

BACK TO THE FUTURE: THE NEXT 50 YEARS

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MARC AUREL SCHNABEL (Ed.)



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Between Architecture and Construction

A Site of Integrated Learning

Kerry Francis

Unitec Institute of Technology, Auckland, New Zealand

kfrancis@unitec.ac.nz

Abstract: In 1994 the School of Architecture and Construction at Unitec Institute of Technology received its first intake for a new Bachelor of Architecture programme. The co-location of this architecture degree within a school that contained construction programmes (Bachelors of Building and Quantity Surveying) was seen to be of collaborative benefit. However, within three years, this new theoretically beneficial formulation had split. Contemporaneously, the University of Newcastle, Australia had adopted a one hundred per cent Problem Based Learning (PBL) model to facilitate stronger relationships for learning with the local profession and construction industry that ran for 10 years. Recently Unitec MARCP students engaged in an integrated design and technology studio project for a comparatively short period of six weeks. In a contemporary education world where collaboration and cross-disciplinarity are the language of currency this examination of the processes of growth and decay in these three events at Unitec and Newcastle provide insights into the potentials and pitfalls of such constructions. This paper will discuss upon these events to draw out issues that might illuminate future attempts to develop integrated learning practices for architecture and construction.

Keywords: Pedagogy; integration; design; technology.

1. Introduction

The work of the best pupils leaving the school shows patently, and every day that the school's construction course fails to meet the needs of our time. (Saint, 2007,435)

It is a quote that I use every year in my introductory lecture to first year architecture students in technology. That this is a quote from a series of polemical articles on architectural education by Eugene Viollet-le-Duc and Louis Vitet from Paris 1862 demonstrates that the tension between employer expectations and graduate construction knowledge has persisted for some time. Viollet and Vitet continue;

Both the idealism and the instability persistent in architectural education feed off obscurities attending the subjects aims and the public utility of its practitioners. With engineers there is less uncertainty. They are thoroughly trained because they are found useful. (2007, 435)

The distinction, these statements identify, is founded on the oppositions of obscurity and clarity and the subsequent conclusion that the discipline with clarity is, ipso facto, the most useful. The last sentence of the quote seems awkwardly constructed and might almost be construed as; they are found useful because they are thoroughly trained. That construction points to a paradigmatic difference between of methods for learning for and about these different fields where construction knowledge is seen to be gained from training and design knowledge from some other obscurity.

These tensions, as I have noted, have been with us for some time. They are a manifestation of differing perceptions and expectations in the fields of design and construction. It is into the space of these tensions that this paper will delve. It will examine events at the Unitec Institute of Technology, Auckland, Aotearoa, NZ and the University of Newcastle, New South Wales, Australia that demonstrate different pedagogical responses to this tension. This examination will attempt to draw out some principles for a sustainable model that integrates design and construction learning into a holistic view of architectural production. How, in the future, might we design constructive relationships within learning processes that might be models for conduct outside of the place of formal learning?

2. Unitec

In 1994 the School of Architecture and Construction at Unitec Institute of Technology in the Auckland suburb of Mount Albert received its first intake for the Bachelor of Architecture programme. This new programme had been developed by a cohort of staff who had originally taught in the architectural technicians course, the New Zealand Certificate of Architectural Drafting (NZCAD). The Education Amendment Act 1989 opened the way for Polytechnics to offer degree programmes and Carrington Polytechnic (as Unitec was then known) began development of a suite of programmes designed to position it as the premier place of integrated learning for design and construction practice. The Bachelors of Building and Quantity Surveying were started in 1992 followed by the Bachelor of Architecture in 1994. The co-location of this architecture degree within a school that contained construction programmes was seen to be of collaborative benefit. However, within three years this new, theoretically beneficial formulation had split and architecture and construction had reverted to predominantly separate programme structures located at opposite ends of the campus.

