

2011-01-01

To Dallas and Back - The Oaklin Design Build experience

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To Dallas and Back

The Oaklin Design Build experience



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ISBN 1 9000454 47 5

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Edited by Lloyd Scott

Typeset by Simon Harrington

Printed in Ireland



Brendan Towey, Peter Whoriskey and Simon Harrington at Atlanta Airport

Preface

The skills associated with realising the construction of a building have become increasingly complex as new technologies, tools and methodologies emerge which contribute to an enhanced quality in both the design and construction processes.

In order to gain the maximum benefit from the developments taking place in thinking processes, technologies and products, it is more important than ever that the advantages that can be gained from teamwork become a natural consequence of Practice. This applies in particular to the educational processes that students experience in preparing for their professional careers in the construction industry.

Synergies which can be formed between various groups of students at undergraduate level is the best possible educational tool to prepare these future young professionals for the working relationships that will occur in their future working lives.

Competitions therefore that have been specifically designed to foster and encourage cross-disciplinary teamwork at undergraduate level are to be welcomed and commended. These types of competitions create scenarios where cross disciplinary teamwork will be experienced and learnt. In contest with their peers the realisation of the value of well-performing and well-integrated teams will be all the more quickly understood and appreciated.

The working relationships that have developed in the ASC Competition between students of architecture bringing their design skills, students of architectural technology bringing their technological skills and students of construction management bringing their management skills, demonstrate this value and lays the foundation for their future professional activities.

To have merely participated in this type of event would have in itself, more than compensated for the time and effort spent in travelling to Oklahoma to compete. To have gained the experience of the teamwork necessary to perform at this level and to observe how other teams from other places and other cultures behave, added additional layers to the educational process that would be difficult to simulate at home.

But on top of all of this, to have won the competition outright provides an extraordinary sense of pride and achievement. It also confirms the knowledge that the education these students have been receiving in their respective disciplines within the Dublin Institute of Technology and Oklahoma University has been both appropriate and effective, and has set these students firmly on a path towards a successful professional future.

Prof. James F Horan
Dip. Arch FRIAI RIBA MIDI ARB

Acknowledgments

This publication provides a record of the educational journey of the 2011 OU DIT International Design Build team who competed in the Associated Schools of Construction Region 5 competition between 12th and 14th April 2011 in Norman, Oklahoma and Dallas, Texas. It would not have been possible without the support and encouragement of so many people, too numerous to mention. The brain child of Lloyd Scott and Kenneth Robson it would not have been possible without their efforts.

Thanks are due to the support and direction of the two Heads of School, Professor James Horan and Dr. Louis Gunnigan. To those colleagues in the College of Architecture at Oklahoma University and the College of Built Environment and Engineering at DIT who offered their support, a special thank you. To the families of all team members whose support and good wishes was greatly appreciated.

To all the team members for their drive, spirit and determination to achieve. The OU motto 'the spirit of learning is a lasting frontier' inscribed outside the Bizzell Memorial library has inspired both during the time in Oklahoma and since. May it always inspire us to keep learning as we journey.

Lloyd Scott
MA, B. Tech. Ed, ICIOB

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Winning International Design Build Team at TEXO Headquarters, Dallas

Introduction

Education is about providing the support and direction to people on how to think, how to question and how to reflect on what they see and hear. They need to be educated to partake fully in the society in which they live, not merely trained to perform a set of limited or limiting tasks. Palmer (2007) speaks of educating 'new' professionals and reflects that if Higher Education is to serve a human purpose it is not sufficient to acknowledge what we know but more importantly we must recognise what we know and take responsibility for this knowledge. As educators in HE there is a need to educate people to have ethical autonomy and have the courage to act upon it, people who possess the knowledge, skill and the highest values of their professions.

Learning is an everyday occurrence and often it is taken for granted and not always fully appreciated. A intense competition such as the Design Build can have the effect of providing the context for one to reflect and to open one's mind to the value and importance of learning. The Chinese proverb "Tell me and I'll forget; show me and I may remember; involve me and I'll understand" very much relates to the student experience in the ASC competition. The application of their collective wisdom and knowledge is really what education should be about. And the competition provides the possibility to fully involve students in a collective approach.

A very strong interest in supporting both students and colleagues and developing best practice with a developed sense of reflective practice over the years in education has allowed me to evolve. It is with this sense of making a difference that excites a person to continue an emancipate themselves.

The inspiration to continue is often provided in the form of discussion and time spent with learners. The value and development achieved through the work in the US Design Build competition - a collaborative student project between the construction science program at Oklahoma University and the CM programme at DIT has been at the heart of project based learning initiative using authentic formative assessment practices as a core element. The project has involved students preparing at a distance with the aid of ICT (Skype and Box.net) in advance of a one day design build problem on location in the US. The students work independently and as a group to solve problems. The important formative assessment aspect is where informal feedback is provided to students along that journey. Importantly too, more structured formative feedback is provided from presentations sessions, presentation of portfolio work and the like. This type of educational experience, while unique, allows students to become more independent and self regulated but also more collaborative.

What follows is the sharing of that experience between the members of 2011 DIT and OU team and it has fittingly been titled 'To Dallas and Back- The Oaklin Design Build experience'

Lloyd Scott

Mitnik et al refer to collaborative learning as based on the approach that knowledge can be created within a group whose members actively interact by sharing experiences and take on 'asymmetry roles' (Mitnik et al, 2009). Based on Mitnik et al's definition the collaborative learning approach taken by the DIT/OU design-build team aligns appropriately. What should be added to is that this collaborative approach should include knowledge production which was very much part of the educational experience.

The current model of pedagogical approach, which is at the heart of the modern university, is becoming obsolete. The notion of collaborative learning has been around for a long time, of course, predating the Internet. But it had a very limited scope. In 1992, Barbara Leigh Smith and Jean T. MacGregor argued for a shift away from the typical teacher-centered or lecture-centered milieu in college classrooms: "In collaborative classrooms, the lecturing/listening/ note-taking process may not disappear entirely, but it lives alongside other processes that are based in students' discussion and active work with the course material." Their spirit was right: "Teachers who use collaborative learning approaches tend to think of themselves less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences for students — as coaches or mid-wives of a more emergent learning process."¹¹ The bottom line was simple: professors should spend more time in discussion with students. As the educator Jeff Golub pointed out in 1988: "Collaborative learning has as its main feature a structure that allows for student talk: students are supposed to talk with each other . . . and it is in this talking that much of the learning occurs."¹²

With technology, it is now possible to embrace new collaboration models that change the paradigm in more fundamental ways. But this pedagogical change is not about technology per se. This is not about distance learning. This is not about students being able to access lectures by some of the world's leading professors from free online sites like Academic Earth. Rather, this represents a change in the relationship between students and teachers in the learning process. The change of approach is about creating significant learning opportunities for learners where they can engage in meaningful contextual learning. The methodological approach should aim to embrace more student centred engagement. The use of a collaborative learning approach such as the OU/ DIT initiative embraces the true essence of what education is about. There is a need to focus not on what students are learning but how they are learning. The principles of collaborative learning of social learning, embracing discovery , self paced and student centred address a modern pedagogical approach. Opportunities for collaborative learning should be explored at every

Collaborative Learning Is Social Learning. In a 2008 article in *EDUCAUSE Review*, John Seely Brown and Richard P. Adler wrote: "Our understanding of content is socially constructed through conversations about that content and through grounded interactions, especially with others, around problems or actions."¹³ They argued that that we need to focus not on what we are learning but on how we are learning. Students who studied in groups, even only once a week, were more engaged in their studies, were better prepared for class, and learned significantly more than students who worked on their own."

Collaborative Learning

It appears that when students get engaged, they take a greater interest in and responsibility for their own learning. Brown and Adler argue that the web provides powerful new tools and environments for collaborative learning — everything from wikis to virtual worlds like Second Life. However, the web enables social learning in other ways as well. First, interactive computer-based courseware can free up professors from lecturing and allow them time to collaborate with students. Second, the web enables students to collaborate with others independent of time and geography. Finally, the web represents a new mode of production for knowledge, and that changes just about everything regarding how the “content” of college and university courses are created.

Collaborative Learning Is Social Learning

Collaborative Learning Embraces Discovery

Collaborative Learning Is Student-Focused and Self-Paced.

Professors who want to remain relevant will have to abandon the traditional lecture and start listening to and conversing with students — shifting from a broadcast style to an interactive one. In doing so, they can free themselves to be curators of learning — encouraging students to collaborate among themselves and with others outside the university. Professors should encourage students to discover for themselves and to engage in critical thinking instead of simply memorizing the professor’s store of information. Finally, professors need to tailor the style of education to their students’ individual learning styles.

The Internet and the new digital platforms for learning are critical to all of this, especially given the high student-faculty ratio in many universities. But

most faculty do not have the resources to develop the required courseware. This must be co-innovated globally through new partnerships.

Changing the model of pedagogy and the model of knowledge production is crucial for the survival of the HE. If students turn away from a traditional university education, this will erode the value of the credentials that universities award, along with the position of these institutions as centers of learning and research and as campuses where young people get a chance to “grow up.” The Global Network for Higher Learning is not a pipe dream. Leading scholars are beginning to implement elements of all five of its levels today. They know that universities and their faculties cannot continue to operate as separate ivory towers but must work toward collaborative learning and collaborative knowledge production. It is time for other academics to

“In no other industry is the responsibility for design so far removed from the responsibility for construction”

(Banwell, 1964)

Throughout the history of construction there have been many different methods of tendering. A traditional system of tendering follows the path of a client seeking an independent architect whom in turn seeks an independent construction manager. This is the tried and tested approach and is still used extensively in Ireland and throughout Europe today. In recent years however, the idea of having a one point of contact for a client during a construction project has become very popular and so instances of the design-build tendering system have increased throughout Europe. Initially, the concept of the design-build was developed in Europe, however it has become

extensively used in the United States of America accounting for over 40% of non-residential construction projects (Design-build Institute of America 2011).

The principle behind design-build is simple, instead of having multiple, independent designers, engineers and technologists working to produce a design, cost and schedule of a construction project the client employs a construction company that cater for all those tasks ‘in house’. The added benefit of using a design build company allows for the construction manager to have a more active input in design and structural capabilities earlier on in the project (Peace and Bennett 1995). This element is perhaps the most unique from the point of view of a construction manager as, traditionally, they are the last link in the construction chain and are often not consulted in terms of building design (Peace and Bennett 1995).



