# EXPLORATORY BUILDING: A MAKERS APPROACH TO LANDSCAPE ARCHITECTURAL EDUCATION

**Gallo, Cory**
Mississippi State University, cgallo@lalc.msstate.edu

**Stevens, Julie**
Iowa State University, jstevens@iastate.edu

**Winterbottom, Daniel**
University of Washington, nina@u.washington.edu

## 1 ABSTRACT

*The authors argue that Design-Build has been an innovative and effective method of implementing landscape architecture studios where designs are both designed and built, and students learn by thinking, reflecting, and doing. We suggest using the term Exploratory Building (EB) to better describe the academic learning model that encourages student exploration and discovery of innovative ways of designing, making, and problem solving. Its strengths include a symbiotic relationship between the acts of design and building, tangible community service, created assets, professional skill development, and ease of transition from academia to practice. Many faculty believe EB is a difficult model to implement and incorporate in their curricula. Understanding the many challenges and significant efforts required, we use decades shared experience and literature to offer strategies to develop and manage EB programs and reduce resistance to the expansion of this model within the Landscape Architecture pedagogy. We argue that the challenges of funding, time demands, liability, and the application of EB to recognition and promotion can be addressed. What remains, a critical area of further research and documentation, is to improve upon and address the pedagogical advantages that students perceive to result from this learning model. The modest number of experienced faculty and programs continually implementing EB suggests a rigorous assessment of landscape architecture EB programs is critical to document the value, or the lack of, that students place upon the EB model, and to encourage additional LA faculty to develop EB programs in their respective institutions.*

### 1.1 Keywords:

Design-build, pedagogy, service-learning, experiential

## 2 INTRODUCTION

Exploratory building (EB) is a descriptive term we have applied to a specific applied experiential education model that utilizes making as the primary method to investigate space, form, materiality, ecology, meaning, broader issues of social justice, ecological design, community identity, and equity. We advocate the use of EB as the preferred term in comparison to design-build, as it more aptly describes the academic learning model where students explore and discover innovative and appropriate ways of designing, making, and problem solving. The term design-build is often associated with the professional project delivery that differs in intentionality when compared to its academic goals. EB's prominence in landscape architecture (LA) programs is admittedly modest when compared to more conventional methods employed in design studios, and in material and construction courses. The opportunities and benefits embedded in EB are numerous, yet it is notably absent in most LA programs (Winterbottom, 2020). The effort to develop and manage an EB program is undeniably substantial, but students find the experience valuable both as a pedagogic model and for skill development especially in their transition from academia to practice (Winterbottom, 2013).

## 3 REVIEW OF COMMON CHALLENGES

In this paper we address four common challenges associated with (Project Funding, Liability and Safety, Faculty Recognition, and Student Assessment) and attempt to broaden the acceptance of EB by presenting strategies to benefit faculty intending to develop their own programs. Each challenge is presented with a literature review covering common themes associated with each strategy. Through review of literature and expert observations, the topics are discussed and analyzed along with potential solutions to address each challenge.

### 3.1 Funding and Time Constraints

Exploratory Building project success is contingent on the ability and willingness of faculty to develop achievable course objectives and secure the funding and resources to support those projects (Doyle and Whitehead, 2017). Securement of funding requires a significant time investment with agreements/contracts ideally in place at least a year prior to the start of the project. Most funding directed to academic programs is focused on research initiatives and often they are not allocated for capital (construction) related activities unless they are sourced directly through university building and grounds, facilities capital budgets, or donors willing to fund building activities (Winterbottom, 2020). These and other restrictions associated with established grant funding requirements create significant hurdles for EB programs. In addition to use restrictions, many funders require post-completion documentation with stated intended outcomes, for example student learning or community empowerment have been met. This suggests that a more rigorous evaluation component should be integrated within EB projects to evaluate if and how outcomes, such as student growth and learning are measured and their effectiveness. For example, are learning outcomes lesser than, equal to or greater than those offered in design studios without an EB component? With a wide selection of worthy endeavors to fund, EB faculty must develop a body of evidence that validates EB experiences from multiple perspectives that can be used in funding applications and open a broader source of funding streams.