There are several strands that might inform this split. In a contemporary world the differences (and one might also mean divisions) between design and construction are embedded in conventional contractual arrangements. They are also deeply embedded in personal attitudes of the disciplines towards their other disciplinary collaborators and counterparts. One experienced construction educator remarked that it often takes only a summer holiday job to inculcate these attitudes. (Birchmore, 2002) The contractual and personal are interwoven and mutually reinforcing. The history of the split at Unitec is illustrative of these tensions and might serve as an object lesson on how not to conduct business and so provide useful insights for the future.

The Bachelor programme in Architecture began in 1994. It was developed under the leadership an architect and educator who subscribed to an idea that buildings were produced by groups of people with contributing skills and abilities. In the original proposal for the new architecture programme this was described as a “building team” approach and a

...reaffirmation of an approach to design that is both broad (technical, practical, spatial, contextual etc) and long (from problem setting to post occupancy evaluation and beyond. (Matthew, 1991).

This lead programme developer was supported by staff members from the then Department of Architecture and Construction comprising architects, draughts-persons, engineers, quantity surveyors and building construction managers. The Department was headed by an architect who was also a member of Commonwealth and NZ Institutes of Building. He was recognized across both fields - design and construction. In 1994 Carrington Polytechnic became Unitec Institute of Technology and with that new name came a new Faculty of Architecture and Design headed by this architect as Dean. The faculty moved into new premises at the north end of the campus and into the two-storey, brick building designed for the Whau Lunatic Asylum and originally opened in 1867.

Once Carrington had approval for the degree programme from NZQA in late 1993 a permanent Head of School was appointed. The new Head of School was a Scot who had spent 5 years at Victoria University in Wellington and the last six years in charge of the technology stream in the School of Architecture at the University of Western Australia (Miller, 1994, 79) Anecdotal evidence suggests that this new appointment was not the ideal or even preferred candidate. He was seen by the construction faction as having little local construction knowledge and viewed with suspicion by the architecture faction because of his construction experience. As a result, he was undermined and marginalized by both groups leaving him no choice but to resign before the year was out.

A Quantity Surveyor was the Programme Director for the other two Bachelor programmes [Building and Quantity Surveying] under the School of Architecture and Construction umbrella. When the Head of School resigned the Quantity Surveyor took over as acting Head of the Architecture Programme. This heightened the tensions. In the view of the architecture staff, his attitude towards architecture reflected his profession's instrumentalist views. The prospect of his appointment having permanency galvanized the architecture staff. They discussed and collated their views in a staff briefing document in July 1995 and arranged an after-work meeting with two senior members of the Advisory Panel set up to help develop and later support the degree. Shortly after that meeting these two senior architects visited the Dean of the Faculty of Architecture and Design to convey the staff views. The Dean, also a pragmatist, made the decision to split the School into Architecture and Construction.

The separation was difficult and painful. One former staff member when asked for an interview for this paper, refused stating "it still hurts". The lead programme developer elected to go with the "new" Construction programme. He believed that he had conducted an inclusive and exhaustive consultation process in the development of the bachelor programme with processes for regular review. He was frustrated by the separatist disciplinary manoeuvring that had, without inclusive consultation, dismantled the integrating trajectory of the original idea/configuration. But it happened and what is more important to us now; is why?

We can identify certain belief systems that are held by architects and the other major disciplines (engineers, quantity surveyors and construction managers) in the field of design and construction. They are largely related to chronology or sequencing of processes and have implications in contractual arrangements as discussed earlier. Out of this conventional separation in sequence comes a separation of skills. The argument is that because the skills are different we need specialist teachers and specialized programmes and the best way to impart the knowledge is to concentrate the students into their disciplinary groups to impart the deep knowledge required for each specific discipline. Critics might describe this as a silo. The 1994 Unitec model had proposed to co-educate architects, quantity surveyors and Construction managers with the intention of sharing some base knowledge and facilitating personal and professional mixing by getting them to 'rub shoulders'. (Wood, 2016)

While the initial physical separation was fast [construction returned to the other end of the campus shortly after the split was announced in late 1995] the curricular separation was still being debated in 2002 as a letter from a senior Construction staff member to the Head of the School of Architecture confirms. The Head of the School of Architecture, had called for a review of the combined courses and the Construction staff member was responding, articulating reasons for the Construction Department's desire to maintain these combined courses. He described the cross-disciplinary tension that he saw.

