

Building Beyond Borders: Project-based Learning from, with & for the World

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ABSTRACT: In accordance with and to strengthen the adopted Civic University model operationalized by a project-based learning approach, the Faculty of Architecture and arts of Hasselt University initiated the 'Building Beyond Borders' programme in the academic year 2018-2019. This postgraduate certificate invites students and professionals to enrich and strengthen skills in sustainable architecture. In a unique knowledge-driven, interdisciplinary and participatory set-up, the programme pushes innovation, contributes to the Sustainability Development Goals, and enhances competences in Global Citizenship. Learning from, with and for the world, is both motive and means to address 10 learning objectives for the participants. Each year, a Design/Build project is the leitmotif of the programme, which in 2018-2019 was a women's house in Ouled-Merzoug in Morocco. This paper discusses the experiences of the pilot year in lessons learned and challenges, and outlines tentative perspectives for future editions of the programme. It is concluded that one of the main success factors of programmes set up as 'Building Beyond Borders' is the awareness of and anticipation on the dynamisms of intercultural collaboration in build projects.

KEYWORDS: Sustainable architecture, Project-based learning, Design/Build project

1. INTRODUCTION

The Faculty of Architecture and arts of Hasselt University is framed within the Civic University Model where academic excellence is put to work in response to the needs and demands of society (1), adopts the specific pedagogical approach on project-based learning (2), and has an international ambition. Within this context, the innovative programme 'Building Beyond Borders' was initiated in the academic year 2018 - 2019. This postgraduate frames the opportunity to enrich skills by exploring and practicing sustainable architecture abroad. The aspirations of the programme are to strengthen the capacity of students and professionals in the building industry, and to support/push innovation in sustainable building in its broadest scope (Planet, People, Prosperity, Politics) for the 'here-and-now' and for the 'later-and-elsewhere'. This way, the programme contributes to the Sustainability Development Goals, and enhances competences in Global Citizenship.

The objective of this paper is threefold: first, present the set-up of the programme by introducing the objectives, strategy, structure and content; second, discuss the outcomes in lessons learned and challenges based on the experiences of the pilot year; third, outline perspectives for future editions of the programme.

2. SET-UP OF THE PROGRAMME

2.1 Educational objectives

In 'Building Beyond Borders', ten learning objectives are targeted: 1) awareness of sustainable development and global citizenship in general, and

sustainable building in specific; 2) familiarity with non-conventional design and build approaches and processes towards innovative architectural solutions; 3) awareness of the specificities of working with local communities, multidisciplinary experts and professionals; 4) ability to implement sustainable building in its broadest scope (Planet, People, Prosperity, Politics) for the 'here-and-now' and for the 'later-and-elsewhere'; 5) ability to implement non-conventional design and build approaches and processes towards innovative architectural solutions; 6) ability to deal with local communities, multidisciplinary experts and building professionals as part of a sustainable design and build process; 7) ability to critically reflect and do research on sustainable building in its broadest scope; 8) ability to work independently and in a collaborative way and to communicate with stakeholders, local communities and/or clients in order to make decisions during the design and build process; 9) ability to report on research, design and build activities; 10) ability to deal with practicalities related to designing and building of projects abroad.

2.2 Educational strategy

The strategy adopted in order to achieve outlined learning objectives consists of a Project-Based-Learning (PBL) set-up. Projects are complex tasks based on challenging questions or problems: which urges involved students to conduct design, problem solving, decision making, or investigative activities; provides students the opportunity to work relatively autonomously over a certain period of time; and which results in realistic products or presentations

(3)(4). Often related features of PBL are: an authentic content and assessment; teacher facilitation but not direction; explicit educational goals; cooperative learning and reflection (5)(6). Particular models of PBL may also have features like: an authentic 'driving' question, a community of inquiry, the use of cognitive tools (7); 'expeditionary learning' which adds features of comprehensive school improvement, community service, and multidisciplinary themes (8).

