

Article

The Social Quality of Design-Build: Lessons Learnt from Higher Education

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Abstract: The need for a systemic transformation of the building sector is increasingly recognized, but much of the current discussion and actions focus on the creation of technical innovation, while the question of how to improve the social quality of buildings and building processes is largely ignored. Socially engaged architecture more broadly and design-build projects in particular represent an exception in this regard. Design-build studios have emerged as a new teaching method at numerous universities in North America, Europe and elsewhere to equip students with the skills needed to address pressing sustainability issues. Most design-build projects include an explicit claim to social relevance and change and opt for a co-productive process. However, the extent to which such practices have the potential to enhance the social (and, ultimately, the ecological) sustainability of buildings and construction processes has been insufficiently assessed. Based on a comparative analysis of five design-build projects carried out at the University of Stuttgart, this paper discusses critical factors that influence both the (social) quality of the design-build process as well as its (built) outcome and impact. The findings offer important insights for future design-build projects and their underlying need for revised training and teaching curricula to equip future architects and planners with the necessary knowledge and skills to act as process designers and facilitators and to shape a more people-centered built environment.

Keywords: design-build; socially engaged architecture; co-production; participation; social change; process learning



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1. Introduction

By the middle of this century, an additional 2.5 billion people are expected to live in cities [1]. The unprecedented scale and pace of this urban growth will create huge demand for housing and urban infrastructure. This process is paralleled by a growing demand for larger living spaces by the rising middle and upper classes, with a corresponding increase in building floor area as well as the financialization of the building sector that results in investor-led construction activities. As a consequence, the global building stock is likely to double in the coming decades. Already today, the sector accounts for nearly 40% of global energy-related CO₂ emissions [2]. If we continue to build as we have been doing, using conventional building materials such as cement, steel and aluminum to construct future buildings and infrastructure, this alone will consume more than three-quarters of the available CO₂ budget, a budget that has been calculated in line with a temperature increase limited to 1.5 °C [3] (p. 6).

At the same time, the contemporary building sector has failed “to meet the basic needs of the global populations who continue to live in impoverished and undignified conditions” [4]. More than 1 billion people, representing a quarter of the world’s urban population, live in informal settlements and slums [5]. This number is expected to double

by 2030 and to triple by 2050. In light of these challenges, a systemic overhaul of the building sector is increasingly being called for if the Sustainable Development Goals (SDGs) and the aims of the Paris Climate Agreement are to be achieved. However, much of the current discussions and actions around systemic change in the built environment focuses on the creation of technical innovation, while largely ignoring ways to improve the social quality of buildings and construction processes.

Among the few exceptions are so-called ‘socially engaged’ building and design practices. These reflect what is often seen as a ‘social turn’ within architecture and design debates, characterized by a (re)new(ed) critical engagement with the disciplines’ roles and its contribution to the addressing of pressing sustainability challenges [6]. Socially engaged practices represent an active turn towards social issues and attempt to restore faith in architecture as a discipline that shapes society. Typically, the built outcomes of such practices range from school buildings to community centers to small-scale temporary interventions in the public space and demonstrate a clear focus on the needs of marginalized and vulnerable groups in society. In doing so, they formulate a direct critique of the current building and construction sector, which has increasingly lost sight of both the (social) needs of a broad spectrum of society as well as the importance of locally appropriate and sustainable solutions [7]. Socially engaged architecture seeks to give priority to local contexts and needs, placing emphasis on the use of locally available building materials and vernacular building techniques, as well as on co-producing architectural solutions with and for the users/communities [8]. The shared aim is to ‘do something good’ for both the environment and the community. These ambitions place new demands on architects and architecture students, who must act as initiators, facilitators and mediators of social processes, while also pioneering and innovating sustainable building and design practices.

