



Learning by Building: An Investigation of Two Studio Approaches to Design-Build Within One School of Architecture

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Abstract

Design-build style educational programmes have become a global phenomenon in schools of architecture. As this pedagogical approach continues to evolve and gain popularity it becomes relevant to discuss its motivation, implementation and outcome. Inevitably the scope and complexity of the build projects are dependent on very real constraints regarding time, organisation and economy. The resulting constructions tend to be either temporary structures with simple materials and a pavilion-like character, or small, fully climatized pilot projects. This paper investigates two studios within the Oslo School of Architecture and Design (AHO), which have successfully integrated full-scale building within their master level course pedagogies; the Scarcity and Creativity Studio led by Professor Christian Hermansen and the Oslo Project run by Professor Marius Nygaard. Both studios have received recognition for their interdisciplinary teaching and innovative buildings, but implement full-scale building very differently within their teaching. Their pedagogical models and motivations are presented to illustrate the scope of educational potential inherent to the design-build approach. Limitations and challenges related to each of the AHO studios are explored and discussed.

1. Introduction

The use of design-build methodologies in architectural education is founded on a belief that the quality of architecture is verified by its realisation, and that the experience of transforming architectural intention into a real building is full of educational potential and pedagogical opportunities.[1] Since 2010, the Oslo School of Architecture and Design (AHO) has developed two separate and distinct pedagogic approaches to implementing design-build within educational programmes. The Scarcity and Creativity Studio (SCS) offers a design *and* build model through which participating students follow a project from design to completion within the confines of one semester. In contrast the Oslo Project (OP) offered a design *for* build model that exposed and connected students to the broader field and processes of construction. The SCS model has resulted in a series of small-scale community projects in Chile, Finland and Norway, while the OP resulted in a climatized module prototype that included a series of technical solutions to meet 'passive house' standards. Both of these courses view the building process as a tool rather than ultimate aim within a broader pedagogical framework. This paper will present and compare the two models, to illustrate the inherent potential of the design-build approach and highlight some of the key challenges.

The two co-authors of this paper have initiated and developed the design-build models presented. The paper draws upon the authors' experiences and reflections as educators and pedagogic professionals to explore some of the advantages and limitations in their approach to design-build as a pedagogical tool.

2. Two studios

2.1 The SCS model

The SCS aims to expose students to an experience of the complete building process, from interacting with the clients to concept design, structural analyses, detailing and construction in full-scale. The studio offers one course each semester and has built a total of nine projects since 2012. The selection of clients and projects for each of the courses is largely opportunistic in so far as it takes advantage of the clients who present themselves to the studio. The client's needs are then developed by the studio to fit within the remits of the SCS. The initial concept phase of the design process is run like an architectural competition where students develop individual proposals. Through successive reviews the number of projects are reduced and students develop the selected projects in groups. Once the final design has been selected the students collectively work to finish the detailing, arrange the logistics and plan the final build. Construction usually takes one month each semester. The most recent of the studio's projects was The Wave: Public Performance Space and was built for a local

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theatre, art and architecture group in Valparaiso, Chile. The Wave was nominated for the Mies Crown Hall Americas Prize in acknowledgement of “the interdisciplinary nature” of the project.[2]



(SCS 2015: "The Wave": Construction site and finished build. Photos: AHO)

2.2 The OP model

The OP was established in 2010 and brought together a network of schools, research institutions, authorities and companies with the aim of establishing a new model for interdisciplinary teaching and exploratory building within this sector of higher education. The OP utilised the design and build of a prototype module as a platform for uniting disciplines and exploring solutions for low energy and ‘passive house’ standards. The architectural design of the module was developed by a studio course at AHO in autumn 2011. The course focused on the industrial conditions of modular building and on developing technical solutions in cooperation with industry and external specialists. Energy solutions were developed in cooperation with engineering students from the Oslo and Akershus University College, while pupils at the Kuben vocational school were responsible for constructing the module. An elective course at AHO in the spring of 2012 followed up on details and the building process. The project was selected as an example of interdisciplinary teaching and innovative building by the government-appointed strategy groups; Bygg 21 for the Norwegian building industry and Skog 22 for the forest and wood based sector.



(The Oslo Project: Interdisciplinary meeting and finished module, 2012. Photos: AHO)

3. The student experience

The courses offered under each of the design-build models were and continue to be popular, well attended and consistently score well on student surveys, especially on the students’ perceived learning outcome.[3] Participating students emphasise how dealing with real world design challenges and full scale buildings motivates and builds knowledge in ways that are not possible elsewhere within the educational program.[4]



4. Discussion

4.1 Pedagogic motivation

While the two models presented in this paper emphasise the relationship between the design process and construction, the construction process itself features differently within the pedagogical motivation of each. For the SCS the physical build is a means of realising architectural form, while the OP build serves as a broader research platform for the project partners. Within the SCS model, the building introduces students to the transition from drawing to built object. As a pedagogic tool it facilitates learning about the relationship between conceptions of architecture and their physical realisation. It enables the student to move beyond representations and verbal descriptions to the experience of the building itself. In addition the hands-on experience of construction also provides the students with an opportunity to learn about the assembly sequences and the physicality of material. The model's reliance on students, as amateur builders, does affect the material character and limits the scope and scale of the buildings.