It usually takes the form that architects think the others don't have a creative bone in their body, no appreciation of design and only an interest in things that can be counted or making things simple. The counter criticism usually hangs around observations that architects aren't interested in the practical things like 'will it stand up, can it be built' or 'can it be afforded?'. (Birchmore 2002)

He goes on to add.

I believe one of the sources for this 'tension' which I'm not sure is creative is the lack of respect for the challenges that need to be faced by each of the team members. I think this lack of respect grows from ignorance of these challenges. (2002)

We seem to be getting in this correspondence an alliance of creativity with design and a denial of such with construction. It could also be characterized as a play(creativity)/work(construction) dichotomy. It is a dichotomy identified by Peggy Deamer in her recent book 'The Architect as Worker: Immaterial Labor, the Creative Class and the Politics of Design.' (2015) Deamer claims first, that as architects "we do not believe we do work. We fail to conceptualise our work as work" (2015,61) and secondly

"We have a pathetic notion of design that isolates it from work. Architects design, constructors build; we do art, they do work" (2015,61)

These positions parallel the sentiments articulated by the Construction staff member. In "Work" (her chapter in the book) Deamer discusses the group of artists that have conceptualised art as work.

Just as the tradition of art-as-labour suggests that architecture as a profession should consider 'labor value' the tradition that sees human work as inherently imaginative, creative and self-realising should be equally embraced by architects. Creativity in architecture rests not on an ever-expanding categorical inclusion of form making but rather on an imaginative approach to problem solving. (2015, 67).

Deamer is arguing that architects need to have a more inclusive view of the design and construction process, one that has respect for the contribution of all participants.

Architecture has always strongly defended its disciplinary boundaries. There is an argument that maintains that secure disciplinary identity is precisely what allows an architect [and here you could substitute Engineer, Quantity Surveyor, Construction Manager or any other discipline] to engage with confidence with other disciplines. If this is a valid argument, then the pedagogical questions that follow are; how do you construct a method of learning to act within this discipline while at the same time being a participant in the broader field of construction? How do you learn behaviours that are both exclusive and inclusive?

3. Problem Based Learning (PBL)

During the same period of development and implementation of the new Unitec Bachelor of Architecture programme there was a pedagogical movement termed Problem Based Learning (PBL) that was being introduced, trialled and developed in professional studies programs in North America, Europe and Australia. (de Graaff and Cowdroy, 1997) The most significant local example of PBL was at the School of Architecture, University of Newcastle, Australia where they ran a 100% integrated architecture program for about 10 years (1984-94), then a partially integrated program for another 6 or 7 years (History, theory and research methods were removed from the core integrated component).

The program was highly innovative and for motivated students, it was incredibly successful. The architectural profession loved it. (Ostwald, 2017)

De Graff and Cowdroy (1997, 168-169) identify some basic principles shared by most PBL versions:

Didactic principles

Students are responsible for their own learning

Cooperation rather than competition

Active acquisition of knowledge and skills

Professional orientation

Holistic orientation towards professional practice

Integration of knowledge from different domains

Integration of knowledge skills and attitudes

The Newcastle programme faltered for several reasons. Ostwald (2017) identifies them as; (i) cost factors (time and staffing) (ii) lack of compliance with university systems, (iii) lack of flexibility, (iv) some student retention problems. All, I suspect, are related and intrinsic to the formulation. The undefined nature of the PBL process means that curricular requirements, those requirements valued by the institution, are often hard to manage. The research nature of PBL identified in the didactic and professional principles noted above stretch and contract student and staff time in unexpected ways making time allocation complex and difficult to sustain. This in turn generates a planning instability that could be described as inflexibility. The student centered orientation requires staff to play a more facilitative role rather their traditional role as design master – a role they may not be good at or enjoy. The PBL model adopted at Newcastle came not from comment about the lack of construction knowledge of its graduates but, ironically, from a threat to become part of the much larger Engineering Faculty. However, in response, the local profession lobbied the university to retain the school and develop a new approach. The architecture programme then adapted the PBL model from the Medical School that had recently been established on the same campus.