In response, design-build studios as a new teaching method have emerged at numerous universities in North America, Europe and elsewhere to equip students with the skills needed to take on such new roles and to manage these complex tasks [9]. Design-build projects offer students the opportunity to learn hands-on technical and material solutions, acquire organizational and managerial skills and gain experience of working interculturally and collaboratively with diverse actors in a real-life context [10,11]. The recent ‘wave’ of design-build projects, however, is also an expression of the discomfort of teaching staff and students with established building practices and their desire to pay greater tribute to societal and sustainability issues. Design-build projects are defined as “components of higher education in the field of built environment that allow students to be physically involved in the materialization of their designs” [10]. Most projects also include an explicit claim to social relevance and opt for a co-productive process [11]. The aims and claims of design-build projects thus greatly overlap with what socially engaged architecture outside of the university context is trying to achieve. However, what the ‘social’ dimension of these projects exactly entails and by how far such practices enhance the social (and ultimately the ecological) quality of buildings and building processes—as they claim—has been insufficiently investigated so far and is therefore the focus of this paper. Based on a comparative analysis of five design-build projects carried out at the University of Stuttgart, we demonstrate the need to better prepare future architects and planners for their new tasks and roles as facilitators and moderators of participatory/co-productive processes, and the importance of planning for deliberate and mutual learning processes in order to create social relevance and change.

The paper is structured as follows. In the first section, we critically address the question of what constitutes the social dimension of socially engaged architecture and design-build projects, arguing that it relates both to the process as well as to the ‘built’ outcome and the wider impacts. In ‘Materials and Methods’ we present the research design and reasoning behind the selected case studies, including their description and limitations. ‘Results’ presents the findings from the comparative case study analysis along the lines of (1) the quality of participatory/co-productive processes and (2) outcome and impacts with a particular focus on the role of process learning and reflection therein. The

section ‘Discussion of Findings’ contextualizes and reflects on the study findings and in ‘Conclusion’ we draw implications for future design-build projects and their underlying need for training and teaching curricula, as well as for enhancing the social (and the ecological) quality of building more broadly.

2. The ‘Social’ Quality of Design-Build Practices—A Critical Engagement

The social dimension of design-build projects is often explicitly highlighted but poorly defined. For some scholars, the word ‘social’ serves primarily as a linguistic distinction from other architectural practices and is meant to indicate some kind of improvement, but without specifying what exactly that improvement consists of [12]. For others, the social dimension reflects the unique qualities that such practices bring, including “some kind of participatory, equitable, and inclusive process with some positive impact on the local community” [6] (p. 770). This interpretation suggests that the social dimension is composed of a process-related as well as an outcome and impact-related component.

The participatory and/or co-productive process is often considered the ‘poster child’ of design-build projects and of socially engaged practices in general [7]. The early, continuous, and close involvement of the potential users and other relevant local actors is cited as the main reason why design-build projects transform the oftentimes authoritarian act of planning and building into a democratic and liberating process that gives the outcome greater legitimacy and sustainability [13]. Thereby, the underlying assumption is that a participatory approach helps remove “all barriers between builders and users” and creates physical artefacts that better respond to local needs and realities [13] (p. 91). While some research proves that this can certainly be the case [14], there is surprisingly little critical reflection and empirical research on obvious power imbalances between users and architects, or more specifically between users and architecture students in the context of such projects, and how it impacts both process and built outcome. Whereas participatory planning studies point to issues of power relations, and different and even mismatching underlying logics and potentials for conflict [15–18], such perspectives have not yet sufficiently informed debates on socially engaged architecture. Instead, there is a tendency to romanticize the involvement of users in such practices while ignoring uncomfortable questions such as: Whose knowledge counts and should or can count when it comes to taking decisions? Who is in the driving seat in such processes? What is the level of participation and the extent to which the perspectives and needs of users are being considered? In the end, it is a question of what the extent and limits of the participatory design space are. When young and well-educated architects or architecture students aim at developing solutions for and with marginalized and vulnerable communities to improve their living conditions, then questions of power and knowledge hierarchies cannot remain unaddressed; otherwise, they will likely persist despite all good intentions. Participatory processes in development projects have been criticized for overlooking power politics and perpetuating inequalities because of their technocratic and situated focus [18–20]. This becomes evident when looking at design-build and socially engaged architecture projects carried out in the so-called ‘Global South’ where many of these projects speak the same visual language despite being built in very different local contexts [7]. Whereas the use of local materials and vernacular building techniques necessarily generates a certain kind of “authentic aesthetic” [7], Grubbauer [8] argues that many of these building projects follow a particular logic of how ‘development’ and positive social change should look. The extent to which the often-claimed self-determination of marginalized groups is granted sufficient space in such projects must be critically examined. At the same time, the level of participation needs to be carefully assessed for different phases and design aspects of projects [21]. Processes that interpret all-inclusive design decisions as participatory democracy might overlook the critique expressed by Cooke & Kothari [20] that group dynamics might lead to (design) decisions reinforcing the status quo. (Future) architects are then left to integrate different forms of knowledge, such as their own knowledge of sustainable materials and design as well as the contextual lay knowledge of the community

