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Learning through Collaboration, an Industry/School of Architecture Partnership

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Abstract

In the academic year 2003/04 a collaborative industry/university project to design an exhibition stand was conducted between the Institute of Architecture at the University of Nottingham and Nottingham-based Canal Engineering. The project was incorporated into the educational curriculum through the Year 3 Design Studio course, as well as forming a 'design competition' judged by Canal Engineering. Four schemes were short listed from the competition entries, from which the winning scheme was selected, developed, fabricated, built and used at Interbuild 2004. The winning students were involved at all levels of the design development, fabrication and realisation. Using first hand student experiences this paper focuses on the learning opportunities brought about by collaboration and the influence upon the design studio environment, concluding on the positive effects the project introduced to both tutor/student relationships and the students' learning experience, and suggesting the case study as a possible model for others.

Keywords: Collaborative Design, Industrial Collaboration, Employer Engagement, Live Project; Group Work, Design Studio

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Background

> …the form and conduct of the typical design studio today encapsulates architecture schools' entrenched isolation. Once considered an exemplar of project teaching, the studio is increasingly distanced from the real world it is intended to simulate.
>
> (Abel, 2000, p.68)

Architectural learning at the first stage of an architect's seven-year education conventionally introduces the theories that influence the built environment while allowing students to acquire the necessary skills for building design and construction. Commonly amongst schools of architecture across the country this is largely based upon 'simulated' design project work within a design studio.

Within the context of increasing criticism of ARB/RIBA Part 1 graduates' preparation for their 'year-out' placements, this paper reflects on the learning experience through the introduction of a 'real' project (i.e. with a genuine client in a construction industry context) into the design studio; the use of industry collaboration as a learning opportunity and a means of closing a perceived gap between academia and practice.

Context

In the academic session 2003-04, a Nottingham-based steel and aluminium fabricator approached the School of the Built Environment and the University of Nottingham about possible design collaboration with the students of architecture. Their motivations were primarily in increasing their presence physically within the local area and economically within the architectural industry. Discussions eventually resulted in a design competition that was then introduced to third year undergraduates.

Aims

The project was devised to fulfil a range of objectives both for the Institute of Architecture as educators and for Canal Engineering as industrial partners. Educational aims included:

- To introduce a 'real' client to a design studio project, with 'real' briefs and objectives.
- To expose the students to technical information from industrial experts.
- To provide students with the experience of industry through a factory visit.
- To encourage the students to work within strict deadlines and submission criteria, as defined by the competition requirements.

- To encourage the students to work in groups, and subsequently analyse and draw on individual strengths and weaknesses.
- To involve the winning students in all aspects of design development, fabrication and assembly.
- To enable winning students to have a design project realised before embarking upon their Part 1 year in practice.

Implementation

Third year students were introduced to the project initially through a one-day programme aimed at establishing the project. The programme included presentation of the competition briefs and project objectives through direct consultation between the students and the official 'client', Canal Engineering. Early engagement between the client and designers allowed the students to perform the preliminary duties of the 'architect', to gather initial thoughts regarding their client's goals and the complexities of the project etc assisted by written briefs.

The project brief had clear objectives:

- To design, in groups of four people, either a roof top sculpture for the offices of Canal Engineering, or an exhibition stand to display Canal Engineering's products at the UK's building industry trade fair Interbuild 2004.
- To satisfy the client's brief in either competition and, especially, to seek to reflect the company's desires and aspirations in design.
- To consider the context of the designs and especially structural, technical and material aspects.
- To explore appropriate oral and graphic presentation skills so as to communicate the design to its maximum potential, within the competitive submission procedure.

Further interaction was provided by way of a site visit to Canal Engineering's Nottingham headquarters/factory and technical seminars on the nature of stainless steel and aluminium, thus providing an ideal opportunity for the students to experience the materials they were to design with.

The seminars began with a series of slides demonstrating the raw materials, the manufacturing process and then the resultant products; samples of which were passed around the students. The seminar concluded with further slides showing examples of realised fabricated designs. The seminar aimed to encourage technological consideration and to promote more viable student designs while maintaining a creative aspect.

Figure 1: Factory visit: students

The factory visit was conducted in small groups throughout the first day of the project; it allowed the students an important insight into their client's design aspirations as well as providing a direct exchange between students and a comprehensive technical knowledge base. Small group numbers provided greater staff/student ratios further assisting effective learning. Together with seminars the initial programme provided the students with technical support as well as a sense of enthusiasm for the project.

Following the initial establishment of the project all 140 students in groups of four, over the two-week project, developed and finalised their design response to the client's brief while exploring the structural and technical aspects aided by two design tutorials. The normal Year 3 teaching support of five full-time academic tutors plus ten part-time practicing architects led these. The students were then required to present their designs (to a standard competition format) at the end of the two-week period where each group received a 30-minute critique review by both tutors and Canal Engineering.