Within 'Building Beyond Borders', the PBL model is set up in an unfamiliar context with its challenges and opportunities, where 'out-of-the box' thinking experiments as well as real-life experiences and realizations are key. This way, the programme distinguishes itself from traditional education and everyday design and build processes, and facilitates new approaches and processes towards innovative architectural solutions.

'Building Beyond Borders' is put into practice by studying, designing and building in/for unknown urban and natural environments, different climatic and geographic zones or societies with other cultures, traditions and habits, and various sociotechnical architecture and building industries. This designing and building out of the comfort zone requires to explore other processes and new ways of building. The core idea 'Think global, Act local' of Global Citizenship is embodied in the programme.

2.3 Operational strategy

The programme aims to produce highly sustainable projects. Each academic year (September – August), a project is designed and built. Projects selected have: a) a high beneficial impact on the local community at large; b) a support base within the community; c) financial and practical support from the community and sponsors/donors; d) high potential for innovation in architecture and sustainability; e) the possibility to act as a demonstration and capacity-building project for the local community as a niche development strategy (9)(10).

The selected project is the leitmotif of the academic programme. Backed by theoretical insights and case studies, all aspects of the design and build process are carried out by participants over the course of 1 academic year. Participants explore, experiment, and design and build while collaborating with local communities, multidisciplinary experts and building professionals. In doing so, participants conceive and realize built works of architecture which are exemplary, and which contribute to science and society.

2.4 Structure

The pilot edition of 'Building Beyond Borders' consisted of two modules of each 20 ECTS which structured the 40 ECTS postgraduate programme. The

first module, module A, 'Skills Lab towards sustainable architecture', focused on knowledge and insights and consisted of theory, exercises and hands-on experiments. The second module, module B, 'Live Lab of a sustainable Design/Build project', focused on project-based learning and consisted of designing and building the selected real-life project.

The linear follow-up of module A by module B resulted in a content which transgressed from general to specific, and from theory to practice.

2.5 Content

The programme consisted of tutoring theoretical background and research, case-study research, hands-on experiments and a real-life Design/Build project abroad. The programme was composed in such a way that interaction between these methods was achieved. The focus of the work on the real-life project gradually shifted from exploring, over designing, towards building.

Courses covered all aspects needed to prepare participants in a substantive and practical way to work on own projects, specifically 'beyond borders', in their future career. Seven course units formed the core of the programme:

1. *Sustainability and design methodology (3 ECTS)*: Theoretical background, insights and examples on relevant aspects of, and strategies towards sustainable architecture beyond borders, with following topics: a) sustainable development & sustainable building; b) sociocultural aspects of building(s) and architecture & identity; c) the vernacular as a model for contemporary sustainable architecture; d) the participatory Design/Build process and mapping.
2. *Project management (3 ECTS)*: Practicalities related to designing and building beyond borders, with following topics: a) representation techniques for analysis, design and execution; b) questioning and critical thinking of the project program and activities; c) off-site and on-site practicalities and preparation field study prospection; d) processing field study results; e) intercultural understanding and behavior; f) safety and healthcare abroad.
3. *Field study prospection (3ECTS)*: One-week on-site exploration of the natural, built and sociocultural context of the Design/Build project, backed by gained insights on the participatory Design/Build process, sociocultural aspects of building(s) and architectural identity, on-site practicalities, representation techniques of mapping and

analysis, and intercultural understanding and behaviour.

