INVESTIGATING DESIGN-BUILD AS AN ALTERNATIVE MODEL FOR ARCHITECTURAL EDUCATION

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INTRODUCTION

The importance for the author of responsible educational architecture is unquestionable and the reasoning behind this cannot be explained much better than by the words used to introduce the Live Projects of the University of Sheffield School of Architecture: "We see the Live Projects as important in educating architects of the future. Too often architectural education establishes a set of remote values which then go to define the profession; these centre on the myth of the architect as individual, male, hero-genius clinging to a set of ideals that are often removed from the concerns of the everyday world. In contrast, the Live Projects develop collaborative techniques and skills in communication and participatory practice – all approaches that are essential and absolutely relevant to the future practitioner" (University of Sheffield School of Architecture, 2012).

Students in their second year of study at the Cape Peninsula University of Technology recently completed an outdoor classroom at an under underprivileged multigrade school. The positive experiences and exciting learning opportunities presented by the project to the students, staff and school community have led to the initial establishment of a design-build unit within the department. Although each architectural school is situated within its own geographic, political and social context, there is the chance to learn from developing and established design-build programmes while being in the process of positioning the CPUT programme in the curriculum.

THE LITERATURE SURVEY

The literature is categorised to form an understanding of the aspects of design-build that is covered in current literature, those that are not covered and what opinions are voiced.

Current placement in the curriculum

Where and how design-build is situated in the curriculum seems to be almost incidental. Of the design-build programmes scrutinised only two have a very clear strategy of making design-build part of the curriculum where it is specifically quantified within the credits of the course. Other programmes seem to do design-build as opportunity arises with projects situated in different years and courses (Perold & Voulgarelis, 2012).

The one, Live Projects at the University of Sheffield School of Architecture introduce design-build projects in their MArch academic year where it comprises twenty per cent of the course work. Students work in small groups of four to twelve people for a duration of six weeks. Not all of the projects offered are design-build but all are real projects with real outcomes (University of Sheffield School of Architecture, 2012).

The other, Rural Studio previously had three programmes for students, which included 2nd year students spending a semester in Auburn, thesis students spending their entire 5th year Auburn and lastly an additional summer outreach programme (Feuerborn, 2005). Currently, due to a change in the coursework in 2009, third-year students spend time at Auburn working on a charity house and also taking the subjects Vernacular Architectural History, Materials and Methods of Construction, and Watercolor. The thesis in the 5th year still remains and the students live and work the full academic year in Hale County. In the thesis the "focus of the students' academic year is the research, design, construction, and completion of a complex community project" (Rural Studio, 2012).

Other than project-based integration into the architectural curriculum there "are no specific subjects in mainstream architecture schools that are devoted to the understanding of design-build construction" (Abdullah, 2011).

In the United Kingdom real projects are introduced in many schools, but it is not yet a compulsory part of the curriculum (Harriss, 2012).

Project formats

Design-build projects take on various formats. An understanding and/or classification of the different formats could help with the identification of educational objectives and could possibly provide a better idea of how and where to integrate these types of projects in a curriculum.

Christenson and Srivastava (2005) identify "four distinct approaches to full-scale investigations in architectural education". The first is named "experimental" – the testing of specific ideas or technology, for instance climatic performance; secondly "inhabitable" – real work

in a mostly social situation that leave something for later use by a community; thirdly "prototypical" – where students observe and is taught how an aspect of technology is done hands-on, but in a laboratory situation, i.e. not necessarily on a 'real' building; and lastly "generative" – open-ended and very experimental building projects which do not in essence have to be completed or even be functional.

Most current academic design-build projects would fall in this four part classification under the "inhabitable" approach. All of the advocates of this type of "inhabitable" project emphasise the importance and relevance of doing significant work in a world where social inequalities are rife and solutions are needed for making the quality of life better for all.

These "inhabitable" projects are typically funded by sponsors, use recycled and/or natural materials and have a real social need to fulfil in a specific time constraint.

In contrast to the "inhabitable", there are academic projects that would fall under the category of "generative" projects. For example, at the Washington-Alexandria Architecture Center, which is called the "urban extension" (Washington-Alexandria Architecture Center, 2012) of the Virginia Tech School of Architecture and Design, design-build projects happen in the building itself. There "design-build exhibitions are understood as the continuous punctuation of the work in progress, and it does not necessarily signify the end or finality of a given project" (Foote, 2012).