<http://www.church-buildings.net/files/ucstexas.jpg> accessed 24.10.11

Design Build

Using a design-build team streamlines the entire construction process allowing feasibility, design and costing issues to be ironed out all within the one company. Another added benefit is the client can become as involved as much or as little as is preferred. Design-build allows for a shorter communication channel between client, designer and constructor making the entire process a more efficient delivery system (Rowlinson 1987). In many cases the client may call for the design-build team to propose a design from scratch without client input or, contrastingly, a client may want heavy involvement with an entire projects layout and design aspects (Peace and Bennett 1995). While in Dallas, we were fortunate to be invited to the head office of the BECK Group the day after the competition. During a tour of the office we witnessed first-hand the design-build process within a company. Architects, technologists, quantity surveyors and construction managers were grouped together throughout the large office space for particular projects. Each group worked closely with each other from design to completion utilizing the company's strength in terms of organization and costing. The BECK group is one of the largest construction companies in the US and remains at the forefront of the industry due to investment in areas such as technology which, is becoming an important element in the construction process. There are many arguments against the design-build process not least is the view that incorporating the opinion of a contractor so early in the design stage may reduce the overall design quality. This has been evident in many design-build tenders as reducing design flair also reduces costs and so can greatly help in the selection process (Rowlinson 1987). For this reason, it is common in the USA

for the design-build process to be applied to public projects such as schools, town halls and infrastructure (FHWA 2008). Reducing the overall cost of such developments is critical as contracts are awarded to the lowest bidder by means of public tender. It can therefore be argued that design-build companies are extremely competitive because they can make savings by reducing design cost. Additionally they can keep further tabs on expenditure throughout the construction process as the design-build team are familiar with the means and methods of construction (Rowlinson 1987). Another aspect of design-build relates to the speed of construction. This can be argued in a positive or negative light as many view the ability of design-build company's to start construction while still designing elements of the project as a benefit. This allows for a very quick starting time on site (Moss 2001). The counter argument to this is the risk involved starting a project which has not been completely designed to completion. In such instances communication between client and design-build team is critical as any changes must be quickly communicated. This will not only reduce overall construction time but will also reduce costs (Moss 2001). Design-build has become more widespread throughout Ireland in recent years. As a result of the downturn in the construction industry, many construction companies have become smaller and so have developed there own design department which has creative input from costing and construction departments. This is generally not to the same scale as US companies such as BECK but represents a slowly changing dynamic within the Irish construction industry. Competition similarities The Design-build competition is a simulation of 'real world' proceedings

in a design-build tender application. Teams are presented with a typical request for proposal much the same. Teams are presented with a typical request for proposal much the same as in a real tender process and the similarities do not end there. As in a typical design-build team, everyone's opinions were taken into consideration and communicated across the board. We found that not only did this improve our camaraderie as a team but it was vital for our entire design-build process. Having a response from all individuals very quickly allows for designs to be tweaked and re-modeled to suit costing and feasibility. This was identical to a real world scenario and showed that instant input from various sectors was crucial in producing a final proposal.

scores and comments are duly noted by all teams and are considered in the preparation of next years competition.



Practice Makes Perfect, Communications Workshop

In industry, it is common practise for a list of possible tenders to be drawn up. An RFP is then issued to every company on the list and a time and date for submittance is given. There is no collusion between competing tenders and it is common for companies to present there design package to clients (Peace and Bennett 1995). The competition followed this form of events very closely. The tender list consisted of the various teams in the competition who were all issued with the same RFP. There was absolutely no conferring between teams as all design, schedule, site layout and costing information were tightly guarded. This particularly applied to our team as there was a second Oklahoma University team in competition with us.

Once all tenders have been submitted it is standard practise to inform all tendering company's about the evaluation scheme used by the clients and also individual performances. Naturally, this is the basis of the competition and judges evaluations,

Dublin Institute of Technology

The built environment is constantly changing and refining itself as an industry and as an educational outlet. Through the ages, construction sits side by side with the evolution of society from ancient buildings built using simple methods and tools to today's cutting edge designs involving teams of designers and constructors. The pace of change within the built environment is noticeably increasing and human society has found it necessary to categorise the different forms of knowledge in an attempt to make the world more intelligible (Gaarder, 1995). As the built environment encompasses all aspects of construction it can be labelled as vague however, Ratcliffe (2007) argues that the environment should be understood as a set of process rather than one single entity. This set of processes includes planning, design, construction and financial regulation. These four processes are central to the design-build model of procurement and also to the ASC competition. When selecting students for the competition team, it was necessary to involve students of both architecture and construction management as both areas deal with the necessary skill set. Schools of architecture date back to the renaissance period in Northern Italy (Pevsner 1990). Over time the development of architectural students initially began in France (ref) and eventually evolved into the higher education system. Today, a total of seven third-level institutions in Ireland have schools of architecture. The school of architecture in Bolton St started as a technical school under the Vocational Education Committee (VEC) in 1926. At this point the course

was part-time and spread over three years. This was expanded into a five year, full-time course in 1944 that is still in operation today (Duff et al 2000). Construction management has been in existence since Egyptian times. However, the discipline is relatively immature and has evolved rapidly in recent years. This is no more evident than the level eight construction management degree course in Bolton Street today. The course came into existence in 2006, replacing an existing level seven degree in construction technology. Worldwide, construction management has emerged as a distinct discipline and the continuous education in both undergraduate and postgraduate areas remains strong. Langford (2009) argues that the construction management discipline engages students in a hands-on approach. This is evident in today's course which incorporates a mandatory work experience module. 2011 marks 100 years of education in Bolton St. First opened in 1911, the college catered for construction, civil and mechanical engineering, aeroplane construction and various printing courses. The college has evolved through the decades into a world-renowned institute but has always kept its built environment roots to the forefront of its development. In the coming years all the DIT campuses will amalgamate at Grangegorman just north of Dublin city centre. The proud tradition of built environment education will continue for many decades to come in the new surrounds but with the same dedication, challenges and most importantly, results.

DIT Student's Reflections

Simon Harrington

I had passed Lloyd's office on my way to and from classes many times in the four years I had studied at Bolton Street. I was, however, completely unaware of what room 356 was used for. I would soon find out.

Following a phone call from Orna Hanley, the assistant head of school in architecture, I learned that I had been selected to represent DIT in a design build competition in Oklahoma. I was extremely excited but I was fearful about my knowledge of design build and Oklahoma was equally as foreign to me. A meeting was setup and I had the opportunity of meeting my coach, Lloyd, and my two teammates Brendan and Peter. From that day, Lloyd's office transformed itself from being another unfamiliar room at college to a haven of powerful ideas, creative energy and academic exchange. There were also plenty of laughs. Camaraderie between myself, Peter and Brendan seemed both immediate and organic. I was aware, however, that I was different to them. I imagined they might have had preconceptions about me. Both of them studied construction management, they understood how building projects were realized in the real world using real machinery, real schedules and real people. I told them about the time I had spent in New York working in an office where I did a competition for a parametric maritime pop centre in Taiwan. The project had proved to be an eye opening experience, teaching me the global nature of architecture. But my feet were planted firmly back at Bolton Street and I wanted to prove to myself that I could work with

others who were primarily focused on the practicality and realism that envelop the projects in the construction industry. I learned to respect Peter and Brendan's methodical and meticulous way of thinking through issues and problems in projects. I realized that this methodology of thinking could be applied to designing.

Brendan Towey

As a returning mature student to DIT I wondered was there going to be any opportunities to further myself as the year progressed. On the first Thursday morning of week one Lloyd Scott entered the class room and mentioned the ASC competition, he didn't say where it was or what it involved but I instantly thought that's for me! I submitted my application, just a standard letter telling of my experience and my wish to be part of the team from Bolton St.. A week later I was one of 4 called for interview in Lloyd's office, the interview was very formal. We just talked about the competition; what it involved, what individuals could gain from it. I explained that I felt it was the opportunity of a lifetime, something huge to have on your CV and to get placed at the competition itself would be quite an achievement. Shortly after the interview I was informed that I was one of the construction managers selected. I could not believe it, after a year of deciding what to do with my life, whether or not to come back to college, hearing nothing but negative on job prospects I was left in no doubt that coming back to DIT was the right choice. After the initial high of being accepted to go, the thought of all the work that had to be done became very much a reality. As if things weren't hectic enough we now had competition research to carry out, but to be honest there was nothing else I'd rather be doing, I was



Peter, Simon and Brendan

happy to be busy with construction again. A few weeks later we met with Simon, the architect who would be coming with us to the competition. Just like Peter, Simon was easy to get on with and totally down to earth. It didn't dawn on me until much later in the process that Simon, Peter and I gelled very quickly, as focusing on the competition helped us to bond and get on very well with each other. Our first meeting with Lloyd involved us just talking about the competition, deciding on travel dates and outlining initial ideas. We all felt that something special would have to be incorporated in our project to make it stand out, but that was easier said than done! Later that day we had our first (and my first ever) Skype meeting with Dan, Molly and Brandon from Oklahoma University. They were as enthusiastic as ourselves and we all felt we were going to get on great. From this meeting it became apparent that we all had a lot of work to do. Self motivation

and team support were very much the key drivers in keeping on top of things. From early on in the process it was clear that we had a good team. Everyone was highly organized and appreciated the task in front of us. Strictly speaking there were no 'Bosses' standing over your shoulder, no deadlines but it was felt that if you put your hand up to do something, you didn't dare half finish it or bring it late. To do that would be letting your team down and therefore letting yourself down. That was never going to happen!

Peter Whoriskey

I was a full time student at DIT and starting my fourth year in the four year degree program of construction management. The first week at college our department head Lloyd Scott visited the class and told us of the ASC design and build competition which involved a lot of work on top of our hectic final year work. I was instantly interested in a construction competition but to tell the truth I was daunted with the extra work load at first but suddenly realized that I strive under a big work load and pressure. After class I researched the ASC website to see what it was all about. What a fantastic opportunity the competition was, not only to enhance my CV but to gain valuable experience of design and build and be part of a construction team. I knew I wanted to be one of those team members. As there were more students interested than places available a written submission had to be put forward. All my effort put into the written submission, so that it would be perfect, paid off as I was one of the four selected for interview. I didn't know what to expect at the interview so I just went in as myself. In the interview the competition was explained in a little more detail as to what was involved. The more I heard of the competition the more I wanted to be part of it. I explained how much I wanted to be on the team, the amount of experience it would provide me with and that I would work hard and well as part of a team. When all the interviews were finished we all gathered in a class room and I could not believe when Lloyd announced that I was one of two chosen to on the team. Brendan a mature student whom just returned to college was the second construction manager selected. A fourth year architect, Simon was also selected to be a member of the team. I didn't know either of them prior to being

selected for the competition just a few words with Brendan before and after class for the first week. Before meeting the architect myself and Brendan had hoped he wasn't weird, as architects go, the majority are. Gladly enough Simon was like Brendan, a real down to earth kind of guy but that still didn't stop us in giving him a hard time for being an architect. All said after we met the three of us got on like a house on fire and gelled well together as part of a team. Our first meeting as part of the team with Lloyd, he showed us a copy of the binder from the previous year team created which was really inspiring and they finished in third place out of nine other teams. It was an impressive standard they set, a standard we wanted to meet and exceed. It was a difficult goal to set for ourselves. In the first week of November, we had our first Skype meeting with the other half of our team in Oklahoma, Dan, Molly and Brandon. It was an exhilarating time for all of us meeting each other for the first time and the American's were as thrilled as ourselves as being part of the international design and build team. The whole team got on really well from the start as all six of us were up to the challenge and committed to the team. Therefore the team was prepared and willing to take on the high standard within the competition and set by the previous year team. Having the initial goal in common we had the team determination to go on and achieve the difficult goal of exceeding last year team's standard.