Educational assessment was through the critique, while Canal Engineering were involved in an independent appraisal to determine short-listed schemes. Internal tutors were not involved in this short-listing session, so as not to influence unduly. All the students were informed of their grades through usual educational practices while the client short-listed four designs from each competition category for further discussion.

This dual assessment was interesting, since there was the potential for the educational team and the 'client', Canal Engineering, to come to widely different conclusions, since each party was perhaps looking for differing values (high creativity from the educators' perspective, perhaps more buildability from the clients' perspective). As it happened, there was very close commonality between the two parties' assessment; certainly all the schemes short-listed by Canal Engineering were the high-scoring projects

educationally. This is perhaps not surprising given that the objectives of the brief emphasised both creativity and buildability – the best student designs exhibited both and were thus rewarded by both separate assessment bodies.

Two winning schemes were later selected to be developed, fabricated and built[1], Canal Engineering providing £1000 student prize money and an additional £30,000 for the manpower and materials involved in fabrication.

Student Response

> …students adapt to the requirements they perceive teachers expect of them. They usually try to please their lecturers. They do what they think will bring rewards in the systems they work in. All learners, in all educational systems and at all levels, tend to act in the same way.
>
> (Ramsden, 2003, p.62)

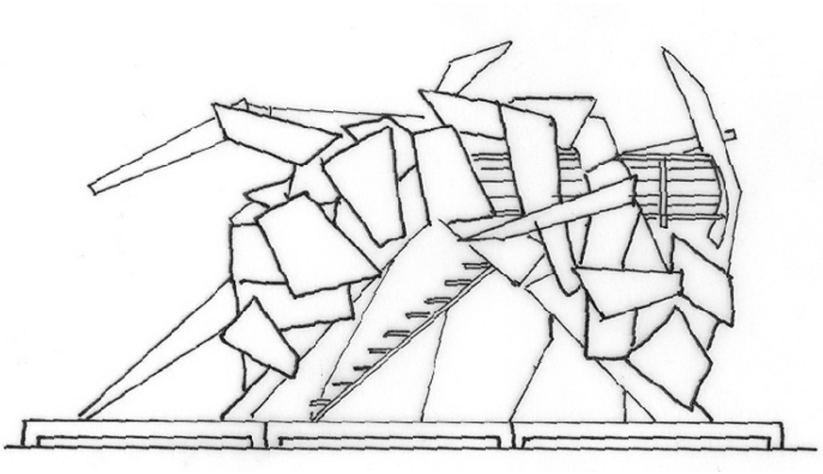

Figure 2: Winning exhibition stand design: "The Gauntlet", sketch

In creative subjects such as Architecture there is a primary educational objective to foster design creativity, skills and knowledge amongst students while considering the core issues such as theoretical intent, technology and the environment, and latterly practical and professional issues. The architecture curriculum is primarily taught and assessed through design studio and at the end of the course a design portfolio showcasing the student's creative responses to different design problems ultimately demonstrates this.

With a typical architectural educational programme there is particular emphasis and perhaps greater value placed by tutors upon the creative process itself over the end

[1] To date, only the Exhibition Stand design has been realised. Canal Engineering also plan to fabricate and build the winning rooftop sculpture scheme, but have been too busy in the past three years – partly as a result of the increase in business following the success of the exhibition stand – to yet do so.

product and upon the students' education and skills base rather than the qualification. However, whilst it can be debated amongst academics and architectural employers as to whether or not this is true in an undergraduate architectural student's eyes, it is still degree classification that will typically influence their prospective opportunities and therefore be given the greatest priority.

A student's primary motivation is fundamentally influenced by the academic reward for completion of a task. With typical design studio projects the amount of importance placed on the task by the student is relative to the amount of educational value it contains i.e. how much it contributes towards the students' overall grade. A project that carries a large weighting can however restrict students' creative freedom as they seek to 'tick the boxes' or even directly appeal to tutors' preferences.

> "A lot of project briefs can feel like an accommodation schedule; a list of objectives you need to tick. Because the project was for a real client the brief felt a lot less constrained, more open to what we wanted to do. Throughout the project we were always focussed on producing something that would appeal to Canal (Engineering), there was never a debate as to what our tutors wanted."
>
> (Student Participant)

A 'real-world' project can be an effective tool in challenging this attitude of 'grade chasing'; a real brief such as this doesn't have an educational checklist to such an extent. Firstly the aspirations of the company were given to the students as the primary objectives for them to respond to, with the educational objectives outlined last of all. A greater emphasis was also placed upon the commercial viability of the design process. As a result the students had a much more relaxed attitude regarding the academic assessment and concentrated more on their design responses. The students perceived a greater reward in achieving a desirable design solution as a means of winning the competition over the academic value (i.e. grades) and so the attention shifted from academia towards the commercial partner. With this shift students no longer saw appealing to a tutors' preferences deserving of their greatest efforts, they sought to appeal to their client's aspirations instead; the very objective initially outlined by the project.