or user. In the best case, both forms of knowledge and expertise might be mutually reinforcing. It is also possible, however, that the two end up in conflict, resulting in the need to balance sustainability targets and user preferences that in many instances are oriented towards more conventional building solutions. In this regard, it is also crucial to ask whether architecture students and practicing architects are sufficiently trained to facilitate, moderate, and sometimes mediate such participatory/co-productive processes and the conflicts and challenges that go along with them, or whether further training and a revision of curricula are needed [22]. Design-build projects operate in the realm of complex and fluid stakeholder constellations, placing high demands on students in terms of their dialogical, methodological and intercultural skills [11]. Such skills, however, are typically taught in disciplines such as pedagogy and social work and feature less in architecture and design education. Accordingly, scholars point to the need for an interdisciplinary approach in design-build studios, involving not only architecture students but also students from other disciplines [6]. The reality, however, is that such an approach is often lacking, raising questions about the actual (social) quality of the participatory and inclusive process that most projects claim to have—and ultimately about the quality of the built outcomes themselves.

Nevertheless, design-build projects are often framed as ‘catalysts of change’ [23,24], as they create buildings of higher social and architectural quality and generate a positive impact, socially, economically, and ecologically, that stretches beyond the physical building. Research suggests that the participatory approach and close involvement of the users throughout all stages allow for an improved understanding and fulfillment of the users’ needs and wishes and produce architectural solutions that reflect regional and cultural peculiarities [14]. Moreover, tapping into user knowledge and local expertise (e.g., in relation to legal frameworks, user behavior, vernacular building techniques or the availability of local building materials) enhances the sustainability of the buildings in terms of longevity, usability and appropriation. In this context, scholars point to the importance of conceiving the architectural object as an ongoing project that is not finished once constructed, but rather constantly examined, changed and appropriated over time by its users [13,25]. An example of this incremental approach is the ‘Quinta Monroy’ project in Iquique, Chile, by Alejandro Aravena, Elemental, which includes habitable but semi-finished low-income houses. These were designed and built from the outset so that they could be extended and expanded by the residents according to their own needs and financial possibilities, ensuring longevity through flexibility [26]. Looking beyond the individual building, some scholars point to the potential of design-build approaches to trigger broader social change by improving local living conditions and providing the necessary impetus for long-term transformation of local building and construction processes. What exactly is meant by ‘social change’ is not precisely defined in the literature, but is often discussed in terms of newly emerging local networks [27], the revival of vernacular building techniques or the creation of new employment opportunities. Follow-up projects of local communities involving the same architect and ongoing engagement of students beyond the duration of the design-build project are also mentioned as indicators of (social) change [8,28]. Moreover, the positive impact on students is often mentioned in terms of the lessons they learn about project development, how to deal with different social and cultural contexts and how to take into consideration users’ needs, traditional building methods and the use of local building materials [28]. Such experiences are considered to be so impactful that they shape students’ perspectives in the long term and influence their future architectural practice. However, the learning effect should not be limited to the students involved, as often seems to be the case, but must be reciprocal in order to create social relevance and generate a positive impact on the local community [27]. Moreover, most projects tend to be small-scale and take a pragmatic rather than a programmatic approach [28], which has the advantage of directly involving the local community, but also means that the larger and often unsustainable context is disregarded, creating “islands of social engagement” with limited impact [6] (p. 772). Currently, much of the discussion on ‘social impact’ lacks

empirical evidence. For Gribat & Meireis [7] a “statement about (the) emancipatory and transformative impact” is thus nearly impossible and further research is urgently needed (p. 781). Regarding the factors that contribute to social impact, we can draw on findings from transdisciplinary research that highlight the crucial role of co-production and mutual and reflexive learning as important drivers [29,30]. While these are fundamental qualities of design-build projects, research on how they play out in practice and what we can learn from them to improve social quality and thus the sustainability of future buildings and construction processes needs to be further explored.