Since 1990 students have proposed and been engaged in a range of projects of various scales and complexity. These include the "2-story waac library and circular stair, the brick cylinder, the cantilevered piano platform with glass handrail, the pivoting movie screen panels, the photography studio, the meeting bench, the 'secret room' and the brick courtyard" (Washington-Alexandria Architecture Center, 2012).

There is scope to further investigate project formats at different schools and to classify these from different perspectives.

Pedagogic approach

There is a call for identifying good live or real project precedent and to define "their pedagogic as well as their practice ready value" (Harriss, 2012). No literature was found that with clarity classify or identifies the pedagogic approach. Harriss (ibid) mentions that real or live projects are aligned with established learning theories. These are identified as 'situated learning', 'whole-person learning', 'problem-based learning', 'student-centred learning', knowledge creation', 'engaged scholarship' and 'service learning'.

The Oxford Brookes School of Architecture had a symposium in May 2012 that focused on Live Project pedagogy. Live Projects are real projects and include design-build projects. The symposium was held with the aim of "co-creating a pedagogic best practice framework" (Architecture Live Projects Pedagogy Symposium Oxford 2012, 2012).

From the literature it seems clear that there is a search to understand pedagogy of design-build projects with the specific aim of clarifying and identifying an appropriate place in the curriculum and that it is being recognised "as great learning vehicles" (Sokol, 2008).

However, design-build "programs integrated in academic architectural programs have been in existence for just about two decades. As such, development of their pedagogy and organizational structure is emerging" (Rice-Woytowick, 2011).

An unpublished study investigating design-build programmes at several educational institutions by the Kansas State University, entitled the K-State Design + Build Protocol Committee Report of 2005, states that pedagogic approaches are similar across academic institutions (refer back to most projects being of the "inhabitable" nature that could start to explain this). The similarities in terms of the pedagogic approaches include setting the projects so that students make decisions in a consensus-based manner and that students do collaborative construction work where teams lead various aspects of the construction (Rice-Woytowick, 2011).

There is an apparent difference of opinion on whether the pedagogy is grounded (enough) in theoretical practice. Foote (2012), describing the projects done at WAAC that are "generative" projects according to the earlier classification, presents the opinion that, from "a pedagogical point of view, once the notion of completion is removed from its customary ties with the end of a project, the typical linearity from idea to execution is thrown open for chiasmic revisions and reconsiderations as is dictated by the continuously evolving project. In this way, exhibitions are understood as the continuous punctuation of the work in progress, and it does not necessarily signify the end or finality of a given project".

Foot (2012) argues for the notion of reflection, open-endedness and non-linearity where it is not necessarily clear what the end product/project will be and the discovery of possible solutions happens within the building process.

It would be interesting to investigate whether all "inhabitable" projects are completely linear, in other words whether the project is fully designed and solved before that building process starts, or whether there is discovery and reflection during the building phase as well. There is a warning against the possibility that students' "role may easily become that of executants or assemblers of the pieces emerging from fabrication machines with little possibility for reimagining alternatives or improvements as the work takes material form" (ibid).

Pedagogy could be more clearly classified and explained. Doing this according to the four categories identified by Christenson and Srivastava (2005) would be a start.

Academic outcomes

Although in current literature academic outcomes have not been explicitly investigated, outcomes classified according to the four categories would be an interesting study.

Outcomes mentioned in the literature, either in articles, hand-outs to students or on websites devoted to design-build projects, include learning physical skills; working in teams or collaboratively; dealing with problems in real time; developing skills in management; communication; team work; brief development and consultation skills; involvement in creative and collaborative design; the improvement of representation abilities; realising the value of process rather than exclusively prioritising final product; leadership; real-world intensity; creating a sense of social justice in students (Rice-Woytowick, 2011) (Sokol, 2008) (University of Sheffield School of Architecture, 2012).

Some design-build programmes specifically state their student outcomes, where others imply through describing projects what these outcomes are.

Other/incidental outcomes

Academic specific outcomes are not the only outcomes associated with design-build projects. In "inhabitable" projects there is usually a deserving beneficiary who retains the project and uses it afterwards.

It is however not just the use of the building or structure that the beneficiary receives. It has a further-reaching social impact. It might free up the inhabitant of a previous non-functional building to now pursue new economic opportunities because of the restructuring of space and function or simply because of better living conditions (Sokol, 2008).