> "Success of the project was largely decided by Canal Engineering, as a result the nature of tutorials changed from critiques to consultations. There was no real way of gauging success from a tutor's reaction in tutorials as they had no way of knowing which schemes would be favoured by the client. This encouraged us to make self-critical design decisions from instinct and experience rather than perceived tutor requirements."
>
> (Student Participant)

With this shift the nature of tutorials also changed dramatically. Tutorials are traditionally seen as a time to gather advice, opinions and ideas but also a time to gauge the responses and preferences of those who are eventually to measure and grade a student's success. Although partly still the case the students on this project became much more focused on the client and less reliant upon tutors' opinions. As Canal Engineering were not involved in design tutorials the students were denied a classic project avenue i.e. the opportunity to measure their design decisions directly during the design process. As a result the students had to be more confident of their own ideas. Tutorials became consultations and more relaxed and subsequently students had less of a 'them and us' attitude resulting in a much more responsive relationship between the tutors and the students that proved to be a very useful basis for the continuing academic year.

Often in the earlier years of a student's architectural education a student's confidence in their own design choices is typically limited as they seek to bow to the greater experience and knowledge of their teachers, as per their experience of education from school. As their own experiences and knowledge develop and inform their design decisions their original perception of a tutor's opinion as 'fact' or as instructions shifts towards that of educated advice and support. This often provides students with a confidence to question and challenge their peers. The altered nature of the tutorials generated a relationship between teacher and learner more typical of those between tutors and students further along the architectural education path whereby tutorials were seen much more as informal discussions.

As the project unfolded with the students increasingly focussed upon their design responses the atmosphere of the studio and the nature of tutorials changed. Interesting relationships between teams were formed; the relationship between students competing for the same competition element contrasted to those competing for the alternative i.e. exhibition stand or rooftop sculpture. Teams in direct competition divorced themselves from each other across the studio while promoting mutual support and open exchanges between themselves and teams participating in the alternative design category. By entering a real design competition the students were exposed to the real pressures that often face a design team. The teams were required to work as units where they assigned themselves different roles often according to skills and experiences while the time constraint forced the students to keep to a tight schedule. This helped to lay important foundations for the student's 'year-out' studies.

After the completion of the design competition and the winning scheme chosen, the design for the exhibition stand was put into development for the upcoming Interbuild trade fair. The students were invited routinely to the factory to observe developments, and subsequently to Interbuild 2004 to see the realised stand.

> "To see your designs develop through detailed design and fabrication into a realised scheme provides an impressive feeling; to experience the design

process from the initial conception right through to practical completion was very useful and extremely satisfying. I felt much more confident in my abilities as a result of our success; the independent recognition was a great confidence booster."

(Student Participant)

Enabling the students to experience their realised design first hand provided not only a unique learning opportunity but also a significant reward for their success, creating a sense of pride amongst the winning participants thus providing a useful source of motivation for what is a demanding final year.

From a tutor perspective, it was very rewarding to see this motivation evolve. The tutor's thoughts on the project echo those of the students – that the tutorial process was a much more relaxed, less 'us and them' affair and that the whole project took on an energy that was perhaps greater than that deserved through its contribution to the curriculum grading structure. Each group clearly wanted to win the competition, and see their design built, and thus the level of personal engagement in the project from each student could hardly have been higher. The consequential increased learning – e.g. the need for, and techniques of, rapid experimentation – flowed from this high level of engagement. For the winning students both the rewards and consequential learning was extended, as they moved forward with the project to see it fabricated, built and used.

Figure 3: Design development meeting, industrial partner and students

Evaluation

There are a number of considerations required for anyone considering conducting a similar industry/university collaboration as part of an architectural education curriculum. The primary barrier is of course finding an industrial partner with the necessary vision, motivation and resources to participate. It is important that flexibility on the part of the university be maintained so as to maximise potential clients. It is logical to shape a project around a client's objectives rather than to match a client to suitable project.

The timescale of the project is also an important consideration; fitting a project into the academic calendar can be difficult, especially when the client's brief contains many real deadlines. This may also influence student numbers and educational level i.e. target student year of study.

The substantial degree of investment made by Canal Engineering both financially and with their time meant that a substantial level of creativity, skill and experience was expected by them from the students and University. As a result, choosing the concluding year of the course as the vehicle for the exercise was most acceptable to both parties; however it was very important to consider the timescale of the project within the context of the students' final year. The requirement for two substantial projects within the academic year meant that a short timescale at the beginning of the year was preferable, fortunately this fitted in well with the time constraints afforded by Canal Engineering i.e. the subsequent detailed design stages and importantly fabrication and construction in time for the dates of the trade fair.