UNIVERSITY OF OKLAHOMA

The University of Oklahoma was founded in Oklahoma Indian Territory in 1890 as “Norman Territorial University”. When the territory was formally accepted into the union in 1907 the university was renamed University of Oklahoma.

One of the first majors to be offered at the new University was pharmacy, opening its School of Pharmacy in 1893. In 1903, the only building on campus burned down losing all school records – but also paving the way for a new, master-planned campus. With the help of the first university president, David Ross Boyd, English professor Vernon Parrington designed a master plan that set all campus buildings around an oval. This design developed into the North and South Oval that are now a hallmark of the campus ().

During the Great Depression of the 1920s OU continued to grow slowly, aided by Federal grant programs and the New Deal. Buildings were added to the campus, expanding both the capacity for students and the number of majors offered.

When the United States entered World War II student enrollment levels dropped considerably. There was a Naval Air Station on campus, called South Base, which served as both training grounds and living areas for military families.

In 1943 the University hired a new president, George Lynn Cross. President Cross ushered in a new phase for the university; over the 25 years of his control of the University he dealt with a boom in student enrollment, housing shortages, and continued commercial development in the local community.

In the mid 1960’s student enrollment hit such a rate that the university could no longer provide

housing for all students. To fix the supply problem, the University built three new dormitory towers just past the South Oval.

Over the next 25 years OU had five presidents who all left their mark on the campus. Again, enrollment steadily increased as students from all over the region sought higher education. In 1994 the University hired former Oklahoma Governor and US Congressman David Boren. Under Boren’s leadership the university has enrolled more National Merit Scholars than any other public school per capita, and been ranked within the top 100 US Universities by US News and World Report.

Today, the University of Oklahoma offers 152 different majors at three different campuses. Students come from all 50 states and 100 different countries worldwide. 25% of students study abroad and the average national test scores for incoming freshman continue to rise. The future looks bright for OU, and students seek to take advantage of all that is offered.



Team Lunch, First Day at Campus Corner Oklahoma University

Oklahoma University

Small to mid sized construction programs are presented with unique challenges. There is generally a desire to grow and continually improve. However, growth and program improvement often are at the expense of faculty resources – if you want new initiatives you must either add additional work load to existing faculty by either growing the program and hoping that administration will address the need with new faculty or you can work smarter. When the University of Oklahoma’s Construction Science Division decided to add international experiences to their program, we knew that we must work smarter as additional faculty resources were difficult to come by. At the 2009 ASC Conference in Florida, several international programs were in attendance. Realizing the importance

of international experiences OU wanted to make contact with overseas programs and knew that several international programs would be in attendance at the conference. At the Sigma Lambda Chi breakfast, Ken Robson and Lloyd Scott met and discussed their desire for the Dublin Institute of Technology and the University of Oklahoma to begin dialogue on international experiences. Both programs realized the importance and value of international experiences to their students and to the global construction industry. A visit to the Dublin Institute of Technology in the summer of '09 reinforced both programs desire to develop some form of international experience. Both programs administrations were desirous of international experiences for their students, so the program’s goals were consistent with administration’s goals.

Context

In the fall semester, the CNS Division holds competition team tryouts for the annual Region V ASC/TEXO Student competitions. As the deadline approached for competition tryouts the idea developed that Region V could develop an international competition. When this idea was presented to Lloyd Scott at DIT, he enthusiastically endorsed the idea. After working closely with the ASC Director, Ken Williamson, and other Region V universities, the Region V ASC/TEXO Competition rules were modified to allow a team of a combined international and US team. For the first year, Lloyd selected 3 construction students for the competition. As the Region V rules stated that there would be 2 design students and 4 construction students, OU's team consisted of 2 architecture students and 1 construction student. The second year, both DIT and OU provided 1 architecture student and 2 construction students.

The fall semester team preparations consist of weekly meetings to learn more about the competition category. There are 4 categories – Construction Management, Heavy-Civil, Design-Build, and Design-Build International. Students arrange appropriate guest speakers, determine team members role and responsibilities and make assignments for portions of the proposal packet that can be developed before the actual competition. The actual competition is held the 2nd weekend of February. With the availability of Skype, the teams decided to meet weekly using Skype. Meeting times were arranged to suite the 6 hour time difference and allow for guest speakers. Students also set up electronic drop boxes so they could download documents that everyone could review. Additionally they used email to communicate outside of the regular meeting times.



Team outside Business College, Oklahoma University

Context

Reflecting upon the competition experience, it exceeded both DIT and OU's expectations. It was amazing how the Skype sessions, emails and team assignments, shortened the team forming period. Within hours of the DIT students arriving at OU the team members from OU and DIT were operating like they had been a team for months. OU students learned about Ireland and DIT students learned about the US and how construction work is delivered and acquired in the Design-Build process. From recruiting students to be on the International Design build team, both OU and DIT now have developed a selection process due to the large number of students wanting on the team. As the competition grows, there undoubtedly will be more changes to the format. Each change will make the competition a more valuable learning experience for students and help each program participating develop an international experience without having to devote a faulty line to that effort.

Kenneth Robson



Gould Hall, Oklahoma University

Preparations

Preparations for the competition began in late October 2011. The importance of these preparations would only really impact once the competition began.

We were eventually introduced to our American teammates via Skype. This platform served both the Dublin and Oklahoma sides of the team well and allowed the sharing of ideas, become familiar with each other and the development of our tactics for the big day. The “Sooners” proved to be equally as excited about the competition as us DITers and their enthusiastic nature combined with that southern sense of humour and hospitality made the entire process both relaxed and fun.

The Skype meetings were weekly events, where as a team, we could discuss the nature of the competition and how we could improve our chances of performing to the best of our abilities. At times the meetings dragged on, accents proved to be distracting and tensions arose on certain topics. There were a few cancellations from both sides due to snow days (The disruption was caused by the unusual spait of bad weather in November in Dublin). However, everyone maintained a positive attitude and continued with meetings, which were vital to our eventual success.

At one point, the team discussed appropriate software that could be used on the day of the competition. This discussion lead to the DIT team members receiving a tutorial in Revit from Malachy Mathews at the Architectural Technology department at DIT. As a group, we established that the software could prove to be overly complicated for the end product that we had in mind. Knowledge of other software that we could use on the day was discussed in greater depth between Brandon and Simon. We communicated our own personal ways of working to each other during one to one Skype meetings. It was later realized that we had similar styles of working through our ideas. This made the collaboration both enjoyable and satisfying.



Team Practice Session in Competition Room

Meetings

The weekly meetings were a crucial and essential part of the team development and progression in getting prepared for the competition. It was discussed and agreed by the entire team a meeting would be held weekly, every Thursday at six o'clock Dublin time, was noon Oklahoma. The meetings began in late October / early November, until the Irish members flew to Oklahoma for the competition. As the competition got closer around the middle of January, meetings were held twice a week. This allowed the team members to see and interact with each other at a more natural level, it was as if everyone was in the same room. Those meetings were crucial to the teams groundwork and development towards the competition , not only discussing important issues and sharing ideas but also in helping build the team relationship and bonding. When all the team members met for the first time face to face in February, it was like they already knew each other as friends. From the beginning the entire team 'gelled well' together with each team member's personality complementing the other.

Important discussions were held at each meeting where the agenda wa drawn up before to discuss any issues. Molly generally compiled the meeting agenda with each team member sending her issues that they would like to take up during the meeting. Each team member took notes at all meetings so no one forgot any important issues and their tasks for completion before the next meeting. Meetings generally lasted anything between thirty minutes to an hour, depending on issues being discussed. Main issues which were discussed at the majority of the meetings was team member's roles, the team name and logo, individual and team preparation work carried out on the binder and when we

were to have the mock competition run.

OAKLIN
INTERNATIONAL

The team logo was designed by having a discussion about the nature of the design build company. We had come up with the 'Oaklin' name, which we felt represented the connection between the two cities where we worked from. The final graphic developed into a simple logo which would give us an identity unique to our international team.



Practice Sessions

An important part of the preparations was to do a practice of the event. This proved to be difficult because of the remote nature of each part of the team.

Practice Session 1, 17/12/10

The DIT contingent met up at Simon's house just before noon; meanwhile the OU part of the team was meeting up at 6am OU time in their college building. Laptops were set up, tables were cleared for drawings and a Skype connection was established with the 'Sooners'. Our coaches, Lloyd and Ken developed a mock Request For Proposal and requirements similar to actual competition conditions. The RFP called for the design, estimate and schedule of an office building. The site in question provided numerous difficulties such as a steep decent in levels across the site and also the threat of flooding. During the course of the practice session both teams worked through the RFP and an outline design was established. Simon and Brandon collaborated in a separate Skype meeting while Molly, Dan, Peter and Brendan concentrated on a construction method and planning schedule. During the session it was noted by everyone that the most frustrating part of the process was the restrictions we all faced when it came to conveying ideas, drawings and methods to each other across Skype. This was a problem on both sides as it took up a lot of time in comparison to explaining ideas face to face.

As a team we established an outline plan of the building which allowed everyone to develop the plan in terms of construction sequence, costing and time line. Being

so far away from each other it took a lot of time and effort to iron out all the small details and problems but as a team we persevered. We took coffee and lunch breaks throughout the day, and rather than disconnect the Skype meeting we used this time to talk to each other, in doing this, we all got to relax with each other and simply talk, this really set a foundation for friendships. At 6pm we decided to wrap up and reconvene at a later date. Everyone felt that the practice session went very well; we felt that we had gotten to know our American counterparts very well over the 6 hours and looked forward to completing the RFP.