3. Materials and Methods

This article draws on empirical research conducted between 2020 and 2021 in the context of the interdisciplinary knowledge transfer project ‘Learning by Building’ funded by the University of Stuttgart, Germany. Over the past couple of years, more than 20 design-build projects were initiated and partially implemented at the University of Stuttgart, supported by the platform *eInszueInS*. As part of the knowledge transfer project ‘Learning by building’, one aim was to systematize the experience gained to date in the search for transferable knowledge; another was to study the projects’ direct and indirect impacts. To this end, five design-build projects were carefully selected and analyzed in great depth to examine how social quality is addressed at different stages by the design-build studios and which approaches have proved successful. The selection criteria included the quality of the project documentation and coverage of the relevant variety of design-build projects. Given the lack of (comparative) empirical studies on design-build practices, the research project was designed as an exploratory study using a qualitative research design. To ensure a holistic analysis of design-build practice, an interdisciplinary approach was applied involving the Institute of Spatial Conceptions and Fundamentals of Design, the Institute for Urban Planning and Design, the Institute for Social Sciences, the Institute for Economics and Law, and the International Center for Cultural and Technological Studies at the University of Stuttgart. Researchers from the fields of architecture, urban planning and design, social sciences, law and cultural studies worked closely together in all stages of the project, from conception and methodological design of the study to analysis and critical reflection of the results. Regular meetings ensured knowledge flow and transfer and an interdisciplinary engagement with the subject. The study itself was structured along three successive phases combining a set of qualitative research methods. In accordance with the explorative character of the study, the research process was designed iteratively, and each phase informed the subsequent one. In the first phase, a comprehensive literature review was carried out to extract the current state of research concerning socially engaged architecture and design-build and how they interrelate. The aim was to elaborate the core characteristics and claims of such practices and to understand the current strands of discourse relating to both process and impact. The findings of the literature review were critical in specifying the research question and in selecting the case studies for the comparative research (phase two). The case studies, as detailed in Table 1, include (1) the ‘Begegnungsraum’ in the city of Stuttgart, Germany (2) the ‘Übehaus auf Wanderschaft’ in Stuttgart, Esslingen and München, Germany, (3) the ‘Centro Comunal’ in Lima, Peru, (4) the ‘Zukunftstraum’ in Yale Yale Puna, Tanzania, and (5) the Bamboo School in Lombok, Indonesia.

The projects were chosen based on a set of criteria derived from the current body of literature and with the aim to acknowledge and reflect the diversity of design-build approaches in terms of regional context, use of locally available building materials and innovation in building construction, participation of users and involvement of other actors in the construction process, as well as the maturity of the project and its outcome (e.g., permanent buildings versus temporary interventions). The comparative case study research involved both desktop and document analysis of the selected case studies as well as a total of 19 semi-structured interviews lasting between one and one and a half hours. Interviewees included students and users as well as other actors involved in the development and realization of the projects. It should be noted that the number of people interviewed varied

considerably from project to project due to the unavailability of some of the actors and the fact that the date of completion of some projects was quite some time ago. All interviews were transcribed and analyzed according to the guidelines of theoretical coding [31]. As part of the third phase, a half-day reflection workshop with 20 participants was held in July 2021, with the aim to (1) present the research results, (2) critically reflect and discuss them with a diversity of actors, and (3) create a platform for mutual exchange and learning. Therefore, students, teaching staff and partners involved in the design-build projects were invited, as well as external experts from academia and others with practical knowledge in the fields of design-build and social design. The results of the workshop were documented and incorporated into the analysis.

Table 1. Overview of design-build case studies investigated in the study.

Design-Build	Location	Objective	Stakeholders	Construction Materials	Planning Stage
Begegnungsraum	Stuttgart, Germany	Space for interaction and integration	City of Stuttgart, University of Stuttgart, residents, District Council Stuttgart-Mitte, plus+ architects, among others	Brick, timber, clay, plaster	Built, in use
Übehaus auf Wanderschaft	Stuttgart, Esslingen, München, Stuttgart, Germany	Space for practice of music	City of Stuttgart, Jazz Club Stuttgart, Philharmonie Stuttgart, among others	Timber	Built, in use
Centro Communal Lima	Informal settlement, Alto Peru Lima, Peru	Community building	UCAL, UPC University of Lima, IntuyLab Collective, NGO Aalto Peru, Residents of Alto Peru	Brick, timber	Planned
Zukunfts(T)raum	Yale Yale Puna, Tanzania	Space for education of orphans	NGO Dunia ya Heri African Family and Health e.V. and welfare office Tanzania	Concrete slab, concrete stone block, eucalyptus, makuti-dry palm leaves	Built, in use
Bamboo Education	Lombok, Indonesia		SD Terpadu Hijrah, Institut Teknologi Sepuluh Nopember, University Nahdatul Ulama	Bamboo	Built, in use

