What To Build – On the Thematic Diversity of University-Based Design-Build Assignments and Their Different Impacts on the Learning Outcome

For a number of years now increasing use has been made of Design-Build projects as a teaching method in architectural education. This can be explained by the fact that this kind of training represents an ideal learning situation in which students can achieve a competence in taking action that is highly relevant for later practice and, as well as gaining specialist knowledge, also acquire non-technical skills such as teamwork and communication. In planning a suitable Design-Build project a number of factors must be taken into account such as defining the goals, choosing the suitable task, financing, defining the period of time for the project, clarifying the legal aspects, etc. Choosing a suitable building task is perhaps the most important step in the successful implementation of Design-Build projects.

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In contrast to standard architectural practice where, generally speaking, the designer is approached to design a specific building, Design-Build projects offer universities, faculties or students the possibility to seize the initiative themselves. This represents a great opportunity but also involves considerable responsibility for those who must decide on the task to be carried out. The aim of the paper is to present different experiences of Design-Build programs in selecting the building task and to illustrate the advantages, disadvantages and challenges involved in choosing certain building tasks. Here different building typologies are not compared in terms of their specific qualities, but, using general characteristic parameters, they are juxtaposed and examined in order to make comparison easier. In this paper the following parameters are used to classify the building tasks:

• small-scale vs. large-scale
• public vs. private
• local vs. global
• temporary vs. permanent

These parameters can be applied to every building task and, as variables, they exert an influence on the entire process of a Design-Build project and, consequently, on what is called the "learning outcome".

RESEARCH APPROACH

The data used as a basis for this work were compiled between 2008 and 2010 in an explorative process in the course of writing my Ph.D. which was titled *Design-Build STUDIO Framework, Processes and Potentials of Design-Build Projects in Architectural Education*[1]. In collecting these data, alongside an examination of the existing literature, guideline-based interviews were also made and a comprehensive questionnaire-based survey was carried out.

Open, guideline-based interviews were used as means of obtaining primary data about the field of research. The questions focused primarily on the following 13 thematic areas: creation and development of the Design-Build program, embedding the program in the curriculum; organization of the project; financing, legal aspects, infrastructure, didactics and methodology, inter-disciplinary quality, identifying the building task, design process, evaluation and assessment, perspectives and view to the future. Full-length interviews were made with 14 heads of Design-Build courses.[2]

The questionnaire survey was carried out in order to obtain comparable data on Design-Build studios and on their individual projects. The questionnaires, which were sent to 50 heads of international Design-Build programs, were broken up into four sections. The first section, in addition to requesting contact data, asked general questions about the program and the institution. In the second and third sections more specific questions were put about the program and how it is embedded in the curriculum and information was requested on the teaching method, financing and legal aspects. The fourth section of the questionnaire focused on obtaining information about all projects carried out in the program, including details such as the project name, address, date of completion , typology, construction method, and the number of students involved. The response rate was 40%, which represents a total of 22 Design-Build studios. [2]

TYPOLOGIES

If we look at the building tasks chosen in various Design-Build programs we can safely say that a single typical Design-Build project type does not exist. The projects carried out range from a small bus shelter in Buffalo, New York to a campus school in Johannesburg, South Africa, and from a smart single-family house in Kansas City to an animal shelter in Newbern, Alabama. The range of possible tasks is practically unlimited. However, an evaluation of the 281 project data sheets from the 22 Design-Build studios that took part in the survey reveal certain tendencies as regards the choice of building task. For instance a "Pavilion" type building was carried out 90 times. "Affordable Housing" was the theme 79 times, while 23 projects were devoted to the theme of a "Community Center". It was revealed that a number of Design-Build studios restrict themselves to carrying out certain building typologies such as "affordable housing" and then optimize this area year after year, or carry out different versions of this typology as prototypical examples. Other programs select very different typologies from year to year, but often cooperate with the same partner institutions or clients.

SUPERORDINATE FOCUSES

In analyzing the different Design-Build tasks it proved possible, despite the heterogeneous nature of the typologies, to identify three principle focuses. We noted a social, an experimental and an ecological focus. These focuses exert a strong influence on the choice of building task but can also overlap and merge.