4. Comparisons

Although the reconfiguration of the Newcastle programme was generated by different circumstances from the new Unitec degree they do share similarities in aims. Both were recipients of active local professional support. In the Unitec case it was because of a perceived lack of professional and constructional orientation in the adjacent Auckland University programme. For Newcastle the initial imperative was to maintain independence from a threatened merger with the Engineering faculty. The adoption of a pedagogical approach strongly aligned with local professional agenda was a perfect fit. For

both this outreach to the profession and the subsequent validation of the role of the profession in learning was important.

The significant difference appears to be in the make up of the student cohort. While the Unitec architecture programme was originally located within a School of Architecture and Construction and course and classes co-taught, the Newcastle programme was exclusively a single discipline (architecture) one. The thesis that core knowledge and the experience of architecture students rubbing shoulders with students from associated disciplines does not appear to have been part of the Newcastle agenda in the same way.

5. Integrating Design Studio and Technology: Utopia Waiouru

The Unitec architecture programme, at both undergraduate and post graduate levels has, for several years, been actively responding to the persistent calls by external examination bodies for integration of technology teaching/learning and design studio. (IRP, 2017) Traditionally, in Schools of Architecture, the Design Studio has been identified as the course in which the integration of all lecture subject material occurs. Empirically however, we know that the opposite is the case. In most programmes, this traditional structuring functions is a dis-integrating mechanism unless active agency is applied.

During the last two years a six -week design studio project in the first semester of the first year of the MARCP Design Studio has been aligned with the technology lecture course. The activating impetus for the integration, in this case, comes about because of shared interest and belief in the importance of construction knowledge for design by the two course leaders, both of whom are tenured staff members and Registered Architects.

The project aims were specifically directed towards construction technology as the driver. The generic Design Studio project needs to engage issues of programme, site, technology and theory. In this project technology, as structure and envelope, was prioritized. The necessary context (Programme, site and theory) had been generated by the initial six weeks of study that had involved analysis of a three utopian cities/settlements and the application of these learnings to the design of a contemporary utopian city for 75,000 refugees in Waiouru. Design development of programme and site was deliberately subordinated. Space planning and site planning were simply “taken” from the earlier project. Theory was carried over from the earlier section of the project (the first six weeks) in the form of the question; What is a utopian tectonic? Theory was supplemented by a series of readings that examined the performance of structure and envelope technology.

Other elements of project design were subject to an integrating approach. The Design Studio course for the six weeks of the project was co-written with the Technology lecturer. The majority of the presentation requirements were the same in each course with Design Studio requiring only some additional contextualizing material.

The integration of performance of the two courses took place at a number of levels:

1. The whole of the lecture course was attended last year by the Design Studio leader.
2. Selected lectures this year were attended by the Design Studio leader.
3. Site visits in the lecture course to a precast factory, a façade manufacturing factory and timber laminating factory were all attended by both course leaders.
4. A curated Trade Fair showcasing cladding/facade materials was attended by both course leaders.
5. The Technology course leader was a member of the interim and final review panels for Design Studio.

6. Both Course Leaders were participants in the post review marking and moderation processes for both courses.

And, there was an additional layer of technical support. A Structural Engineer was embedded in the studio. He attended every studio session and interim and final reviews. His opinion was seen to be valued. He was given the first response to a project in all reviews. His assessment mark was an identified component of the final grade.