Second practice session 29/01/11

For the second practice session the DIT contingent met up at Peter's house in Drumcondra. The practice session began at 1pm (7am for the OU members). As before Simon and Brandon continued working on finalising the details and drawings, Peter and Brendan compiled a schedule and a site layout while Molly and Dan completed the estimate. As most of the detail work and construction methods had been addressed we set about tidying up our design and focusing on a presentation layout and sequence. This was essentially a dry run of what we would actually be doing on the day of the competition. As this stage we were all very familiar with each other and we found it very easy to come together as a group and address any issues. With the competition coming closer, there was an air of excitement about completing the practice run. The next time we would do this would be at the competition, we knew that it would be a much tougher scenario with a more stringent time constraint but, as a team, we all felt that we were more than capable of producing something special.

Competition Overview



Competition Dinner, TEXO Headquarters, Dallas



The Associated Schools of Construction Region V student competition has been taking place annually for 16 years. The competition has evolved into the two-part stage as we know it today. Part one consist of the issuing of the request for proposal (RFP) and the associated design / schedule / planning elements. Part two consists of the presentation of the completed design to a panel of judges. For all of the teams taking part, there is an argument that the amount of time and dedication put into preparation for the competition could be deemed part three of the process. For the OU/ DIT design/build team, the competition started in October 2010 as this was when team members were selected and meetings began. Throughout the months before the competition the work rate and development of the team never stopped. Weekly meetings held at various times included topics ranging from team name selection to updates and different ideas for our binder. There was constant emphasis to keep in touch with each team mate regardless of regular college workload and everyone was happy to do this as we all wanted to give the competition our very best shot.

From October to February wall of the team worked very hard on our individual responsibilities as well as our group moral and friendship, both were as important as each other. Once Brendan, Peter and Simon arrived in Oklahoma, the entire group was aware that we did not have as much time as usual to get to know each other as important work had to be finalized before competition day.

The competition was based around design-build procurement and consisted of a sixteen hour lock down period to develop a proposed design, estimate, and schedule and LEED analysis to comply with the assigned RFP from the competition sponsor Speed Fab Crete. The RFP provide in Appendix A, outlined both information provided and information requested by the client, Speed Fab Crete. It also contained the weighted criteria for the requested information to help Speed Fab Crete judges make their selection. The RFP requested provision of design-build services for a new Primary School at Arlington Classics Academy in Arlington, Texas. The team's response to the RFP was to be presented in binder format and submitted immediately after the sixteenth hour lock down on the 12th of February 2011 to the team coach along with an online website submission. A presentation was also to be carried out on the 14th of February furthermore explaining the teams response to the RFP. The RFP outlined all the exhibits with additional electronic files which contained crucial information to allow the team, design, schedule, and estimate the New Primary School. The RFP furthermore outlined that the team's response should contain the following information;

A. Design-Build Team; Company background

B. Proposed Design Solution for New Primary School: Arlington Classics Academy, Arlington, Texas

- Site Plan of the proposed design which includes indication of the future High School
- School building on the site
- Floor Plans
- Exterior Elevations or 3-D views

C. Project Cost Summary / Cost Estimate

D. Project Schedule

E. LEED Features: describe design features or construction activities that would contribute to LEED certification should the Owner decide to certify this project

F. Assumptions / Qualifications: List any major assumptions or qualifications made to complete this RFP

Each part the requested information was taken on by different members of the team. Molly provided the fictitious company background with previous schools which the Oaklin company had built and in particular the projects in which this Oaklin team had worked on together in the past. Both architects Simon and Brandon took the role of designing the new primary school to the criteria requested by Speed Fab Crete. Dan built the cost estimate for the new school based on the size of the school and also the materials and construction methods to be used during construction. Peter and Brendan put together the schedule for the entire duration project from conception to completion. The schedule took into consideration the length of the design, construction and commissioning processes. They also did the site layout for construction stage of the project. The LEED features was also taken on by Molly. She analyzed the entire project from its design, construction methods to materials being used to construct the new primary school. This task was vital to complete the LEED checklist and to determine the level that the project would be certified to.

Lockdown

Each team taking part in the competition was allocated a room in their college where they had 16 hours to complete the project. We had chosen to work in a large classroom. The setup that the Oklahoma University provided was extremely professional. A team of technologists created a network of computers for the entire team. This new office base was organized so that the team could share information easily and efficiently. Each station was equipped with up to date software, which was used in completing schedules, renders and estimates. Brandon and Simon had been supplied with model making equipment and graphic materials so that they could fully explore all of our ideas.

A large drawing board was positioned in the centre of the room, which sat next to the meeting table. The team sat down as a group on the morning of the competition and discussed the nature and scope of the brief: a semi public school in a suburban site in Texas. We had the opportunity to meet and discuss ideas, compose lists of individual jobs and establish goals for the remaining time in the day.

The atmosphere was tense and all of the team were anxious to get started. Brandon and Simon were not used to others breathing down our necks, looking for numbers and information on something that wasn't yet designed. At times we invented figures and quantities to ease the pressure and allow space to develop our concepts and ideas. The construction management students didn't seem to understand why things were taking so long. They would later learn that we were making more than a collection of pretty pictures!

Lunchtime offered the entire team an important period of reflection.

We were half way there but we had to deliver a product at the end of the day. Our coaches looked on and I could sense they were trying to mask their worry about our progress. Coach involvement was strictly forbidden but encouragement in their faces was continuously observed. Their presence was felt and we were motivated to push ourselves and finish this intense day of work with a positive outcome.

The clock continued to tick and all members of the team delayed in providing Molly, who was in charge of creating our booklet, with the material that they had been working on. Our delay put her under extreme pressure, which she handled like a true professional. Her ability to continue her job without getting into a panic was an inspiration and put all of us at ease to finish up each individual task. We eventually provided her with our work and she sent our finished proposal to the competition website. We managed to submit successfully with minutes to spare. We were too tired and drained of energy to celebrate finishing. In any event, there was still work to be done the next morning.



Competition Day Lockdown

Competition Binder: Design

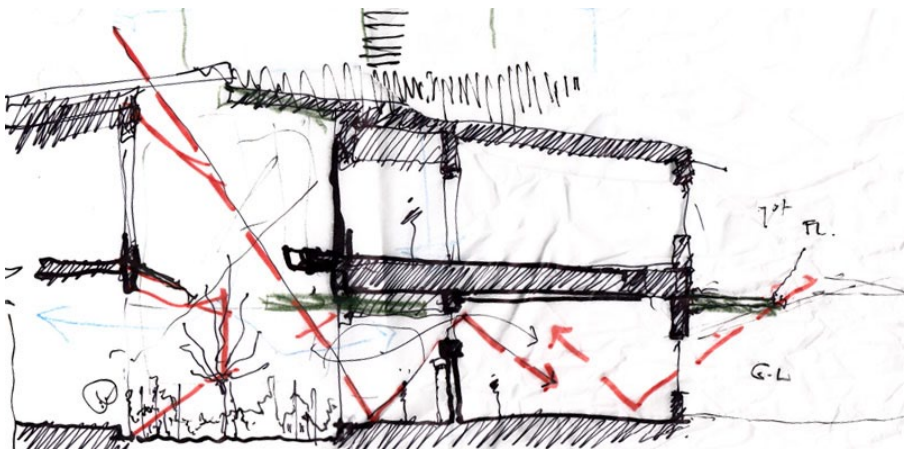
The brief outlined that the site in Arlington, Texas was to be the location of a new primary school. The site is grounded in a suburban context. A large parking area created an existing entrance while a meadow bordered the back of the site. A small stream created a third edge. An initial site strategy proposed a reinforcing of an existing campus atmosphere. The new primary school was to be part of a bigger school campus. This was an opportunity to propose an idea for a stitching device for the entire campus. A cheap yet elegant solution came in the form of a simple timber structure which could be attached to existing school structures and be elevated on simple columns when needed. This structure would provide a canopy for a new walkway which would connect the different parts of the campus. It's louvered nature would provide shade in the hot summer months and shelter when colder weather.

The primary school was located in close proximity to an existing school building, in an effort to create a link between new and existing educational facilities.

The school's form allowed existing landscape to merge with the building and form external learning environments for the children.

The classrooms were to be arranged around a central courtyard with younger age groups occupying the lower level and older students being taught on the upper level. 'Flex spaces' allowed for alternative and modern teaching opportunities for teachers and would create a new learning experience for students. Openings in both walls and the roof structure would permit the entrance of light, creating inspiring and appropriate moods of lighting. Classrooms and communal areas offered views of the surrounding campus and landscape.

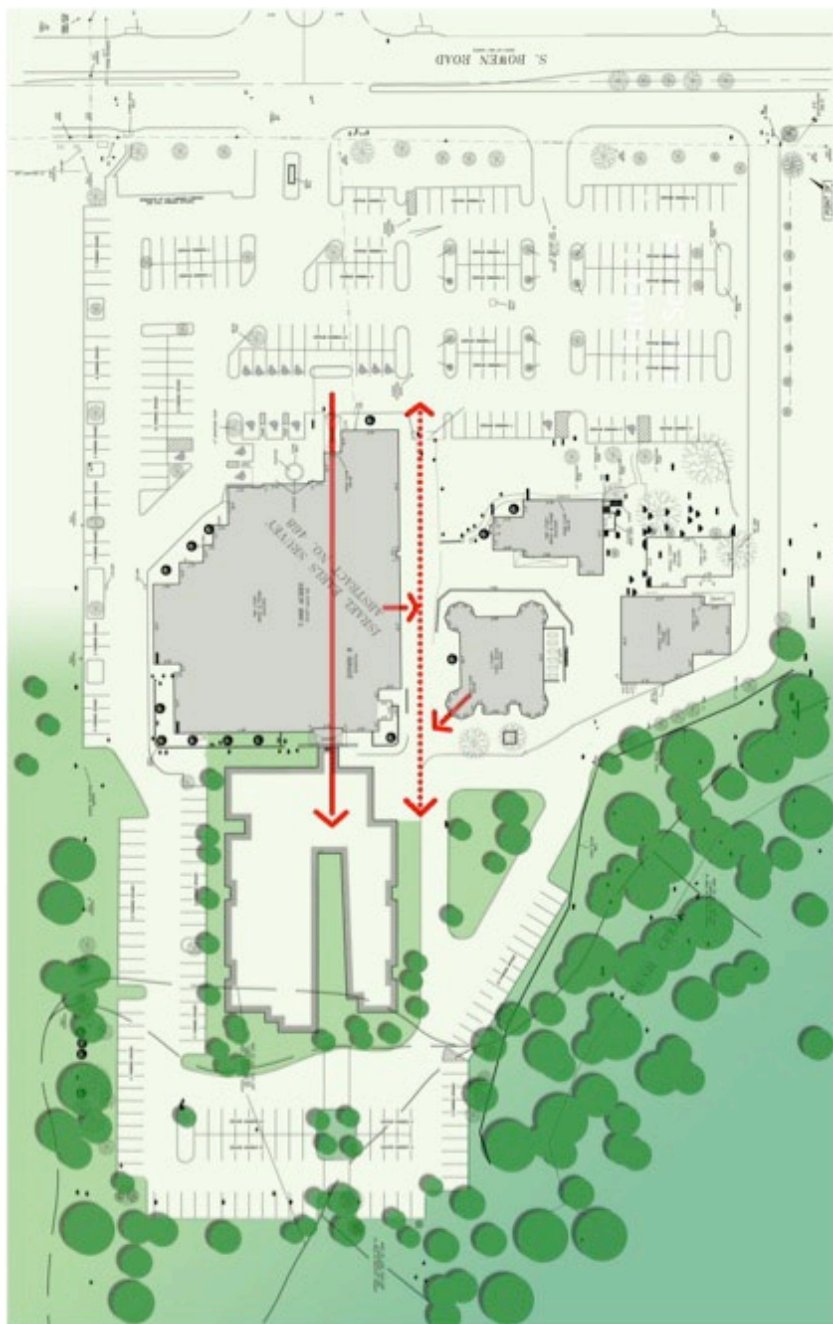
Prefabricated concrete allowed for an ease of construction and simple and affordable building materials combined with simple detailing results in a cheaper yet effective design.