For students the outcomes also extend beyond the scope of the project into the long term. Students learn that "you do not have to be good at everything because you can work in a team with different strengths" that leads to a growth in self-confidence. Students are better prepared to go into the workplace; they are prepared on a more practical level to engage with other professions (i.e. engineers). Students get to understand that the possibility exists to contribute to society through small-scale work and to start their own design-build practices (Sokol, 2008).

Educators' perspectives

Educators involved in design-build projects do so seemingly out of passion for the hands-on educational and social value that these projects inherit. In a very valuable interview with five design-build educators (Sokol, 2008) educators express views on the joys and difficulties associated with design-build projects.

The opinion is expressed by several of the interviewees that, outside of the actual construction of the project, fundraising is the most time-consuming and worrisome aspect of running a design-build studio.

The educators also comment on the necessity of being in control of a project without taking over control of everything, of the ability to help students to not be impaired by their lack of skills and of being able to steer students in the right direction in terms of the technological solution. One educator mentions that it is important not to push a personal vision or design agenda. Another says that the excellence of design should not be compromised because it is done by students.

The different educators have varying opinions and inputs on the organisational aspects of the project that include how the project is conceived; how the winning design is selected from amongst all the possible student solutions; how and whether the project runs from one year to another; how the student groups are organised.

Outside of the above interviews, the opinions expressed are that "the academic live project is (already) quite complicated to administer and manage" (Jann, 2009). Also that educators need to consider that design-build projects "brings a number of legal and liability issues not normal to the education of students" (Rice-Woytowick, 2011).

It seems that educators engaging in design-build education should understand that difficulties can arise and that unforeseen things can happen. Time, technical difficulty, funding, materials, manpower could all cause delay and frustration.

A thorough understanding and research into the experience of educators in the field could clarify and clear the path for future design-build practitioners.

Student perspectives

Some formal investigations have been done into the perception of students taking part in design-build programs. Students seem to value and specifically select to attend schools with design-build programs and that the community or social aspect of the work is a big draw card. For students it is "not just learning how to swing a hammer or how something sits on something else, but there is real interest in being citizens or a larger community" (Sokol, 2008).

In one study (Abdullah, 2011), which specifically tracked and evaluated the student response of participants in a design-build exercise at the University of Nebraska- Lincoln, students said they realised that participating in actual construction "broadens their learning in architecture".

They also seemed to value and to start understanding the narrow link between designing and building and the relevancy design-build has in their formal education. It appeared that the difficulty and complexity experienced in the construction process emphasised

this link. The idea that drawings actually must communicate clearly to builders, was another lesson learned.

Students further placed emphasis on the need for close collaboration and open communication in the project team. The complexity of the process again led to this realisation.

Another valuable lesson was the realisation of the time it takes to complete actual building work.

All students taking part in the study expressed the view that hands-on learning should become part of the architectural curriculum in some way – either compulsory of by elective.

In this study students did not specifically mention whether the fact that they were doing "social" work formed part of their satisfaction with the process.

Seventy-five per cent of participants in the study would want to become involved again in design-build either in education or in practice.

Client perspectives

The perspectives of clients who are recipients in design-build programmes have not been investigated in the literature reviewed. In the client guide (the only client guide found in the literature reviewed) of the University of Sheffield School of Architecture clients are told that many

> "clients don't realise the value of the service they are receiving. Working with students does not mean expectations should be low.
>
> The total time spent on each project by a group over its six-week duration equates to roughly the same number of working days that a single person manages in a year. This is a substantial amount of work by high calibre students in their fifth or sixth year of architectural education, with at least a year in professional practice and a supervising tutor offering experienced advice.
>
> We expect the highest quality and in the past, clients who have underestimated what could be produced have been overwhelmed by the results. In many cases client bodies feel the students participating can be more approachable and free-thinking than their perception of someone in professional practice" (University of Sheffield School of Architecture 2012).

Although the above describes what a client can expect, it would be important to research what client's perceptions and perspectives are before the process starts, during the process as well as a follow up a few years after completion. Students would benefit from the feedback and projects could be structured better with that knowledge.

Underlying beliefs (or why we do this)

Why do academics engage in design-build practice? What makes them passionate about pursuing this? And there is almost no doubt that it is a passionate pursuit. A few opinions are mentioned below.

"In the discipline of architecture, as is generally true of the plastic arts, a comprehensive understanding of material is essential to success: architectural work is bounded by, and possibilities for innovation are guided by, material properties. As architectural educators, we are convinced that our students must engage material at full scale to build the understanding and conviction necessary for successful operation within the discipline. We believe that the study of architecture cannot be limited to representational study (i.e. "paper architecture"); at some level, successful study must engage direct, full-scale investigations of the physical components of the work" (Christenson & Srivastava 2005:232).