4. Results

This section summarizes and discusses the major findings of the study along the lines of (1) the quality of participatory/co-productive process, and (2) outcome and impact with a particular focus on the role of process learning and reflection therein. The lessons that can be drawn for socially engaged architecture and construction processes more broadly are made explicit.

4.1. Participation and the Myth of Co-Production

As explained earlier, participatory approaches play an essential role in the conception of design-build to address societal concerns that are usually ignored in more traditional approaches. The participatory purpose, therefore, mainly refers to the involvement of the local population and giving voice to their ideas. While the participation of local communities is already common in urban planning and design projects, this is less true for construction projects. When it comes to buildings and infrastructure, users are rarely if ever involved in decisions about construction techniques and materials, and can at best help shape issues relating to building equipment at the very end of the process. Moreover, there is often a degree of tension between the aim of participatory co-production and the successful integration of relevant diverse perspectives. It can prove particularly difficult to involve the already socially disadvantaged—the younger, female, and foreign members of society—while the older, educated and socially well-placed, the “usual suspects”, tend to be overrepresented in the participatory processes. At the same time, it is worth noting that the development of participatory and inclusive planning methods have given rise to

a culture in which the researchers have gained importance. Under the critical notion of ‘post-politics’, the relationship between those inviting and those involved, the reflexive handling of different articulation capabilities and possible power imbalances in the process, as well as procedural openness to inconvenient results, are discussed [32,33]. Therefore, we studied the participatory goal definition, its reflexivity and involved understandings of procedural legitimacy, roles, duties, transparency, and conflicts. The main results are thematically grouped and presented below.

Project initiation: We found that almost all design-build projects were initiated exclusively through personal contacts or networks of individuals—both students and teaching staff. The legitimacy of those (students) initiating the project and setting the project goals is rarely questioned or discussed with other participants. Especially in the case of projects in the ‘Global South’, there is little critical discussion on sensitive issues around power imbalances, neocolonialism, racism, and the understanding of ‘development cooperation’. Only after the completion of the project, and often with time and spatial distance, did some students reflect on their role. Our investigation showed that any exchange or process of reflection with other participants and project partners on these matters was usually absent. We at the university recognize a duty in this regard, e.g., to raise students’ awareness of these topics and of their responsibilities during such projects. To prevent undesirable mechanisms of (social) preselection and cooperation with project partners, who may be in pursuit of completely different goals, the process of project and goal selection should be approached more systematically and, if necessary, on the basis of deliberate selection criteria. Moreover, an internal university network of existing cooperation partners could help interested students and teachers initiate projects without private contacts.

Transformation of roles: Participation dramatically changes the entire setup of a project, turning design-build projects into ‘different’ kinds of architectural projects: the sheer number of actors to be considered is larger and their interests more diverse, topics are more social, professional roles more holistic and tasks are more communicative, hierarchies are flatter and design and decision processes are more inclusive, requiring a more iterative, explorative and experimental approach. Due to participation, communication is no longer only situated at the end of the process but also at the very beginning. In design-build projects, students suddenly become moderators and facilitators of social processes. The results of the study show that students struggle with the task of facilitating complex and fluid actor constellations and moderating the continuous participation of users. It can be a challenge trying to involve not only the “usual suspects”, with whom they are familiar, but also those who find it more difficult to participate. Despite their best efforts, students frequently lack the skills and knowledge required to communicate with all users equally and effectively, using plain language and such tools as visual representation where necessary. Their architectural education may prepare them for the physical design aspects of the project, but largely omits the soft field skills required.