Sketch of Courtyard + Classes



Site Plan



Proposed Connections

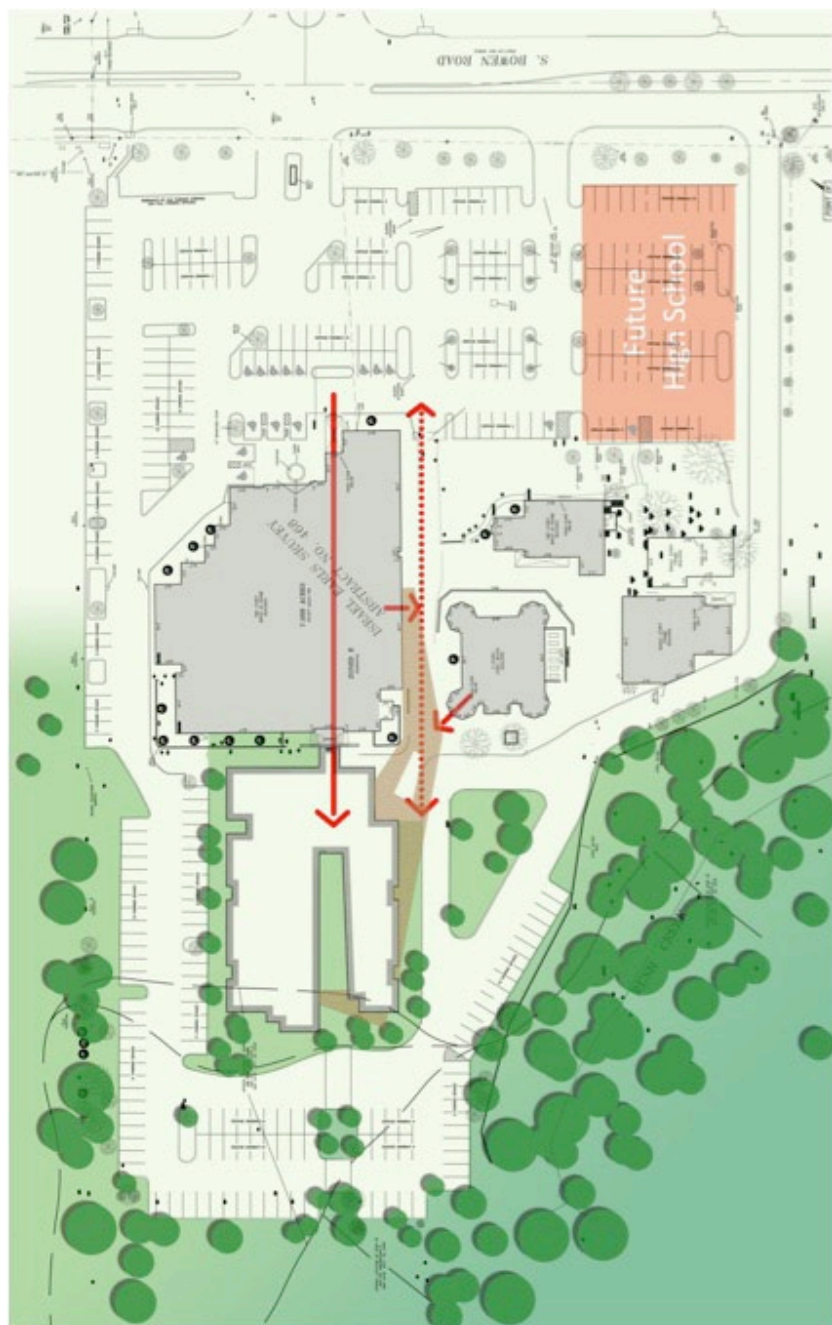


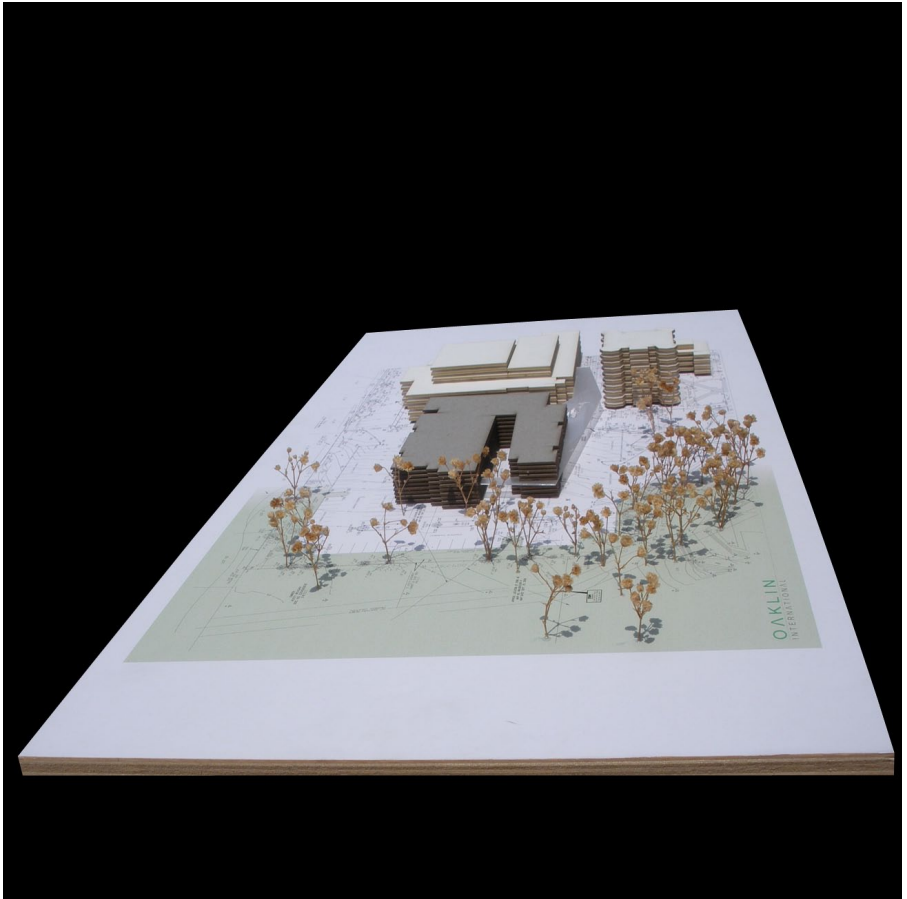




Existing Floodplain











Structural Analysis



Lighting Strategy



Air Exchange



Water Retention



Competition Binder: Estimate

The Design Build Estimating Process When estimating design-build projects there are several considerations a team must take into account to accurately attain a realistic price that will translate into 'real value' for the Owner. This is completed through detailed preparation and research. Design-build projects are inherently littered with assumptions and variables that need to be examined to attain this 'real value'. In no other circumstance is this truer than in an international setting. There are economics, regional nuances, and building processes that vary depending on location. The importance of being able to identify these differences, and quantify them, could be the difference between a win or lose of the project. The design build estimating process is quite different than the standard hard bid. The design-build estimating process progresses with the design. As Architects' develop their designs the estimate becomes more firm. During the early stages of the estimate, before design is complete, the estimating team will have established a potential GMP (Guaranteed Maximum Price). The GMP is based off of a baseline square foot of the building. This price usually falls within -25% to +10% of the actual price. As the design becomes more detailed Estimators will refine their GMP to reflect a more realistic price, this would usually reflect a price range of -5% to +5%. Although this percentage range is workable it is not ideal for an estimator to have so much flux in their final GMP. At this point the estimator will further refine their final GMP by accounting for risk, which will be later discussed in this section.

Preparation

In a real world circumstance, Estimators will use resources such as historical

cost databases and subcontractor quotes to price the proposed project. However, during the ASC Competition Subcontractor quotes are not allowed. To adequately prepare for this the team must thoroughly analyse the Owner. Typically the "Owner" of the competition is a regional construction company. A team can deduce a great amount of information by researching this company. What are their most recent projects? Do they specialize in a certain building process? What are their green processes? Do they specialize in a certain type of building (schools, hospitals, auto dealerships, etc.)? These are important preparatory steps the team must take to ensure a successful estimate. Failing to recognize these patterns will most certainly set the team up for an estimate that is not competitive.

Estimating Unique Elements

Additionally, a large part of placing a competitive bid is the design. In an industry where building construction is becoming a commodity it is important for Designers to insert unique elements into their design that will set a team apart, thus enticing Owner's to choose their design. Estimating these unique elements can be tricky. It is important to understand the use of the element, the material it is constructed from, and its function. Once this has been established you will typically not be able to refer to any database or literature for an estimate. Unique design elements will have to be estimated as a separate item to the building and will be taken off as a quantity takeoff. For example, In the ASC 2010-2011 Competition, the proposed building was an addition to a Preparatory Academy. The Academy was a system of independent structures, but were tied together as one campus, much like a college.

Competition Binder: Estimate

Oaklin International designed an architectural wood framing that would weave the campus together.

Estimating Out Risk

Risk is an essential part of construction. One of an Estimator's main functions is to identify this risk and account for it in the project estimate. This can be done by building in contingency. Contingency in the simplest definition is a future event or circumstance that is possible, but cannot be predict with certainty. An example of this would be building on a difficult or constrained site. It would be impossible to predict regionally specific considerations.