4. *Physical-spatial and building-technical design measures for sustainability (3 ECTS)*: Generic framework for the selection of, and specific hands-on experimenting with, bioclimatic design principles (e.g. orientation, ventilation) and building materials and construction techniques for sustainable building projects. The course consists of both theoretical lectures on physical-spatial and building-technical design measures for sustainability, based on scientific knowledge and insights and backed by practical examples, as of hands-on experimenting with - for the Western European context - non-conventional building materials by a predefined learning & research process. Topics were: a) context variables for selecting sustainability measures; b) bioclimatic design principles; c) life-cycle thinking and sustainable resource management; d) environmental and human health impacts of building materials; e) design strategies for sustainable material use; f) non-conventional building materials and construction techniques.
5. *Design/Build studio (12 ECTS)*: Real-life project-based experimentation on and implementation of design strategies and physical-spatial and building-technical measures to operationalize sustainability in architectural projects 'beyond borders', focused on: in module A the conceptual design; in module B the development and execution. Aspects of theoretical courses are integrated and operationalized. In module A, 6 groups of 3 to 4 students designed a concept. After receiving feedback of an expert panel, a design workshop week was held where all students collaborated on one final design. In module B, each student worked on one specific aspect of the executional design or the execution on site.
6. *Research paper (5 ECTS)*: Setting up and conducting research (per two participants) on a specific topic (within predefined themes) related to the content / objective / philosophy of the programme of 'Building Beyond Borders' or relevant for the Design/Build project.
7. *Internship 'beyond borders' (11 ECTS)*: Eight-week on-site follow-up of and collaboration in the build phase of the Design/Build project, from the specific perspective of the

participants' background/interest. Local builders (foreman and craftsmen) were hired to build the project. Participants of the programme and the local builders exchanged knowledge, insights and experiences.

2.7 Practicalities

Within the faculty of Architecture and arts the study load per ECTS is pinned on 27 hours, meaning that the programme had a study load of 1,080 hours (27 x 40 ECTS). The programme consisted of weekly class sessions (1 day of 8 hours) and workshop weeks, both with required attendance, between September 2018 and March 2019. In addition, an important part of the postgraduate needed to be spend on self-study on predefined topics framed within specific assignments. The eight-week internship abroad was planned within the months May – June – July – August.

3. OUTCOMES OF THE PILOT YEAR

3.1 Participants

The programme was primarily accessible to candidates holding: a) a Belgian master or bachelor degree in disciplines related to designing and/or building of spaces on different scales, and/or designing and/or manufacturing products; b) a foreign master or bachelor degree in disciplines related to designing and/or building of spaces on different scales, and/or designing and/or manufacturing products. All applicants had to be fluent in both spoken and written English.

Each application was assessed on a case by case basis, which included the candidate's diploma, CV, portfolio, and personal motivation. In case of doubt, the performance on an interview was decisive on the applicant's suitability.

The 'Building Beyond Borders' programme was promoted by a mailing to Belgian and non-Belgian universities, a social media campaign (Facebook, Instagram), and articles in specialized architectural media.

The admission board admitted 19 candidates out of 7 different countries to enrol the programme of 2018-2019: Belgium (11), Italy (3), The Netherlands (1), France (1), United Kingdom (1), Ethiopia (1); Algeria (1). As participants had different backgrounds (architect, urban planner, interior architect, artist), a multidisciplinary group was brought together. Except 2, all participants had no or very limited experience as a practitioner in the architecture and building industry.

3.2 Preparatory activities

Participants were immersed in the topic of ‘building beyond borders’ inter alia by: several lectures and guest lectures of national and international experts on locally available low-impact materials such as bamboo and compressed earth bricks; one-day workshops on e.g. intercultural understanding and behaviour, sociocultural aspect of building(s) and architectural identity, mapping and representation techniques as means of communication if language barriers occur; multiple-day workshops on collaborative designing; hands-on activities on building with rammed earth; an on-site field study prospection for the Design/Build project.



Illustration 1: Immersive activities in the programme.

3.3 Design/Build project

In the pilot year of this postgraduate programme, the Design/Build project selected was a ‘Centre des Femmes’ in the small rural village of Ouled-Merzoug near the Atlas Mountains of Morocco. A piece of land was offered by the community to the recently founded women’s association AFOM (Association des Femmes d’Ouled Merzoug), to establish a women’s house. This house is committed to strengthening community development through education and empowerment of women by providing services, support and training opportunities. A place in the centre of the village where women can share their crafts with the community and visitors.

