexus between design form and character and the associated structural and construction systems they have selected.

3. IN CONCLUSION

The courses I have outlined clearly indicate that students are capable of and willing to engage in projects that require significant levels of technical resolution, and that architectural technologies can be successfully

integrated and acknowledged within the studio design process.

For those students taking these courses it is our hope that they take a greater sense of technical confidence with them into practice.

A. Design/Technology integration

Reflecting on our experiences the following appear relevant to establishing an effective integration of the technologies of structures and construction with the broader design agenda:

- it is made clear to the students from the outset that the technical resolution of their design proposals forms a significant component of their final assessment;
- courses be developed and delivered by staff with a clear overt interest in aspects of architectural technologies; and
- that the design brief be written in such a way as to limit and clearly focus the major variables to be addressed.

B. Studio content and sequence

The significance of writing the design brief to limit and focus the project became clear in the initial 'design shed' project where, with a slightly broader brief, quite disproportionate amounts of time were spent worrying about relatively simple planning and site relationship decisions. We did not expect this with senior students but it raises broader questions for the design curriculum as to what aspects of design are to be addressed, with what emphasis, and in what sequence.

C. Staffing levels

Both courses discussed are staff intensive activities for the program, difficult to justify in this time of reduced funding and worsening staff student ratios. Each student has the opportunity to discuss their project, at length, on a weekly basis. It is a moot point as to whether this should be seen as generous or simply as what is realistically required to deliver an effective design education.

D. Questions of the educational agenda

More generally for architectural education lies the question of how much architectural technology should be incorporated and expected of a program, and where the responsibility for its learning rests. Do we seek to retain a generalist curriculum of the all purpose architect or move to specialist programs? Do we stream our senior students into being designers or technicians according to their apparent aptitudes? Do we acknowledge architectural technician as a discrete profession? What is the evolving role of the architect and the consequent educational curriculum?

ACKNOWLEDGEMENTS

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