Meetings

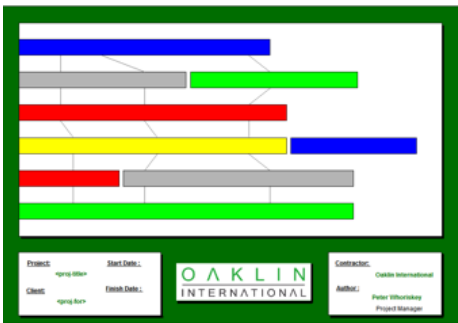
One of the best parts of the IDB (International Design Build) team is its uniqueness and freedom to innovate. The IDB concept is still in its infant stages, by the time this is published it will have entered its third year. The efficiency and effectiveness to which team members are able to communicate has not been fully realized and will continuously evolve, with technology. Prior to the 2010-2011 ASC IDB competition we toyed with several ideas on how to effectively communicate. Weekly meetings are a must, once if not twice a week. This was executed using an online video chat service, Skype, which allowed us connect in real time face-to-face with minimal interruptions. This proved to be necessary for pre-planning and building necessary relationships. Email is also a necessary use of technology, although this can get quite convoluted; a barrage of emails that contain separate edited versions of the same document can be hard to keep track of. Technology is and will continue to be

the challenge to communicating successfully within this competition. Without minimal technology i.e. (email, Skype, Instant Messenger) the effectiveness of the team would be drastically reduced. Sharing ideas and documents is impractical any other way. And with the advent of the Cloud server sharing documents, editing, and uploading information will be even easier than before. This will be the most practical and useful way to share information for the next few years, but the evolution of technology is not just for sharing ideas and documents. If the format of this team continues, communicating over large distances, than technology will be useful in building the necessary team relationships. Many times in construction individuals often communicate with others without ever meeting face-to-face. Because of this it is pertinent that teams be able to adjust their styles of management and communication swiftly and with little disruption to the team. This can be challenging when communication is limited to only once or twice a week, is typically within a group setting and over thousands of miles. However, it is easier to manage this with clearly defined roles and responsibilities. Without roles individuals could lose sight of their responsibilities, ultimately hindering the progress of the team. Leadership should be established early in the process.

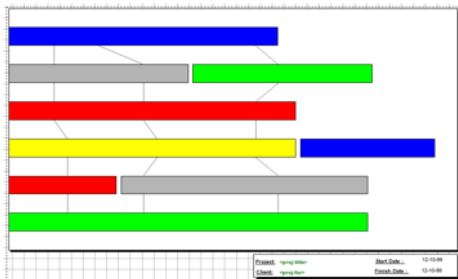
During meetings it crucial to have someone taking meeting minutes, or notes, during every meeting and distribute those notes at the end of every meeting. This will help align the team before, during and after meetings.

Competition Binder: Schedule

A lot of the work with the schedule was carried out in the preparations to the competition; there would not be enough time on the competition day to do everything. Brendan and Peter used a scheduling computer programme, Asta Powerproject for the competition. Both of them were taught how to use Asta Powerproject as part of a college module. Asta Powerproject helped them build the schedule as well as enhancing the schedules presentation.



Template 1



Template 2

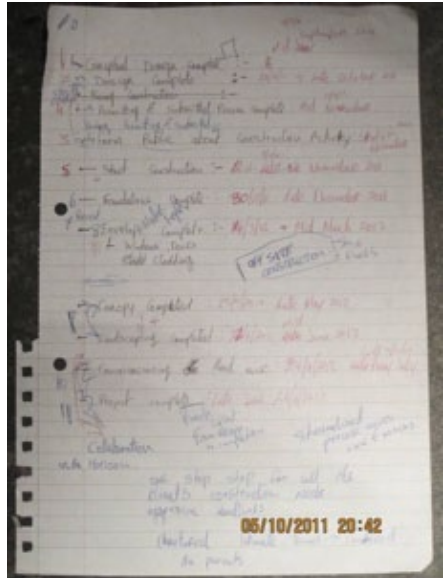
Prior to the competition day the schedules' template was created to suit Oaklin's colour scheme of green and white. A number of templates were created and the team chose the template that was to be used on competition day. Various other elements were also created such as the two tone green colour for the activities sub headings and a typical programme for a typical building with all the activities as

they could be used as a guideline and be helpful on competition day. A calendar year was also produced to replicate the builders' year in America as they have different holidays to the builders' year in Ireland. The mock competition day helped Peter and Brendan realise what had to be done on competition day. It gave them a better understanding on what they had to prepare and how much preparation could be undertaken to help them draw up a schedule within the competition time frame. Dan sought information in America from a precast company on the expected time frame which products be produced from conception to being erect on-site. This gave Peter and Brendan an advanced knowledge for a precast fabrication timeline. It was ideal for Peter and Brendan for a primary school to be scheduled on competition day as both of them had to produce a detailed programme for an Irish school building as part of a college assignment prior to the competition. The competition schedule was only a master programme not a detailed programme so they could use the programme they built themselves as a guideline so no major activity would be left out.

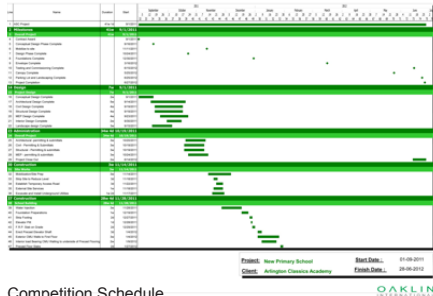
Before the programme could be created on competition day a site layout had to be produced and a conceptual design from the architects, Simon and Brandon to establish the size of the school building and its location on-site. The method of construction was discussed among the construction managers and the architects to come up the best solution possible. The competition sponsor and judges Speed Fab Crete owned their own precast concrete business. Investigating their company Brendan and Peter discovered that they would work closely with any construction firm to produce precast floor slabs. Both Peter and Brendan

used this information to incorporate precast floor slabs into the school building. By including Speed Fab Crete product within the school construction and that Oaklin would work closely with them, the Oaklin team gained a bonus point. The schedule was then created.

A draft was firstly completed by hand with all the summary activities and the estimate time length for each activity. The actual schedule was then drawn up on Asta Powerproject with all the activities and summary activities. The template which incorporated all the correct colour scheme and the America builders' calendar was used to produce the schedule on competition. This saved valuable time which Brendan and Peter did not have to produce all these components within the competition time limit. Once the activity is inserted to Asta Powerproject, to the right of the activity is the activity duration was added which consequently was the estimate duration Peter and Brendan calculated for the particular activity. To the right of the duration was the duration bar which shows vividly the length of the activity compared to other activities and the total duration of the project. When the schedule was complete it had to be stored as a pdf. file as it could be tailored to fit on the pages Molly set out for it within the binder.



Schedule Draft



Competition Schedule

In order to provide any easy viewing and a good explanation of the schedule during the presentation, simple to follow slides needed to be created with good visuals. Brendan and Peter had idea to do this but it was only from the help Simon gave that they produce the schedule slides for the presentation. You can see how simple they are to follow with good graphics below, compared to the schedule produced through Asta Powerproject for the more in detail version which was included in the binder.

Competition Binder: Schedule

Conceptual Design Complete
mid September 2011



Inform Public about construction
mid November 2011



Design complete
late October 2011



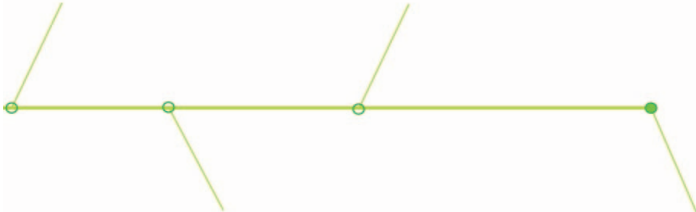
Permit + Submittal process
complete
mid November 2011



Canopy complete
late May 2012



Project complete late
June 2012



Landscaping complete
mid June 2012



Commissioning + Handover
early July 2012



Start Construction
early November 2011



Precast elements installed
early February 2012



Foundations complete
late December 2011



Envelope complete
mid March 2012



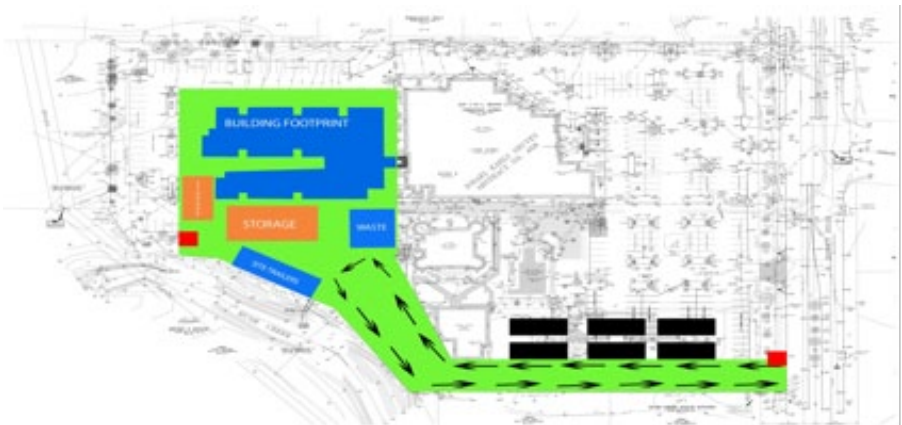
SARAJEVO

Competition Binder: Schedule

Site Layout

Following completion of the work schedule, Peter and Brendan focused their attention on correctly laying out the construction site. Due to the fact the site was located in an existing and active school; particular attention had to be given to the safety and welfare of both construction workers and school staff and children. Key health and safety aspects were highlighted such as solid timber site fencing, turnstile's at each entrance way and electronic key-card entry. The most important element of the site is the access for construction traffic. As a team, we decided to place our site entrance away from the existing entrances at the school. There were two reasons for this. One was to prevent a build up of traffic in the area during school drop off's and pick up's. The other reason was not to prevent access to the existing school buildings for fire trucks or ambulances in case of emergency. After the competition we saw that many of the teams had indeed put there site entrance at the point of access for emergency vehicles.

Within the site itself areas for storage, waste and site facilities were marked out accordingly. Delivery trucks are much bigger in the US and so the dimensions of a turning circle for a typical 18 wheeler truck had to be researched and applied to our layout. Small details such as this added up to produce a realistic site layout and construction section. It also allowed us to feel confident in both our schedule and site layout as no stone had been left unturned throughout the course of preparation.