Participation approach: While all of the students were familiar with the general concept of participation, what it actually consisted of and related debates and their implications for the project were rarely mentioned in the interviews. A lack of knowledge and experience meant that in all of the design-build projects participation was usually not handled systematically, but rather intuitively, pragmatically and sporadically. No specific formats or methods were consciously employed in preference to alternative approaches. As a result, most of the design-build projects cannot truly be called co-productions, but rather remain at the level of consultation: users were usually only involved in the initial stage of design development, their feedback incorporated in draft variants and, if possible, agreed upon during a joint exchange. The main decisions related to structural design and materiality, however, were made by the core project team. This half-hearted participation had many unintended consequences. In terms of untapped social participation benefits, there was no early or continuous involvement of users and reflexivity, which is what user involvement is intended to provide, was mostly absent. Questions about appropriate representation of social interests in the process or how to deal with conflicting claims were not raised.

At the same time, little effort was made to transfer more decision-making competencies to users (keyword “co-production”), formats for more direct, low-threshold participation or consciously mediating third parties were rarely applied, and transparency in internal and external communication was sometimes low. Continuous participant reflection, in the sense of maneuver critique, was missing, as was any kind of binding user feedback. Yet, while there was certainly room for improvement, most project developers did a fairly good job with regards to participation. This is largely accounted for by exceedingly high personal engagement and basic attitudes of openness, tolerance, empathy, curiosity, flexibility, and a willingness to compromise—all attributes beneficial for participation. In all of the projects under examination, the early stages consisted of intense efforts to get to know the initial situation. Where possible, the students collected first-hand impressions of the building site, connected with the local community and thereby tried to gain an understanding of the interests and needs to be considered in the ensuing processes.

Network of supporters: Our investigation also confirms the crucial importance of support networks, promoters, and advocates, sometimes already established, sometimes developed in the course of the design-build projects. Without them, some projects would neither have been possible nor able to deliver as they did. Support ranged from funding the project and establishing contacts to help in navigating complex administrative landscapes. However, the strong role of network actors also posed numerous challenges, especially when supporters sought to exert influence in their own interests and impede attempts at compromise, or stood in the way of consent solutions, or when they consistently stood between the project developers and the users. In some cases, the students were also dependent on communication through third parties, which meant that interaction with users was indirect and possibly filtered through those third parties, with the attendant risk of information loss.

Conflict management: Participatory processes usually deal with change and with change comes conflict. Such conflicts need to be managed constructively in participatory design-build projects. There are, however, limits. In one instance, the project developers were caught in the middle of a local conflict involving manipulation, corruption and even violence—a reason for their immediate withdrawal. While most conflicts are not directly caused by participation but rather uncovered by it, there are also conflicts in design-build projects that revolve explicitly around aesthetics, materials and construction and implicitly around underlying developmental goals and the definition of social order. These kinds of conflicts emerged in all case studies. They were mostly solved from the perspective of the developers (students) and the question of whose knowledge counted or should count was not actively addressed. Our analysis also indicates that hidden goals and beliefs sometimes came into play. In one project, the users considered it important that no ‘self-construction aesthetics’ would be created and that the building should demonstrate a solid appearance. They did not want to reproduce the standard aesthetic of the Global South (or, more accurately, its cliché) but preferred to opt for a material they associated with progress. Forces prevailed that interpreted design-build cooperation more as development work and aimed for Western modernization on site, so that in this case, concrete, which was perceived as progressive, was given preference over timber—although from an environmental point of view the older material should have been preferred [34]. There is a need for a better grasp of the micro-processes and micro-politics at work in these processes as they shape not only the interactions in place but also their outcomes. It can be argued that a more reflexive approach is needed to enable compromise solutions that sufficiently reflect the needs and wishes of the users and simultaneously challenge the beliefs of opinion leaders, regardless of which side they come from.

4.2. Process Learning and Reflection as a Critical Lever for Social Change

Design-build projects often claim to create buildings that are more responsive to the local context and the needs of their users, improving sustainability in terms of longevity and usability, as well as contributing to broader social change that goes beyond the physical

artefact. Such change can take the form of new local networks, the revival of vernacular building techniques or a transformative learning experience for students and the local community. Our study highlights the importance of mutual learning and reflection processes to create such change, as participatory design-build projects are vastly different to traditional architectural approaches.

Reflection: Students often act intuitively in design-build project, but this may not be enough given the fundamentally new challenges they face. We found that those involved in the projects were so engrossed in the time sensitive day-to-day execution of their new tasks that the more general but context-specific focus was lost along the way. While there seems to be a general understanding among the participants of the need for a deliberate, joint and continuous learning and reflection process, we found little to no evidence that this was actually happening. Instead of taking a deliberative pause from time to time to jointly reflect on the path taken and critically assess its appropriateness and, if necessary, make adjustments to changing circumstances, those involved often rushed ahead, with collective euphoria, motivation and drive precluding any objective perception. If reflection took place at all, it was only on an individual level and with temporal and spatial distance, without mutual exchange. Often, a critical view was only expressed after completion of the project.