SOCIAL FOCUS

In examining the different building assignments dealt with in Design-Build programs it is noticeable that social aspects play a major role in the selection of the Design-Build task. Often there is a wish and aim on the part of the students or the university to "give something back" through their involvement. In the USA this social commitment on the part of universities, in particular state-financed institutions, is often a fixed part of the educational mandate. Under various slogans such as "socially responsible architecture", "community action", "urban activism" or "humanitarian design" schools of architecture often undertake projects that begin at a point where, until then, no architects had been involved.

The social area in Design-Build projects is both extensive and oriented in different ways. For example: a number of Design-Build programs focus primarily on their local community with buildings for social, cultural or educational facilities or affordable housing. Others, in contrast, focus on international development work and build the requisite communal facilities. Reconstruction work following natural disasters is another typical area for socially-oriented Design-Build programs.

In projects with a social orientation a decisive role is played by the partner institutions or the future users for whom the building is erected. The intensive involvement with these people during the design and construction processes and communication and personal interaction with the clients represents a very direct learning experience for the students. In their article "*Engaging Communities, Enriching Design Education*" Cheryl Doble und Peter Aeschbacher underline the learning effect for students as follows:

> *Most importantly, community work brings students in contact with individuals whose life experiences are different from theirs, helping students learn to understand situations from new and multiple perspectives. These are critical skills for young professionals preparing to work in an increasingly multicultural world.* [4]

FOCUS ON EXPERIMENT

Another primary aim in the orientation of the work of many Design-Build programs is to offer students room for experimentation. Universities are encouraged in their role as pioneers of innovation and Design-Build programs can serve as a testing area for ideas and experiments, which is not restricted by the economic and temporal constraints found in a traditional business environment. Alongside constructive experiments and tests in using or working material in new innovative ways, Design-Build projects also offer an opportunity to experiment with space and the way it is configured, or to explore social constellations or reorganize them through an architectural experiment.

A number of schools of architecture make available a special defined area for architectural experiment: in addition to the famous Taliesin West test site of the Frank Lloyd Wright School of Architecture the Cantercel experimentation site in Southern France or the experiment area of Darmstadt University also offer similar facilities. The buildings erected on these experiment sites are intended primarily to serve the goals of pure experiment or research and are liberated from the restrictions of standard building regulations.

Peter Schreibmayer, whose Design-Build course at the TU Graz was titled *"Experimental Building"* - a clear indication of the program's aims, emphasizes the importance of experiment in education as follows:

> *An experiment is on the one hand a scientific attempt to prove something but on the other it is also a bold undertaking, the outcome of which is uncertain. Therefore the failure of an experiment does not contradict its nature. Under no circumstances should such a failure occur during an architect's professional career but when someone is still a student, and especially in the context of this course, it is permissible.* [5]

> At the same time, however, in choosing experimental building tasks thought should be given to the context in which the experiment will take place and the question whether a possible failure might have consequences for persons outside the university environment should be examined.

ECOLOGICAL FOCUS

In recent years the general trend towards a new ecological awareness has been reflected increasingly in the area of architectural education also. Themes such as energy efficiency, sustainability and ecological building are experiencing a kind of boom at present. In the context of Design-Build projects, too, building tasks with an ecological focus are being chosen more and more frequently. Architecture students experiment with alternative building materials such as straw and earth and use them to build pioneering projects. Working out energy-efficient solutions and implementing them in the form of low energy or passive houses represents a further building task.

COMPARISON OF THE CHARACTERIZING PARAMETERS OF BUILDING TASKS

SMALL SCALE VS. LARGE SCALE

Defining the appropriate size and complexity of a Design-Build task is decisive for the success of the project. If the task is too extensive or too difficult there is a danger of making excessive demands on the students. A task that is too simple, however, can result in insufficient motivation and can fail to build the self-confidence which results from having met a challenge. It is also necessary to relate the means and possibilities available to the various wishes and expectations.

The size and extent of building tasks is, on the one hand, determined to a considerable extent by the duration of the Design-Build program and the corset of the university curriculum, which is usually very tight. Here it is of relevance whether the students have to attend other courses parallel to the Design-Build studio or can devote themselves entirely to the project.