EB programs rely on a variety of funding mechanisms to support projects, most of which is dedicated to implementation (Canizaro, 2012). Often a combination of sources are used to fund EB programs. For example, through a partnership between the Iowa State University Department of Landscape Architecture and the Iowa Department of Corrections (IDOC), initial funding for an EB project was allocated by IDOC within their construction budget for a newly expanded prison. Over several years, additional funds were needed and through budget tightening, additional funding from IDOC and in-kind donations, successive projects were implemented at less cost than comparable projects. A single funding source has been established at the N.C. State landscape architecture EB program that receives continuing funding through a long-term partnership with their university facilities department to design and install storm water mitigation projects across the campus. The program at University of Washington has relied on several sources including modest grants from the Seattle Department of Neighborhoods, private donors, partnerships with non-profits such as Catholic Charities, Veterans + Friends of the Puget Sound, and partnerships with public agencies such as King County Parks to garner funding and in-kind donations.

**Figure 1. Funding from the Veterans + Friends of the Puget Sound made this healing garden at the Puget Sound Veterans Administration Hospital possible. By law the VA cannot solicit funds so this third-party donation was given to the University of Washington as a gift.**

Due to significant time constraints, diversity of student proficiency, and unanticipated weather conditions, EB projects are inherently flexible. In an EB program the design process is often accelerated to accommodate the implementation process within an academic semester/quarter. The consequence is that there is minimal lapse in time between design completion and implementation, with the construction budget often not finalized until the building commences. Due to field conditions, budget constraints and continuing detail development, design overlaps with the construction process. This creates a cyclical process that continues throughout the project, reinforcing the deep connection between these two activities.

Material donations offer a reasonable, but potentially time-consuming means of off-setting project costs and expanding design possibilities. At ICIW, the Iowa DNR and County Conservation programs supplied prairie plant plugs and seeds. In return, students and incarcerated individuals harvested and processed seeds for future prairie reconstruction projects. Play equipment and furniture companies often provide discounted fixtures especially when the project includes a post-occupancy evaluation to review their products.

Local community groups often provide access to funding. Groups like *100 People Who Care* give funds quarterly without the onerous reporting required by larger funding agencies. To make every dollar count, it is advantageous for these organizations to gift directly to the client, community partner or university. Depending on funding sources and the size of the grant/donation, universities can add a 5%-60% overhead when funding is administered through the grants and contracting department (Winterbottom, 2020).

Managing EB projects within a university context has both advantages and disadvantages. University staff have an extensive knowledge of grants and contracts and are ready to help. Developing a familiar knowledge of grant and contract processes is essential to EB program directors. In universities it is not uncommon for individual faculty to be prohibited from soliciting funds from individual donors and foundations to avoid conflicts with universities' targeted solicitations. Foundation specialists can aid in the application and reporting processes. In larger granting agencies the overhead is understood, but many private donors may be unaware of the percentage taken and without this understand at the beginning that it can be a limiting factor. It is important to understand the contracting protocol and overhead processes and percentages before making final contractual agreements. It is also advantageous to consider multiple avenues to manage the financial transaction between a university and community partner. Before the agreement is finalized faculty should consult with university council and contract officers to assist with drafting and managing contracts to ensure funding and liability concerns of both parties are addressed.

While funding and timing tend to be the greatest challenges in nearly all projects in and out of the university, the many benefits outweigh these challenges. This work is important and fulfilling for all involved. Users benefit from unique and intentionally designed landscapes; clients benefit from participating in the design process and making these projects come to life. Students learn countless technical skills and immeasurable soft skills that will benefit them as professionals and as members of their community and society. And faculty benefit too, despite the challenges. Faculty can enjoy the creativity of a start-to-finish design process. We can feel good about the more meaningful mentoring and relationships built with students, and members of the communities in which we work. In many cases, these feel-good projects are good for our departments and universities as well. Getting off campus lets us share what we know and love about the benefits of nature and well-designed landscapes.