It is important to consider the target level of study sufficient for a project such as this and for the commercial partner; where foundation years may allow for increased freedom and manageability regarding academic timetables etc, they may not offer the level of experience deserved by the 'client'. Alternatively where a final or penultimate year may yield greater design quality it may not be possible to coordinate such a project within an often very complex structure, especially if the project is likely to require a sizeable portion of time. The realisation time required for the Canal Engineering project was carried out beyond the allocated time of the original project but allowed the winning students to experience the process in the form of regular site visits, mostly extra curricular in nature. Although not compulsory the students constantly attended, owing largely to the fact that their designs were to be realised; a significant pull and an important issue to consider.

Throughout the project and beyond, the potential of physical realisation of the winning scheme was the principle pull factor in students actively participating and engaging with the project. The intention to build the winning scheme thus became a vital aspect in the success of the project educationally. This allure of a physical result was an irresistible attraction and prompted a high level of interaction; for the chosen students it allowed them to realise their visions and provided them with a high sense of achievement. The power of this proved exceptionally useful in encouraging further,

extra-curricular participation from the winning students although upon reflection reliance upon student enthusiasm for continued interest was perhaps unfair. Further support from the university could have been utilised to further encourage continued participation, and from the larger group as a whole e.g. the fabrication, erection and use of the structure could have been used as an exercise in construction and possibly management and practice for the larger student group.

The benefits to the working environment and to the students' learning experience demonstrated through this project are significant. The design competition achieved a range of learning objectives creating an engaging, competitive and realistic working environment while focussing the students' attention towards the design response; teaching them to rely upon their own knowledge and experience rather than measuring tutors' responses.

After the completion of the design competition, the exhibition stand was put into development for Interbuild 2004. It is this part of the project that could perhaps have been run more thoroughly so as to contribute to the students' learning experience. The plan was that the winning students would develop the scheme alongside Canal Engineering so as to further enhance the winning students' learning experience by taking them through the detailed design and fabrication stages. Due to the pressures of the ongoing academic year and the involvement of only four students now, rather than the whole year, the university involvement lessened and it was left to the winning students to communicate directly with the client. Although this allowed the students to work meetings easily into their busy timetables, they only attended typically two or three meetings, with Canal Engineering effectively taking control of the continuing development.

Figure 4: Fabricating the stand in the factory

On reflection then, there was thus perhaps a missed opportunity for the students to continue in a limited 'Architects' role, taking an advisory position to help further communicate their vision and concept. The benefits would have been mutual; the students would have benefited from having a greater involvement in the detailed design process while the client would have benefited from continuing creative input.

Although the introduction of this project into the design curriculum was valuable as a learning experience, potentially the collaboration could have evolved into further beneficial educational activities e.g. demonstrating the architect/client relationship as part of a practice and management course through lectures or role-play, etc.

Evidence of the project's success included then RIBA President George Ferguson describing the exhibition stand as "…far and away the most striking commercial stand at Interbuild… I would like to see it as exemplar to other companies and schools…". The project also won in November 2004 an RIBA East Midlands 'Special Category' Design Award significantly enriching the winning students' curriculum vitae and the profiles of both the university and client.

Figure 5: Completed exhibition stand at Interbuild 2004

Conclusion

Projects such as this help to form individual links between industry and educational institutions such as schools of architecture where both parties involved benefit from the technical knowledge, facilities and skills of the other, with both parties working towards a collective target with shared and individual incentives i.e. commercial success through the development of a new product for the trade partner and academic praise for the school of architecture, with both parties receiving reciprocal and marketable sponsorship.

Architectural education at any level is a process of disseminating knowledge and cultivating creative individuals utilising people with direct experience. In this collaborative project, learning from commercial industry-based specialists helped prepare the students for their work placement and professional practice while working with a real client brings realism to the studio and offers a foresight into the commercial world. When students work with real clients they interpret the brief as a range of aspirations to respond to rather than perceiving the brief as a checklist of educational requirements, which often occurs. The students begin to think about the creative design process and a little more 'outside the box' while the winning students see their design resolved to a high level of detail not usually achieved through typical studio projects i.e. through taking the project to final completion. There is, of course, a danger that the real client for a project such as this could be so prescriptive that one set of barriers to increased student learning are simply replaced by another, but that was clearly not the case here. The point needs to be made however that the nature of both the client and the project in relation to the school and its students is key to the success of the project from all sides.

The project between Canal Engineering and the University of Nottingham stands as a new model for achievement through shared ventures - helping to prepare students for their future career and helping to close the perceived gap between academia and professional practice, through collaboration on something real.

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