The duration of Design-Build projects can range from spontaneous projects extending over a period of just a few days to projects that run for several years. The evaluation of the questionnaires showed that the average duration of Design-Build projects is around one semester. Often the time framework within which Design-Build courses are run leads to critical discussions. It is argued that one semester is simply too short a time to design a project, build it and then possibly evaluate it in a serious manner and that the quality of the design or execution suffers as a result of the tight time frame. Many aspects, it is claimed, are not adequately addressed and, due to the acute shortage of time, some questions can only be dealt with in a superficial way. Andrew Freear from *Rural Studio* is of the opinion that it is necessary to give design projects a generous temporal framework in order to raise the quality of both the projects and the training they involve. [6]

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Figure 1: small scale vs. large scale

above: Gateways and Waiting Shelter / Neighborhood Design-Build Studio / Seattle, WA, USA / 2006
Photo: Neighborhood Design-Build Studio

below: Ithuba Skills College, classrooms and campus facilities / Johannesburg, ZA / 2008-2011
with buildings by:
RWTH Aachen University
Salzburg University of Applied Sciences
Anhalt University of Applied Sciences
Graz University of Technology
Munich University of Technology
Vienna University of Technology
Carinthia University of Applied Sciences
University of Art and Design Linz
University of Ljubljana
Photo: Marlene Wagner

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In determining the extent and complexity of a Design-Build project group size also plays a decisive role. According to the questionnaires the average group size is 17 students, who are usually involved for one semester in a Design-Build project. In the Yale Building Project, in contrast, generally 70 students take part in a project, which focuses for a period of around 6 months on the design and construction of a duplex house. The Thesis-projects of *Rural Studio* on the other hand are generally carried out by small groups consisting of three to five students, who often work on this final project for up to three years and these projects often involve very sizable building tasks such as community centers, churches or entire sports complexes.

Financing is a further factor that exerts a strong influence on the possible size and extent of Design-Build projects. In contrast to conventional design studios, carrying out a Design-Build studio is very expensive in terms of resources and materials and results in high costs which are not covered in normal university budgets. Therefore larger projects generally rely on financial support by sponsors, on the use of public subsidies, or on financing by a client. However, the pressure to succeed increases in proportion to the amount of money made available for the project.

Steve Badanes, head of the *Howard S. Wright Neighborhood Design-Build Studio*, believes that in choosing building tasks it is of great importance that the tasks should be reasonably sized. So far in the 25 year history of this program the simple pavilions and park facilities generally built by this studio have been carried out within the envisaged time frame and budget. And so Badanes says, "*Simpler work is better work*", while emphasizing in same breath "b*ut it is very difficult to convince an architecture student of that.*" [7]

PUBLIC VS. PRIVATE

The range of public building tasks extends from installations or pavilions in public urban space to communal facilities such as community centers, or public facilities such as kindergartens and schools. A common feature of these tasks is the fact that they reach a larger public, enabling them to multiply the impact of what is built. In selecting building tasks David Lewis from the *Parsons Design Workshop* always insists that they must have a public character and explains his reasons for this as follows: "*[...] the public nature means that the impact of whatever is done is expanded .*" [8]

In addition many Design-Build programs explain the choice of public building tasks in terms of the conviction that the students' voluntary planning and construction work should ultimately benefit projects that affect a wider public rather than just a few private persons. Given that Design-Build assignments are university teaching projects it is also advantageous if the buildings remain accessible to students after completion in order to facilitate reflection on what has been built and to allow continuous evaluation. Once private buildings have been handed over to their users it is often difficult for students to gain this kind of access, and in some cases is not possible at all.

Nevertheless, in the USA in particular the private single-family house is commonly chosen as a building task for students taking part in Design-Build projects. For instance every year the *Building Project* of Yale University, the *Urban Build program* of Tulane University, the *Studio 804* of the University of Kansas, the *Charlotte Design-Build Studio* of the University of North Carolina or the *ecoMod Program* of Virginia Tech deal exclusively with the building typology "Affordable Housing". The *Rural Studio* devoted 40% of the 80 projects carried out in the years up to 2010 to

Figure 2: public vs. private

above: Info Wash, community center / Parsons Design Workshop / De Lisle, MS, USA / 2006 Photo: Peter Fattinger

below: Duplex house at Kossuth Street / Yale Building Project /New Haven, CT, USA / 2007 Photo: Peter Fattinger