(Transformative) Learning experience: Although the learning experience and learning outcomes could have been improved through a structured and mutual reflection process, our research shows that all respondents found the projects valuable and personally enriching. Students in particular benefited from the design-build processes in a variety of ways and often emphasized that it generated the most significant learning experience they had in the university context, both in terms of gained knowledge and skills as well as personal development. In terms of content, the students found the experience of planning and realizing complex participatory self-build projects particularly enriching. They learned about new materials and construction methods, gained new perspectives on locally appropriate solutions and sometimes even realized that architecture is not always the right answer to the problems identified. Dealing with legal issues often posed great challenges for the projects and led to a steep learning curve among the students. Many had previously little contact with legal issues and were suddenly forced to deal with the role of civic law and public law relationships, clarify liability issues with regards to particular property law and private building law, obtain building permits from local architects or apply for a special use permit in the case of temporary projects on public land. However, even more than content-related and technical knowledge gained, the students appreciated the personal experiences they had during the design-build projects and how much they learned from working with other people and local cultures. Stepping out of their comfort zones, getting to know another culture (beyond tourism) and the experience of living with locals made some students question the resource-intensive German lifestyle, but also appreciate Germany's more open society, e.g., with regard to the role of women. They also began to question their own roles and responsibilities. Their new awareness of structural social inequality and the social responsibility of architecture caused them to reflect on the direction of their studies and future architectural practices. In addition to these aspects of intercultural exchange, the involvement in a (successful) design-build project enhanced self-efficacy and self-confidence. However, similar to other studies, our research indicates that learning and personal development is largely a benefit enjoyed by the students, being less evident among users and other actors involved. To achieve social relevance and a stronger impact on the local community, a structured approach to learning and mutual reflection should thus be taken in design-build projects.

Social relevance and impact: Apart from the considerable learning effects on the students, we found evidence that the projects generated a social impact beyond the physical building and the duration of the project. New networks were established, and contacts and even friendships between some cooperation partners were formed, leading to the development of new projects. In general, the interviews indicated an openness among

most participants for renewed cooperation. Moreover, our analysis shows that lessons learned from the projects were transferred and resulted in new local building practices. In one case study, the novel construction method tested and adopted during the construction phase was applied by local skilled workers in later projects. Some influence on architectural orientation in follow-up projects in the same context could also be detected. Our analysis similarly showed that insights from the design-build projects have been integrated and anchored in teaching content, with one of the projects now serving as a reference for new projects in terms of architectural quality and the process of international cooperation. Lastly, insights gleaned from the interviews showed that users identified with the (physical) results and appropriated space and place according to their needs—during and after construction. This applied in particular to users who actively participated in the process, which suggests that higher levels of identification, trust and competencies are a result of participation and a prerequisite for appropriation.

5. Discussion of Findings

Design-build projects have gained prominence in the past decade. Many are linked to the claim that they bring about social change, both in terms of the underlying process and the built outcome. These assumptions, however, are often unsupported by evidence. This conundrum is further aggravated by the observation that the quality of the process is not necessarily linked to the quality of the outcome. Both assessments are subject to power politics, a pattern we have encountered repeatedly. Based on a comparative case study analysis, this article critically engaged with the ‘social’ dimension of design-build projects at universities and explored to what extent they fulfill their claim to social change and how this social change is defined in the first place. Our investigation invites a closer look at the experience gained in design-build projects, going beyond a mere celebration of the built outcomes of such projects to unravel the different competencies and teaching and education methodologies with the aim of ensuring long-lasting social relevance.