Based on a previous realized sustainable project in the village (pre-school) and aware of the importance of sustainability, the initiators have commissioned BC architects & studies (Brussels, Belgium) to develop the project. In turn, BC architects & studies has offered the project to the ‘Building Beyond Borders’ programme to act as a Design/Build project for the participants. BC architects & studies remained the project architect.

In this project, the objective was: a) to challenge the limits of sustainable building by maximizing the use of local and regenerative materials; and b) to merge traditional building techniques, contemporary architecture, local identity and current required comfort levels. In November 2018, the participants went to Ouled Merzoug for the first time to map the

village, the site, local (building) materials and techniques, and to hold workshops with the women to define the programme (field study prospection). After an intense design period in Belgium, guided by experts and the project architect, fed by theoretical knowledge and insights, and supported by feedback of the women of AFOM, works started in April 2019. In December 2019, keys were handed over to AFOM.

Within the scope and limited length of this paper, information on the design is wrapped up in 3 features: 1) anticipating the genius loci of the site (e.g. topography, geology, hydrology, trails); 2) balancing between the public and the private (seeking connection with the village and passers-by, while guaranteeing needed seclusion); 3) building with local and natural materials, and minimizing construction waste (granite stones, earth, straw, riversand, eucalyptus wood, reed, wool, ceramics). More information on the project can be found on: <https://archello.com/project/womens-house-of-ouled-merzoug>.



Illustration 2: The Design/Build project as leitmotif.

4. DISCUSSION, LESSONS LEARNED & CHALLENGES

Based on evaluation meetings both within the academic team and with participants of the programme during and after the pilot year, this section provides a discussion on outcomes, and in doing so presents lessons learned and challenges.

This discussion is solely focused on the set-up of the programme as evaluation and monitoring is needed/ongoing regarding the niche development aspect (the building and ‘solutions’ as such) and the capacity-building aspect (what knowledge, insights and experiences did locals gained).

4.1 Participants’ perspective

The mix of participants’ profiles was appreciated because this way participants could learn from each other’s background, knowledge, insights and perspectives. Due to the set-up of the programme,

this exchange was encouraged and strengthened, which was welcomed. However, this exchange could have been better. Firstly, participants thought too little time was spent on group dynamics and moments to getting to know each other which, especially in the early stages of the programme, resulted in a restrained attitude. Secondly, it was found that due to the complex and precarious nature of the Design/Build project (unfamiliar sociocultural context), more time for open discussion within the group of participants and with tutors/experts was needed, within the planning of the programme.

The wide range of topics covered in the programme was found relevant and interesting. Especially the hands-on activities which were organized in such a way that theory was combined/alternated with the building experiment, were welcomed by the participants. Such activities were also believed to support and improve group dynamics and team-spirit. The downside of incorporating a wide range of topics was twofold. First, it was believed that in-depth theoretical and practical information was missing (e.g. water use, energy production, bioclimatic design, natural materials). Second, the study load seemed to be higher than initially communicated.

Working in different groups, each developing an own design proposal, was seen beneficial for the project as different perspectives for the Design/Build project were studied. However, participants experienced a feeling of competition between the different groups, which was disliked as it resulted in an increased work load and so pressure.

4.2 Tutors' perspective

Setting up the programme and especially the preparation of the hands-on activities and the Design/Build project was highly labour intensive, before and throughout the programme. Dealing with practicalities required a lot of attention, and finding needed funding was a struggle.

The responsibility, involvement and motivation of the participants was outstanding. This was one of the success factors of the Design/Build project. This attitude was essential during the internship, when participants had to work in relatively strong independence on the construction site.

The involvement of a project architect has led to tensions. These tensions were caused by divergent interests/goals/preferences of the project architect and of the participants of the programme.

The local community and especially the women were involved in the design process. However, indicated by the participants' uncertainty regarding design decisions related to sociocultural

aspects, the organisation of this participation is seen as too shallow.

The aspect of working in group, and specifically 'designing' in group, needs to be addressed in a better way. The organisation and content of group work needs to be made more explicit.