WORKING OUT | thinking while building

the production of dwelling houses. The *Yale University Building Project* has committed itself since 1989 to the building of private homes. For Adam Hopfner, who has directed this program since 2007, the single-family house represents a *"great vehicle for learning"*, as it covers a large number of different thematic areas within a compact framework. However, he believes that the often conservative requirements of private living space and the emotional obligations to private individuals form a very tight corset that can severely limit the potential room for action and experimentation offered in the course. [9]

The requirements of the building regulations represent a further important criterion in choosing between private and public building tasks. For example in many of the federal states in the USA buildings that are accessible to the public are subject to the strict requirements of the Commercial Code, whereas with private houses only the Residential Code is applied, which in a number of states imposes hardly any official requirements at all. In addition in the USA there are a number of state subsidy programs for the provision of "Affordable Housing" that provide a way of financing this kind of project. In contrast to the USA the single-family house is hardly ever a theme in European Design-Build projects. This is due to the fact that in Europe new single-family houses are largely built by a wealthier clientele, whereas the needier sector of the population generally has to rely on state subsidized, rented housing.

As a building project "Student Housing" lies at the interface between private and public. Above all in Europe a number of examples have been carried out already, for example the *Micro Compact Homes* of the *Munich University of Technology* or the *Bauhäusle* StudentInnenheim, which was conceived and carried out in 1981 by a total of 300 students from *Stuttgart University* and today is still run by a student administration. In this particular commission the fact that, at least in the early years, the students live in the buildings they have designed and built themselves produces a special kind of learning effect: in using the building the students can or indeed must directly examine the suitability for daily life of what they have built. In addition there is also an opportunity during the use phase to make adaptations to the building.

LOCAL VS. GLOBAL

The place where the project is implemented is a very important determining factor in Design-Build projects. The geographical location and the local context of university building projects generally introduce a number of very different demands and possibilities.

Many programs, for instance the *Rural Studio*, the *Howard S. Wright Neighborhood Design-Build Studio* or the *Over-the-Rhine Design-Build Studio* are strongly anchored in the local community by their projects. Steve Badanes, who with his *Neighborhood Design-Build Studio* has carried out innumerable pavilions and community gardens in Seattle since 1988, emphasizes the advantages of local involvement as follows: *"[…] it is much more efficient to work closer to home, where you can be more productive, save energy, and build community credibility with each new project in the same geographic area."* [10] As well as issues to do with logistic, it is also easier for the students to keep track of the further development of the projects they have completed if these are situated within the neighborhood of the school.

Other Design-Build programs focus more on international development work. For instance in the framework of their *Mexiko Praktikumsseminar* students at the *Berlin University of Technology* have been involved for 16 years already in building schools, cooperatives and community kitchens in various villages in Oaxaca. Since 2003 a

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Figure 3: local vs. global

above: Venice on Vine, café & community center / Over-the-Rhine Design-Build Program / Cincinnati, OH, USA / 2005
Photo: Peter Fattinger

below: Classroom and Library at Ithuba Skills College / University of Ljubljana / Johannesburg, ZA / 2010
Photo: Peter Fattinger

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Figure 4: temporary vs. permanent

above: Add on, temporary intervention in public space / Design-Build Studio at Vienna University of Technology / Vienna, A / 2005
Photo: Florian Haydn

below: Antioch Baptist Church / Rural Studio / Perry County, AL, USA / 2002
Photo: Peter Fattinger

number of European architecture schools have concentrated their Design-Build activities on South Africa. Coordinated by the inter-university Austrian NGO *SARCH*, more than 30 different social and educational buildings have been built in townships on the southern periphery of Johannesburg. Together with his students and in the framework of the *Basic Initiative program*, Sergio Palleroni has built schools, libraries and community centers in Mexico, Cuba and India.

Palleroni also regards developing students' awareness of global contexts and confronting them with the reality of life in other regions as one of the university's responsibilities:

The initiative to move outside the classroom and even outside the United States, to go to other communities in need was a pedagogical priority. It meant taking students out of their usual environment and into a context they did not understand, so that they would let go of some of the predispositions they had. In a new context, a new frame of mind created by their distance from their comfort zone of what was predictable, I reasoned, they could step outside of themselves and significantly reexamine their priorities and goals. How would they effect change? How would they understand their roles as architects and citizens of this world?"[11]

In connection with Design-Build projects in emerging nations criticism regularly surfaces about insufficient sustainability, excessive use of resources and neo-colonialist approaches. Such criticism, however, should not be generalized and many university projects in emerging nations show that, where a sufficiently detailed examination of the local situation is made and local partners are intensively involved, sustainable and effective projects can indeed be carried out. The built results show that the quality of university Design-Build projects is often higher than that of comparable projects by aid organizations, who often work without the involvement of architects.