"The design-build studio can provide a fertile testing ground for pursuing answers and insights to questions of significance beyond the context, or the reach, of the traditional studio" (Hinson 2007).

Research that could proof valuable is studying the profile of academics that pursue this work.

In conclusion

From the surge in literature published in the last few years, it is clear that design-build is gaining popularity and is pursued by more and more schools. It is also clear that there are many academic and research questions that could be pursued to clarify the place of design-build in the curriculum. Very little qualitative or quantitive research have been done. Most of the work published is reflections on projects.

"Through acts of thinking we came to better see that which is made, both by ourselves and others" (Washington-Alexandria Architecture Center, 2012).

BIBLIOGRAPHY

Abdullah, Z. (2011). Getting Their Hands Dirty: Qualitative Study on Hands-on Learning for Architectural Students in Design-build Course. *Journal of Design and Built Environment*, 8. Available at: http://umrefjournal.um.edu.my/filebank/published_article/3283/Vol 8-4.pdf [Accessed May 2, 2012].

Architecture Live Projects Pedagogy Symposium Oxford 2012. (2012). *Symposium Abstract Compendium.* [online]. 2012. Available from: http://architecture.brookes.ac.uk/research/symposia/liveprojects2012/documents/LPS-2012-Abstracts-Compendium.pdf [Accessed: 20 June 2012]

Christenson, M. & Srivastava, M. (2005). A Proposal for a Cross-Disciplinary Design Pedagogy: Generative Full-Scale Investigations. *International Conference on Design Education*: (95), pp. 231-238. Available at: http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:A+Proposal+for+a+Cross-Disciplinary+Design+Pedagogy+:+Generative+Full-Scale+Investigations#0 [Accessed May 30, 2012].

Carpenter, W. (1997). Learning by Building: design and construction in architectural education.

Feuerborn, G. J. (2005) Making Architecture, Making Community: The Pedagogy of an Urban "Rural Studio". Human Factors and Architectural Research Methods 407/507. [Online] 2005-12-14. P 11

Foote, J. (2012). Design-Build: Build-Design. Journal of Architectural Education, 65(2), pp.52-58. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1531-314X.2011.01197.x/full [Accessed May 30, 2012].

Harriss, H. (ed). (2012). *Architecture Live Projects 2010-2012.* [online]. 2012. Available from: http://architecture.brookes.ac.uk/media/resources/LiveProjectsv2.pdf [Accessed: 20 April 2012]

Hinson, D. (2007). Design as Research Learning from Doing in the Design Build Studio. Journal of Architectural Education, 61(1), pp.23-26.

Jann, M. (2009). Revamping Architectural Education: Ethics, Social Service, and Innovation. : International Journal of Arts and Sciences, 3(8), pp.45-89. Available at: http://openaccesslibrary.org/images/XEW135_Marga_Jann.pdf [Accessed June 2, 2012].

Perold, R. & Voulgarelis, H. (2012) Design-build programme 2012, [Handout] Cape Peninsula University of Technology, Department of Architectural Technology, Cape Town, January 2012

Rice-Woytowick, P. (2011). Academic design/build programs as mechanisms for community development, A report submitted in partial fulfilment of the requirements for the degree Master Of Science In Community Development, Department of Landscape Architecture/ Regional and Community Planning College of Architecture, Planning and Design, Kansas State University: Manhattan, Kansas.

Rural Studio (2012) Studio [Online]. Available from: http://apps.cadc.auburn.edu/rural-studio/Default.aspx?path=Gallery%2fPurpose%2fObjective%2f [Accessed 1 April 2012]

Sokol, D. (2008). Teaching by Example: Design-build educators talk pedagogy and real politick. *Architectural Record.* [Online]. Available from http://archrecord.construction.com/features/humanitarianDesign/0810roundtable-1.asp [Accessed: 20 April 2012]

University of Arkansas Fay Jones School of Architecture (2012) Design/ Build [Online]. Available from: http://architecture.uark.edu/281.php [Accessed 30 April 2012]

University of Sheffield School of Architecture (2012) About Live projects [Online]. Available from: http://www.ssoa.group.shef.ac.uk/?page_id=2&page=3 [Accessed 1 April 2012]