Tutors noticed a lot of uncertainty among participants related to sustainability issues (e.g. bioclimatic design, material choice), although knowledge and insights were given in theoretical courses and were illustrated by practical examples. Decision making needs to be facilitated, so support in the design process must be provided.

Finally, the programme had to deal with timing issues in both the design process and the build process. The design process was slowed down due to the fact that many of the needed information, especially regarding the specific context, still had to be mapped and collected. Construction works took longer than expected because of the chosen materials and building technique for the outer walls (granite stone masonry). As a result, the building was finished in December 2019 instead of August 2019, so the total design and build time exceeded the academic year.

5. PERSPECTIVES FOR FUTURE EDITIONS

Based on this pilot year of the 'Building Beyond Borders' programme, future editions will be adjusted. This section provides some perspectives which will be taken into consideration in adjustments.

With regard to the supportive team, 3 perspectives are pointed out. First, when working with a project-architect the involvement of a facilitator might be recommended. This facilitator, as an impartial actor, compromises the different interests of the project-architect and the participants of the 'Building Beyond Borders' programme. Second, an (experience) expert in collaborative and participatory design might be helpful to support/guide the design process both amongst participants of the programme and with the local community. Third, a staff collaborator during the internship, so on the building site, is needed to deal with questions/issues/decisions on short notice. This will smooth out responsibility of and stress by the participants.

Concerning the group of participants, 2 attention points are underlined. First, team building activities must be incorporated in the programme as a good team spirit and collaboration is needed, especially during the design phase, hands-on experiments, and the build phase of the Design/Build project. These team-building activities are especially relevant in the early stages of the programme. Second, there is an urge to involve participants which

are familiar with or are even from the context of the selected Design/Build project. This is important in view of cross-cultural exchange of knowledge and insights, and especially to be aware of and to deal with sensitivities related to sociocultural aspects. Collaboration with local universities might be beneficial, but the application, admission and participation of 'local' candidates must be facilitated. Attention points are e.g. lowering the registration fee, compiling a tailored programme, and providing the possibility of distance learning.

Related to the content of the programme, 3 recommendations can be made. First, the programme must be organised in such a way that more time for discussion is available. Both programme/topic-related subjects as more personal aspects (e.g. confrontation with other cultures, the perceived responsibility and the impact of participants' actions) must be possible to be addressed. Second, the programme content must be compiled with more in-depth focus/work on sustainability-related topics. Theoretical and practical knowledge and insights must be supplemented with tools which support decision making during the design process. Third, hands-on activities may well be an essential part of the programme and must be more elaborated.

Designing and building a project in 1 academic year is difficult, so more flexibility is needed. A possibility is that the programme runs every two years, and that during the other year preparatory and aftercare activities, related to programme-organisational-, project- and build-related aspects, can be carried out. Project- and build-related preparations or aftercare might be organised as workshops. For example, a mapping workshop during a field study prospection could be beneficial to gather information of which the findings can be used in the actual postgraduate certificate 'Building Beyond Borders'.

Last but not least, the Design/Build project must be selected in a well-advised manner. Potential projects must be assessed based on a more comprehensive checklist (in relevance to the one presented in section 2.3) addressing both practical aspects (e.g. travelling and accommodation, collaborations) and more substantive aspects (e.g. sociocultural aspects, sustainable building, construction management).

6. CONCLUSION

This paper presented the innovative programme 'Building Beyond Borders', and the outcomes of its pilot year 2018 – 2019. Besides the set-up, the strategy, structure and content of the programme, lessons learned and challenges were outlined. In view of future editions, perspectives for improvements were touched.

It is highlighted that outlined perspectives are tentative as more discussions are needed, especially on the aspects of intercultural collaborations in Design/Build projects as this is one of the success factors for programmes set up as 'Building Beyond Borders'. Being aware of the experiences, insights and knowledge amongst both academics and practitioners, a fall symposium in 2020 (Belgium) is being organised focusing on reflecting the dynamisms of intercultural collaboration in build projects (<https://sites.google.com/uhasselt.be/building-beyond-borders/platform/fall-symposium>).

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