TEMPORARY VS. PERMANENT

In general little importance is attached in architecture to what is temporary, short-lived, flexible and transient. But it is precisely built interventions with a limited life-span that offer an opportunity to experiment and to try out things that would be inconceivable in the reality of a permanent building.

Temporary interventions are effective not despite but on account of their transience. Whereas classic planning methods, to a considerable degree, tend to further develop existing social and economic space and conventions, temporary projects work at removing things that are taken for granted. [12]

Precisely this discarding what is usually taken for granted can represent a challenge to and demand on the teaching of architecture in a university environment.

The term "temporary" is, of course, relative: temporary projects can last for just a few hours or run for several years. Alongside a simplified building approval process, the advantages involved in carrying out temporary projects can also include a reduced warranty obligation for the buildings. In projects with a limited lifespan the question of maintenance also plays a less important role. In addition the amount of work involved in temporary building projects is generally less than with permanent buildings. The projects tend to be more clearly delineated and therefore more finite, in the sense that they have a clearly defined end.

On the other hand implementing permanent buildings within the framework of a Design-Build studio brings other advantages. Permanent projects give the students involved the opportunity to observe and evaluate the performance of the building

over a longer period of time. And users can also be asked about their experiences with the building over the long-term. Alongside its concrete useful value the permanent nature of what is built and the long-term usability and visibility of the building that form part of its permanent character provide a greater incentive for potential sponsors and patrons to contribute to the cost of implementing the project.

The other side of this coin is that the regular maintenance and care of permanent buildings, no matter what size they are, involve a certain amount of expenditure and a responsibility that has to be accepted, also with regard to legal liability. In particular, given the fact that students are available for just a limited period, generally only for the duration of the course, if the maintenance of permanent Design-Build projects is not taken over entirely by the users of the building it can present a real problem.

CONCLUSIONS

Through the guideline-based interviews and the questionnaires [1] a large amount of data was collected that makes possible a comparison of different Design-Build programs and their projects. In the paper these data were examined with regard to the framework building task and, using the parameters small-scale vs. large-scale / public vs. private / local vs. global / temporary vs. permanent, were compared with each other and the advantages, disadvantages and challenges associated with the choice of various building tasks were identified.

In the process it was revealed that different tasks offer different learning opportunities. In addition to the general development of a personal capacity to take action, which is usually attributed to project-oriented forms of teaching and learning such as the Design-Build teaching method, choosing the right task can encourage the acquisition of very concrete specialist knowledge as well as key qualifications that go beyond the specific subject.

However, in order to achieve the desired learning effect Design-Build tasks need to be very carefully planned. If this is done these programs can be more effective than conventional forms of teaching and learning in preparing and equipping students to meet the constantly changing demands made on the profession of architect today.

ENDNOTES

1. See: Fattinger, Peter (2011): "Design-Build STUDIO Framework, Processes and Potentials of Design-Build Projects in Architectural Education." Ph D. Vienna: Vienna University of Technology, Faculty of Architecture and Planning.

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3. USA: arch409, University of Kansas / Building Project, Yale School of Architecture / Charlotte Design-Build Topical Studio, University of North Carolina Charlotte / ecoMOD Project, University of Virginia / Neighborhood Design-Build Studio, University of Washington / North Studio, Wesleyan University / Over the Rhine DesignBuild Studio, Miami University Cincinnati / Parsons Design Workshop, Parsons The New School for Design / Remote Studio, Artemis Institute / Rural Studio, Auburn University / Small Built Works Program, State University of New York at Buffalo / Studio 804, University of Kansas / Tectonic Landscapes Initiative, Various Universities / Urban Build, Tulane University // CANADA: Free Lab, Dalhousie University // AUSTRALIA: Learning by Making, University of Tasmania // ASIA: Interbreeding Field, Tainan National University of the Arts // EUROPE: BASE habitat, Kunstuniversität Linz / design&build, Dresden University of Technology / Design-Build Studio, Vienna University of Technology / Mexiko Praktikumsseminar, Berlin University of Technology / Die Baupiloten, Berlin University of Technology

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