Site Layout

Environmental Aspects

In America, the leading green building certification program is an organization called LEED. LEED stands for Leadership in Energy and Environmental Design and is an organization started in the US that focuses on promoting sustainable structures and changing standard industry practices to put more emphasis on green procedures that benefit building owners, occupants and the planet. LEED promotes green building within the AEC (architectural, engineering and construction) industry, provides designers, contractors and owners the resources and practices to build sustainably and has made their programs so well known and a highly respected achievement that many contractors attempt certification based solely on the brand's incentive.

key difference is BREEAM usually lists targets to be accomplished with a specific technology or prescribed solution, while in LEED only the intent is stated and the Project Team must come up with a solution that satisfies. (BREEAM, 14)

	BREEAM	LEED
Launch Date	1990	1998
Ratings	PASS / GOOD / VERY GOOD / EXCELLENT / OUTSTANDING	Certified / Silver / Gold / Platinum
Weightings	Applied to each issue category (consensus based on scientific / open consultation)	All credits equally weighted, although the number of credits related to each issue is a de facto weighting
Information Gathering	Design / management team or assessor	Design / management team or Accredited Professional
Third-Party Valuation	BRE	N/A
Certification labeling	BRE	USGBC (United States Green Buildings Council)
Update Process	Annual	As required
Governance	UK Accreditation Service (UKAS)	USGBC
Required qualification	Competent persons scheme	Passed exam
Assessor / AP-CPD requirements	Carry out at least one assessment per year	No CPD requirements

Figure 1: LEED vs. BREEAM

Europe has their own system of quantifying and acknowledging green building initiatives, called BREEAM (Building Research Establishment Environmental Assessment Method). Started in the UK in 1990, BREEAM has certified over 200,000 buildings based on criteria like energy and water use, the internal environment, pollution, transport, materials, waste, ecology, and management processes. (BREEAM, 2011)

LEED and BREEAM differ most in what each program sees as most beneficial. LEED focuses most of its credits on the indoor qualities that affect daily residents, while BREEAM is more focused on construction's disruption of the natural environment. To be certified for BREEAM, you must have an assessor come and score the project, however in LEED, the design team scores the project themselves, and sends the score into the USGBC for review. (BREEAM, 2011) Another

When our "company" Oaklin International started work on the Arlington Classics Academy New Primary School bid, the team had no idea if it was even feasible to make this a LEED project. We were hovering over a fine business line: if we don't make the design for the school LEED certifiable, odds are that our competition will, and we will lose credibility in the owner's eyes; however if we do make the school design a LEED project will that change our Guaranteed Maximum Price so drastically that we are no longer competitive?

In the end, the choice was a middle route: Try to create a design that incorporates the principles and design strategies of LEED as much as possible, but leave the decision to go the extra step and actually certify up to the owner.

This decision was made possible by the delivery system we were using: Design-Build. This project delivery method contractually requires both the Architect

and General Contractor to be involved in the project as teammates, not rivals. As the Design Build Institute of America's (DBIA) website explains, "Design-build streamlines project delivery through a single contract between the owner and the design-build team. This simple but fundamental difference saves money and time by transforming the relationship between designers and builders into an alliance which fosters collaboration and teamwork." (What Is)

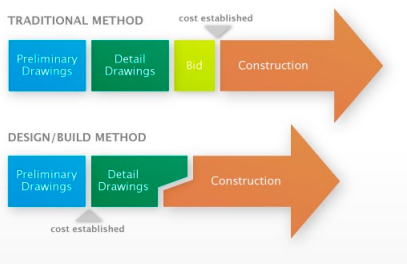
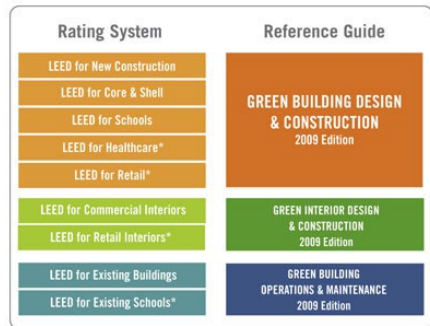


Figure 2: An illustration of Design Build advantages vs. Traditional Methods

Using the Design-Build project delivery system also allowed our team to better plan for "extras" like LEED certification.

The LEED program is run by the U.S. Green Building Council which is a non-profit, non-government associated council focused on making the design and constructing industries more green. Per the official website, the USGBC is "non-profit community of leaders working to make green buildings available to everyone within a generation." (What) To achieve this goal, the USGBC created the LEED program which "is intended to provide building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions." (What)

Within LEED there are different ratings systems for different project types, like: LEED for Schools, LEED Interiors, and LEED Operations and Maintenance. Within each rating system there are seven different point categories, like: Sustainable Sites, Water Efficiency and Materials and Resources. Within each of these Point Categories there are also multiple different points that can be earned voluntarily for the project.



* These rating systems are under development or in pilot. Once they are available supplements will be sold for the new LEED 2009 Reference Guides.

Figure 3: LEED Rating Systems

There are four certification levels in the LEED Program. The most basic is "Certified" meaning the project achieved between 40 and 49 points. The next level is "Silver" meaning the project achieved between 50 and 59 points. The third level is "Gold" which is between 60 and 79 points. The last and most elite certification level is "Platinum" which is awarded when a project achieves 80 or more credit points (LEED, 26).

The LEED program has nine different rating systems by which a building can be certified. For the Arlington Classics Academy, we had the choice of using two systems: LEED for New Construction or LEED for Schools. The team chose to use the LEED for New Construction program as we thought it gave us the

Environmental Aspects

best chance of achieving a high level of certification. We also agreed that the recognition that comes from using the New Construction system is greater because it is more commonly used. LEED for Schools is perfectly fine, but for this project our team was looking for something that would deliver a big bang for the owner's buck, and we determined that this rating system would deliver.

Like BREEAM, LEED has credit categories. To achieve certification, a project must apply for and win a certain number of required points. The points are divided among seven credit categories. The categories are:

1. Sustainable Sites
2. Water Efficiency
3. Energy and Atmosphere
4. Materials and Resources
5. Indoor Environmental Quality
6. Innovation in Design
7. Regional Priority

All credits are voluntary, meaning each individual project team gets to decide which credits they want to pursue for their project (Green, 18).

What is mandatory, however, is that the Prerequisites for the Credit have been met. Each Category has certain Prerequisites (such as building commissioning at the end of a job) that must be met or no credits in that category can be earned.

For example, when Oaklin was conceptualizing our design for the Academy, we knew that to achieve any "Water Efficiency" credits the prerequisite was to have our water use system be at least 20% more efficient than the baseline system. Knowing this, we were able to design the building from the outset to use systems

that would meet these strict criteria.

During our first design charrette the team identified three design themes that would be important to us: using the new school to knit the campus together, identifying and providing for the present and future needs of the school, and incorporating sustainability into the project. Taking this direction, the Project Team was able to sit down and identify the LEED credit categories that were most important to our vision and from there look at each individual credit within the category that we thought we could achieve.

When striving for LEED Certification the project team needs two main materials: a LEED Scorecard (see Figure 4) and a LEED Reference Guide both from the rating system they're using (for us, New Construction). The scorecard outlines the prerequisites and credits that are possible for that category and the point values associated with that credit.

As I previously mentioned, Oaklin's strategy for LEED certification was simple – achieve credits in places that made the most sense to our vision for the school, while not going overboard until the owner chose to. Since this was a competitive process, we wanted to give the owner every option possible, including not going after certification at all.

Because we were using the Design-Build delivery method, we were able to leave a major decision like whether to spend money on a LEED certification up to the owner, and still have a competitive bid. Due to the owner, architect and contractor all having a contract together, they all feel responsible to each other – everyone is in the same boat. By looking out for the owner's back, you are also looking out for your own.

Using the Design-Build project delivery method is a way to break from the antagonistic cycle in the AEC industry of pointing fingers and placing blame. Our Design-Build team chose to use LEED as a competitive tool, yes, but we would never have put our time into it if we didn't anticipate the owner at least wanting it as an option.

Section	Possible Points	Points Earned
Sustainable Sites	24	24
Water Efficiency	10	10
Energy and Atmosphere	35	35
Materials and Resources	14	14
Innovation and Design Process	6	6
Total	100	100

Figure 4: An example of a LEED for New Construction Scorecard

Some of the credits we chose to incorporate into our design for the school were: daylighting (angling the classrooms to utilize the most natural light), natural ventilation (placing the building at the best angle to take advantage of natural wind currents), a green roof (a great educational aid, as well as reducing Heat Island Effect!), natural landscaping and low flow/flush water fixtures.

In all, we discovered 31 credits to easily incorporate into our design philosophies. However, the rating system requires 40 to achieve the base possible rating which is "Certified". This is where we let the Owner make a decision. In our bid proposal, we outlined the 31 credits we had identified and where we were going to make up the 9 missing.

We presented the owner and judges with a plan to achieve the nine credits still missing in the "Energy and Atmosphere" credit category. In this category, the project can achieve up to 19 points based on how efficient the HVAC system is. Depending on how much money the owner wanted to spend on creating a sustainable HVAC system, the school could get a "LEED Certified" building, a "LEED Silver" building, or a completely uncertified building.

We also made it clear to the owner and judges that with or without LEED certification our team had designed a space for the students that was sustainable, took less of a toll on the environment and would cost less to run than a school built using traditional methods.

The judges' responses to our proposal were encouraging. They pushed us on why we hadn't gone straight for LEED certification, but we explained that we were focusing on the needs of the client, and since it was their money we wanted to be good stewards of it and not push something they didn't see value in. The school would still be completely functional without a LEED certification – students can learn in a building that's not environmentally conscious. What Oaklin International stands for isn't something that makes us look better; our company looks after the needs of the client and acts in ways that benefit them.

In hindsight, our LEED strategy helped us win. Instead of looking like we didn't know what we were doing (as was a fear) leaving the final decision up to the owner really made them feel included. All too many times, designers and contractors get involved with a project and take ownership away from the true Owner. The design spirals out of control, materials

get changed on the fly – I believe that many owners sometimes feel left out of their own projects. By leaving the choice of certification up to the Owner, we gave him some control back. He perceived us as really caring for his wants, and truly looking out for his best interests.

Working on this building with an international, integrated team not only gave us an edge over our competition, but it helped us produce a better product. By combining our different backgrounds, educations, interests, specialties and viewpoints we created something that was larger than ourselves. We gave the Arlington Classics Academy not just a new building, but also a theme for their campus and student life. By uniting under duress (and there is a lot of duress in this competition!) and not allowing it to come between us, our Irish/American company led us to success, acclaim and friendships that last longer than any winner's ribbon.