In the literature, the ‘social’ dimension of design-build projects is often highlighted as a key feature, but it remains a vague and largely undefined concept. Often, such projects are labelled ‘social’ because of their supposedly user-centered approach. In theory, architects (or other project developers) try to make a meaningful contribution to solving social problems on the basis of a serious and continuous engagement with the people concerned and their interests and needs. The building is thereby not an end in itself, but a means to address those issues. However, our study has shown that the reality on the ground and the social dimension of such processes are more complex and contested. The (future) users are not the only people involved; the project developers also have their own interests and agenda—as they should. A rigid adherence to the user focus as the only point of reference is neither realistic nor desirable. This is exemplified by the conflicts surrounding aesthetics, materials and construction mentioned above and points to a fundamental challenge in design-build projects: to strike a balance between democracy-building, co-production, participation and empowerment as a principle of development work on the one hand and the need for a transition of the building sector towards the principle of sustainability and climate-neutrality. Obviously, there is a tension between democratic, but non-sustainable user preference and sustainable, but not legitimized building practice. Both aims are legitimate and require further critical discussion about the actual (social) mission of design-build projects.

Our study emphasized that the aim of each project, and correspondingly its scope for participation, needs to be defined in the initial phase, transparently communicated to everyone involved, reviewed in the course of the project and adjusted if necessary. Project developers should allow as much leeway as possible for local solutions without sacrificing their own core values. In this respect, project developers should consciously draw red lines for their engagement. Ideally, these boundaries would be defined not only self-referentially, but in dialogue with the people concerned. Based on mutual understanding, ways can be sought to combine different interests and needs in a common vision. This is what true

co-design (or co-production) is supposed to be: a form of win–win interaction in which all participants see their perspectives reflected. But even in this seemingly harmonious form of interaction, there is no getting around power politics. So, the bottom line is that it is again about social aspects: the perspectives, evaluations and definitions of those involved.

6. Conclusions

This paper discussed critical factors that influence both the (social) quality of design-build processes and their (built) outcome and impact. The findings offer important insights for future design-build projects and their underlying need for revised training and teaching curricula to equip future architects and planners with the necessary knowledge and skills to act as process designers and facilitators and to shape a more people-centered built environment. The following implications can be drawn from the study:

- Everyone involved should be sensitized to the differentness of design-build where long-established routines are no longer valid. A critical engagement with the meaning of this differentness and its implications for structures, processes and roles is of utmost importance.
- New knowledge and soft skills need to be integrated for higher education to equip future architects and planners for an updated role as process designers and facilitators. Current lacks include knowledge and skills concerning the application of participatory formats and methods, communicative skills, and techniques for sensitive moderation of dialogues and constructive mediation of conflicts. Other attributes to be encouraged include flexibility, an ability to improvise, openness, curiosity, empathy, tolerance and cultural sensitivity, an ability to reflect and learn, a willingness to compromise, tolerance of frustration, perseverance, patience, motivation, commitment and responsibility.
- (Future) architects need to be equipped to develop a participatory design space that carves out room for joint decision-making and its limits so that conflicting aims between socially legitimized decisions and ecologically meaningful construction can be addressed. This requires not only the learning of certain skills but also institutionalized engagement with the project's mission and the provision of some leeway for participation prior to the actual participation of external actors.
- The introduction of interdisciplinary background staff to prepare the people involved in design-build-projects for the challenges ahead, manage the transfer of knowledge and serve as an in-house point of contact—even as a neutral mediator, if necessary.
- Funding for design-build projects needs to go beyond material aspects and include budgets for facilitating participatory/co-productive workshops and learning exchanges.
- Learning processes need to be strategically planned. The social impact effects of learning associated with current design-build projects tend to be random and one-sided, favoring those (students) driving the project. In order to be socially relevant, a co-productive approach with a two-way learning outcome would require a multi-actor constellation to jointly define the target (knowledge) that the design-build project is aiming to achieve. Furthermore, learning should be institutionalized, e.g., by implementing mandatory reviews at regular intervals within and outside of the project teams. Organizational leaning could also be supported through the use of written manuals (see Learning by Building “Orientierungshilfe”).
- To prevent isolated pilot projects, knowledge on scaling-up needs to be part of the process design to ensure that small-scale engagements can become catalysts for wider social change.
- Evaluation cannot be restricted to the physical built output. If a claim to social relevance is being made, evaluation needs to include a broader social impact analysis. Analyzing the social impact of participatory interventions, especially in the mid- and long-terms, is a continuing challenge in social science.

In this list of implications, one key challenge stands out: the need to systematically strengthen individual skills and competencies without compromising the character of

design-build projects. Supportive guidance to maximize social impact should be provided while leaving space for the appropriation of process and results.

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