The OP division along disciplinary lines places the building aspect of the project with pupils at Kuben vocational school. For the architecture students the aim of a full-scale build provides a framework for architectural exploration and design that needs to be realistic in terms of complexity and technology. The separation of the physical build from the studio course reflects the division of labour within the construction industry, but it excludes the students from first-hand building experience.

4.2 Architecture as process

Both of the models emphasise the focus on teaching architecture as a process. The design-build of the OP model exposes the students to the multidisciplinary processes of construction through the involvement of external experts and institutions. The benefit of this cross-disciplinary approach is that it establishes an understanding of how design problems resonate with various actors and disciplines. It attempts to tighten the feedback loop for concept ideas, their development, implementation and exploration, in contrast to conventional research, implementation and dissemination processes. However, the institutional resistance to administrative change and the challenge of aligning academic context and content between the various disciplines and institutions can prove to be a real obstacle for continuing or increasing interdisciplinary cooperation.

The SCS model involves the students directly with the entire process of the project, from initial idea to final build. It gives the students an understanding of the project phases and a hands-on experience of dealing with their associated challenges. As a pedagogic tool this condensed process is highly efficient in educating students in project processes and management. However, the studio's focus on collaborative work and construction does take the focus away from individual design skills.

4.3 Client vs technical briefs

Working with a client and site the SCS model actively engages the school in community development. The client and local environmental conditions become an active part of the project development and anchor the architecture to a specific site and social agenda. The SCS model uses the client relationship as an active pedagogical tool to focus the project, providing programmatic and economic constraints. The clients contribute to the direction of the course, but simultaneously need to accept a level of uncertainty and risk. This relationship also puts the studio at a potential, happily not yet realised, risk of withdrawn project support.

The SCS model profiles architecture students as an active resource to the community, and creates potential for re-positioning the school within society, an opportunity perhaps not optimised, in part due to the opportunistic nature of the client selection.

The OP responded to an initiative by the national LowEnergyProgramme and focused exclusively on the exploration of a well-defined technical design challenge independent of client or site. This independence enabled the students to refine building solutions and details, but puts the impetus on the educational institutions to secure a continuation of the work. Motivated by a research policy agenda the academic work is separated from the supply and demand chain and there is a danger of losing an important mechanism for verifying usability and market potential.

4.4 Confines of academic timetables

Operating within an academic and administrative framework, both design-build models face the challenge of tailoring a complex and time-consuming process within one academic session.

The physical construction within the OP was done by external partners and took place after the studio course was complete. The follow up work was an important element of the design for build approach



and there was a need to ensure it was effectively utilised as a pedagogical tool. However, the quantity of work related to following up a project, with detailing and site visits, did not necessarily fill or warrant a full studio course and as a consequence was relegated to an elective course. This spill over of project activity challenges the continuity and cohesion with the students thus limiting their experience of the relationship between design and the final build.

The SCS projects meanwhile are restricted in complexity and scale by the need to fit each project within one semester. The time constraint is a positive contribution in so far as it increases the speed of the design process to a pace more aligned with real world practices, but poses challenges for completing the final build within set timeframes.

5. Concluding words

The two studios presented in this paper both utilise the full-scale realisation of an architectural project as a pedagogical tool. Their courses facilitate an understanding of the physical manifestation of design and the processes of construction and ultimately enables the students to move beyond just the representation of architecture to engage with the resulting buildings directly.

In 2011 a report by The Nordic Institute for Studies in Innovation, Research and Education (NIFU) showed that the percentage of graduated architecture students satisfied with their education's relevance for practice was well below the national average for higher education graduates. The report pointed to the fact that little weight was given to interdisciplinary cooperation and the integration of theory and practice and concluded that the current education system failed to prepare students for the professional arena.[5]

The SCS and OP design-build based models move beyond this division between practical training and theoretical education. Collectively they point to the breadth of educational potential within the design-build methodology and integrate the study of architecture within a wider context. Despite their limitations and challenges they offer the opportunity of questioning how architecture could be taught.

References

- [1] T. Gaber, The agency of making and architecture education, *International Journal of Architectural Research*, Vol. 8/3, Nov 2014, (21-31)
- [2] The Mies Crown Hall Americas Prize, Letter of Nomination
- [3] AHO, Semesterevaluering (Semester evaluation rapport), Autumn 2011 and Autumn 2015
- [4] AHO, Semesterevaluering 40 508, Autumn 2015, and AHO, Semesterevaluering A: Liten byggmodul, Autumn 2011
- [5] NIFU, 'Kvalifisert for bygging?', Rapport 18/2011