Presentation

Before the competition the team got presentation tips and advised from the team's coach, Oklahoma University's presentation coach Price and the employee relations manager at BECK. These tips help the teams' presentation skills dramatically from how they spoke, body language and their individual and team confidants. On the 14th of February each competition each design and build team made a twenty minute presentation to the judging panel to convince them that their own teams' design was the most effective with addition that they are the most suitable and appropriate team for delivering the project. At the end of the presentation, the panel had five minutes for any questions or queries that they may have had. The presentations ran from 8:00 until 15:00 with each team given a half an hour time slot. The time slot in which the team would present was decided by pulling a team name from a hat. The OU, DIT international team was pulled forth from the hat and the team decided on the last slot of the day at 14:30 until 15:00. Before the presentation took place a great deal of preparation had to be undertaken and completed. The previous night to the presentation, the 13th of February each team member's presentation slides had to be created by themselves and possible help from the other team members. These had to be finished and handed in to the competition coordinators before 6:30 a.m. on 14th of February.

During a team meeting before preparations took place it was decided that the team should have a gift to give to the client, the Speed Fab Crete judges. Over a team discussion on what the gift should be, it was decided a flyer of the new primary school Arlington Classics Academy opening day would be created.

During the same meeting a deadline for the presentation slides was set for midnight as the team needed to get some rest and sleep. The following day, the presentation needed to be practice to perfect what each member would say during the presentation and get the timing exactly right. There was five minutes allocated before the presentation for setup and five minutes after the presentation for questions. The presentation itself had to be twenty minutes maximum and sixteen minutes minimum in length. If the presentation finished on a time outside this time range the team would lose points for it. Practice on the presentation began at eight in the morning and following the schedule the team outlined at the meeting the previous night.

Oaklin's Team Schedule

Submit Powerpoint	06:30
Breakfast	07:30
Practice Presenting	08:00
Break	10:00
Practice	12:00
Lunch	13:10
Arrive at TEXO	13:30
Present	14:30

Presentation

The actual presentation went fabulous with timing coming in at nineteen minutes and fifty nine seconds. All the judges' questions were answered to more than their satisfaction and even getting them to laugh when Dan answered the last question without any flawlessness. The team score a nineteen point one out of a possible twenty for the presentation.



Oaklin International preparing to present to judges

Reflections

Reflection, for the influential Brazilian educator Paulo Freire, was the critical component of education. Reflection, he believed, resulted in “critical consciousness” in which learners become actors, not observers, and authors of their own decisions (Freire:1974). This is certainly true in terms of all aspects of a persons life and the formula below offers a simplistic position as to how learning develops:

Action + Reflection = Learning

Learning is both an active and reflective process. Though one learns by doing, constructing, building, talking, and writing, learning is achieved by thinking about events, activities and experiences. The quotes from the competitors of the OU/DIT International Design-Build below show the true learning through action and reflection that has occurred through the special learning journey that took place for the fortunate few. The reflection and application of that journeys travels with us and will do for may years. Along with the special memories.

Lloyd Scott

As an educator one aspires to creating a significant environment for learning, to encourage and develop self-regulation and appropriately facilitate learning. To be part of an active educational initiative where collaborative learning was the ultimate goal has been truly rewarding. Most academics, whether consciously or not, aspire to have learning take place as part of the educational experience for students, few witness that learning taking place. Being involved in the DIT/

OU design build project to ‘witness’ the learning and to see students grow in confidence, belief and stature has been a special for me. Something all educators should experience! It has been very rewarding and fulfilling and I would like to thank the DIT/OU international design-build winners of 2011 for the special memories.

Brendan Towey

From the entire international design/build experience I learned that teamwork comes in all forms. Our team did not meet face to face until 2 days before the competition but we broke the ice very quickly and bonded. For me, the entire experience proved that drive and determination will overcome any task, individually or as a group.

Peter Whoriskey

The entire competition and preparations were hard work but educationally rewarding plus a once in a life time experience. From making friends half way round the world and here at home, getting to travel, getting a glimpse of how the American’s do construction, and the really enjoyable time we all had working together as a team.

Simon Harrington

This project was an inspirational experience, full of fascinating people who exchanged ideas and learned from one another in a rich collaborative process.

The Future

Making prognoses about the future direction of the education of construction professionals, not least for the reason of the constraints of our life's journey, is fraught with difficulty. Since neither the construction industry nor higher education exist in a vacuum there is a necessity to come to terms with and understand the present and future contexts before going on to discuss the possibilities. Graduates in the future will need to be highly technical, adaptable, good communicators and lifelong learners (Hunt 2011). Active learning approaches, like the Design Build experience create the opportunity to develop those skills, competences and understanding. Not only that it goes further where many of the tacit elements that make up the higher educational experience are embedded in this methodology. The holistic, interdisciplinary approach to the design, construction, production and operation of buildings is likely to require changes in the way the process is arranged, resourced and managed in the future (Atkin, 2009). There will be a different kind of professional in the twenty or thirty years whose education and/or training will be required to permit them to make the many connections in thinking and actions required to solve complex problems. Future construction professionals must challenge the conventional ways of the past in ways that use their creative and innovative capacities. The future of the construction industry will be in safe hands because of the commitment, desire and professionalism of students and graduates like Molly, Brandon, Dan, Brendan, Peter and Simon. Sharing the journey with them has been rewarding, enlightening and a privilege for Ken and for me. It has made us better educators and has provided the motivation and appetite for future.

The continued support for the Oklahoma University/ Dublin Institute of Technology initiative is vital to the creation of the future leaders in construction.

Carpe Diem!



Ken and Lloyd, ASC conference, Omaha, Nebraska



Team Photo, Awards Dinner and Ceremony



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Request For Proposal

February 12, 2011

RE: ASC Region V Student Design-Build Competition
New Primary School for Arlington Classics Academy
Arlington, Texas

On behalf of Speed Fab-Crete, we are pleased to inform you that your firm has been shortlisted to provide design-build services for a new Primary School for Arlington Classics Academy at their recently acquired campus site. Enclosed for your review and use you will find:

1. Exhibit A – School background, project program and special project requirements
2. Exhibit B – Overall topographic survey
3. Exhibit C – Aerial photograph
4. Exhibit D – Location maps
5. Exhibit E – Project Cost Summary format
6. Exhibit F – Abbreviated Geotechnical Engineering Study
7. Exhibit G – Architectural Site Plan (showing current renovation project underway)
8. Exhibit H - Master Site Plan/Floor Plan – (showing current renovation project underway)
9. Additional electronic files include:
 - Overall topographic survey (.dwg)
 - Architectural site plan (.dwg)
 - Project Cost Summary (.xlsx)

We are requesting that the RFP response contain the following information:

- A. **Design-Build Team:** Company background
- B. **Proposed Design Solution for New Primary School:**
 1. Site Plan of the proposed design which includes indication of the future High School building on the site
 2. Floor Plans
 3. Exterior Elevations or 3-D views
- C. **Project Cost Summary / Cost Estimate**
- D. **Project Schedule**
- E. **LEED Features:** describe design features or construction activities that would contribute to LEED certification should the Owner decide to certify this project
- F. **Assumptions / Qualifications:** List any major assumptions or qualifications made to complete this RFP

References

Banwell, G. H. (1964). The placing and management of contracts for building and civil engineering work. London, HMSO.

Design-build institute of America, D. (2011). "Design-build project delivery report." Retrieved 05/10, 2011, from <http://www.dbia.org/pubs/research/rsmeans110606.htm>.

FHWA, I. (2008). "International Technology Scanning Program: Bringing Global Innovations to U.S. Highways." Retrieved 19/09, 2011, from <http://international.fhwa.dot.gov/contractadmin/04.cfm>.

Moss, L. (2001). "Design-build." Retrieved 21/09, 2011, from http://www.modular.org/showcase/designbuild5_01.aspx.

Peace, S. and J. Bennett (1995). How to use a design build approach for a construction project: A client guide. Berkshire, UK, CIOB.

Rowlinson, S. (1987). Design build - its development and present status. CIOB. Berkshire, UK, CIOB: 19.

BREEAM vs. LEED. Inbuilt Ltd. February 2010. Accessed 12 September 2011. <<http://www.inbuilt.co.uk/media/406565/breemvsleed.pdf>>.

Figure 1. Comparison of Rating Systems. Astudentoftherealestategame.com. Accessed 12 September 2011. < <http://www.astudentoftherealestategame.com/wp-content/uploads/2010/10/Comparison.jpg>>.

Figure 2. Design Build vs. Traditional Method. Blackriverbuilders.com. Accessed 12 September 2011. <<http://www.blackriverbuilders.com/designbuild.html>>.

Figure 3. LEED Rating System. Everblue.edu. Accessed 12 September 2011. <<http://www.everblue.edu/leed-rating-systems-explained>>.

Figure 4. LEED Scorecard. LearningLEED.com. 27 May 2011. Accessed 01 September 2011. <<http://leadingleed.com/2011/05/27/how-leed-works/>>.

Green Building and LEED Core Concepts, First Edition. U.S. Green Building Council. 2009.

LEED Green Associate Study Guide. U.S. Green Building Council. 2009.

"What is BREEAM?". BREEAM. Accessed 12 September 2011. <<http://www.breem.org/page.jsp?id=66>>.

"What is Design-Build?". Design-Build Institute of America. Accessed 12 September 2011. <<http://www.dbia.org/about/designbuild/>>.

References

- “What is Design-Build?”. Design-Build Institute of America. Accessed 12 September 2011. <<http://www.dbia.org/about/designbuild/>>.
- “What LEED Is”. U.S. Green Building Council. Accessed 23 August 2011. <<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988>>
- Duff, T., Hegarty, J. and Hussey, M. (2000) *The Story of the Dublin Institute of Technology Dublin*, Blackhall.
- Freire, P. (1974) *Education for Critical Consciousness*, Continuum, London.
- Griffiths, R. (2004) knowledge production and the research- teaching nexus: the case of the built environment disciplines *Studies in Higher Education*, 29(6) pp709-726.
- Langford, D.A. and Hughes, W.P. (eds) *Building a discipline: the story of construction management*. Reading: ARCOM.
- Mitnik, R., Recabarren, M., Nussbaum, M., & Soto, A. (2009). Collaborative Robotic Instruction: A Graph Teaching Experience. *Computers & Education*, 53(2), 330-342.
- Ratcliffe, J. (2007) *Built Environment Futures: adopting the foresight principle in formulating and applying a theoretical approach towards the creation of a sustainable built environment*. In Kosela, L. and Roberts, P. (Eds), ‘Towards the Foundation of Theory for the Built Environment Symposium’ 18-19 June 2007, University of Salford, Research Institute for the Built Environment.