Anecdotally, the outcomes have delighted students and staff. Students remark upon the presence of the engineer in the studio as being particularly valuable. A recent visit by the Interim Review Panel (IRP,2017) remarked upon the high quality of the work being done within the programme to maintain and extend the integrated teaching of design and construction technology.

6. Discussion

The three examples, described above, were all attempts to integrate a series of strands into a cohesive body of knowledge to enable a graduate to begin performing effectively as an architect. The original Unitec Bachelor of Architecture programme in 1994 was predicated upon the idea of the “building team” and sought to co-teach groups of students in design and construction. It foundered because the architecture staff felt that the course content required by co-teaching was a poor compromise for both architecture and construction. There was not enough design in the course for the architects and not enough construction for the construction students. (Birchmore, 2002) There were other contributing issues that have been anecdotally identified; the possibility that the head of the architecture programme could be a Quantity Surveyor and the experience of the enmity between architecture and construction being played out in the lecture theatre. There is also the argument that there were significant differences between academic cultures within the two areas that exacerbated the tensions.

The Newcastle programme configuration was generated by the threat of disciplinary subordination; the prospect that it might be subsumed under an Engineering Faculty. (de Graaff and Cowdroy, 1997). Like the establishment of the Unitec new programme, the Newcastle programme had originally also grown out of a technicians course at a Technical College. They both received strong support from the local profession. Whereas the Unitec model might be seen as internalized integration around the student cohort (students rubbing shoulders and sharing base knowledge) the Newcastle problem based model (PBL) could be seen as externalized around knowledge. The foci for integration were different. They both push stress during the performance of the course to different areas. The Newcastle model exerted temporal organizational pressures due to the fluid nature of the problem/research process. The Unitec model exerted pressure on the organisation/provision of content that satisfied both parties without compromise. This is obviously an oversimplification of the issues but I think it is useful as it highlights some issues that might be capable of re-design. The significant impression is that both models both placed enormous pressure on staffing. These new configurations required for their success; the role of the architectural educator as a facilitator rather than the master design tutor at Newcastle and for staff at Unitec the need to model the product of architect/constructor with equal respect for and appropriate knowledge of both fields.

The final example described, Utopia Waiouru, is of a different scale and took place within an existing programme with a conventional lecture/design studio dis-integration model. The important thing identified is that it required enormous effort beyond the normal institutional rationing of time to organize and perform. It required a consistency of purpose [to focus only on structure and envelope], project

design [to reinforce this with complementary timetabling, assessment/grading schedules and readings] and performance [complementary lecture content and consistent, focused studio discourse with students]. For a Design Studio project to have focus within the short time frames designated something has to give, to take back seat. To integrate lecture subject material, that which is discriminated against by its location elsewhere, requires affirmative action. To integrate requires that element, in this case technology, to be elevated to the same status as design. Design is applied to technology and technology is applied to design in equal measure. This has to be a focused act and other architectural design issues of programme and site must be marginalized. We must also face the pressure of conventional paradigms of technical training and creative design. To achieve this staff must be skilled at articulating the focus of this issue, generating an atmosphere of creative work and be equally able to critique its products. These are tall orders.

7. Conclusions

This is not a new insight. The first two stories happened thirty to forty years ago. They illustrate the need for a collective vision for success. Both of these configurations, Newcastle 1984-1994 and the new Unitec programme 1994-1996 required particular values to be shared and particular skills to be performed. They required what might be termed a culture. They existed for different periods of time but faltered and changed because the necessary components for sustained success, a shared vision and appropriate skills, evaporated. The Waiouru project can be seen as a success because the time frame was short and the staff involved had established a vision based on shared experience, shared values and mutual respect. They had established a culture to sustain that project – but they only had to do it for a short time. There are a number of conditions that need to come together for the effective and creative integration of design and construction. Maybe these conditions can occur only occasionally, they are like sunspots, brilliant explosions and by their nature short-lived. We must acknowledge these conditions and during the next fifty years organize our places of learning to provide capacity to encourage and provoke such explosions.

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