### 3.2 Liability and Safety

Liability and safety are often a primary concern among department chairs and deans who often perceive EB as a high-risk method of experiential learning. The perceived danger of power tools, heavy equipment and materials should not be overlooked. Rather, these concerns can and should be addressed as a pedagogical opportunity. Students and faculty should complete formal safety training in line with the types of tools and equipment necessary to complete the project. For example, at ISU, the office of Environmental Health and Safety offers a skid loader training module that has been required for students working at ICIW. Furthermore, students receive additional training from the equipment rental technicians. These opportunities provide a safe space for students to learn about job site safety while becoming more effective machine and tool operators.

Exploratory Building projects require creativity throughout all aspects of project development and completion. Assessing and managing risk and liability requires foresight and familiarity with the applicable university regulations pertaining to risk management and students. One way to manage administrative and community concerns about liability is to engage the university legal counsel in conversations early in the project development and create a risk management plan to determine potential concerns and constraints.

Understanding the unique needs, aspirations and concerns of clients and intended users is an important in any EB project. Understanding the inherent limitations including skill level, reasonable fabrication techniques, tool and equipment feasibility is important to access feasibility, scope, and safety. The level of risk can be managed, to a degree, by ensuring that the location, scale, and technicalities of the project are reasonable. “The scopes of projects vary widely both among programs and over time within each program. Many build pavilions, park and recreational structures, interpretive centers, and other outdoor structures, of a program. The reasons given for the selection of these projects include the desire to avoid code constraints, project visibility (as these are typically in public view and for public use), greater ease of construction, ability for students to explore structural, material, and tectonic issues, and so that projects fit neatly within an academic term” (Canizaro, 2012). For example, it may be easier to manage risk if the project is to be designed and built on the university campus, where liability may be more straightforward. Furthermore, university planning and design administrators can be helpful and well-resourced collaborators.

Not all projects can or should be contained within our home campuses. “In terms of clients, most design-build programs tend to work for public entities and/or nonprofits that work in service to those in need such as community development and housing organizations” (Canizaro, 2012). Much of the reason we design AND build is to expand our students understanding of other cultures and communities with whom we might not otherwise cross paths. In the case of the ICIW+ISU collaboration, lawyers at both ISU and the Iowa Department of Corrections met to determine where liability would fall while students travel to and from the prison and while they were working on the prison campus. But gray areas always exist. Who is liable if a student breaks their foot while loading tools into a university vehicle outside of a home improvement store? It is critical to have these complicated conversations early in the process to allow for changes in scope, scale and general operating procedures and ensure the project can still be implemented.

Design-build instructors wear many hats—educator, construction manager, contract negotiator (Doyle and Whitehead, 2017). Depending on the location, faculty should expect to “solicit consultant participation, secure permitting, and solicit bids for specialized construction methods unfit for beginning students” (Doyle and Whitehead, 2017). Because students are new to many of the tools and techniques of the trade, some fabrication or heavy equipment work may require outsourcing—another point to clarify with risk management professionals at the university and with your client. Students may be required to complete safety training prior to operating heavy equipment, but oftentimes the best lessons are taught by the professionals we interact with throughout the project, like the contractor or heavy equipment tech who delivers equipment to the jobsite. They are often willing to provide lessons on how to safely operate their rental equipment.

**Figure 2. The scope of work and complexity of building methods could be dictated by the students' construction experience. However, the goal of EB education is help students to overcome fears and trepidations about building. When instructors guide students through the techniques, students excel well beyond their perceived limitations and the high-quality execution enhances self-confidence and often exceeds client's expectations.**

"Each project is unique as are the risks" (Winterbottom, 2020). Risk is a relative idea, and all EB projects have inherent levels of potential injury. How much risk should be accepted is often not standardized but is balanced with other factors including if the outcomes are essential to the community served and offer unique and meaningful student experiences not achievable using other processes or techniques. The COVID 19 pandemic has taught us all about balancing risks and benefits—not to mention the role of collective action and the need to support our communities. Risk, always a factor in any construction project can be managed with proper planning. "… the issues of liability for both student safety and for the protection of property (i.e. risk management) are interpreted or learned differently at every institution as each has their own tolerance for risk. Many programs reported protracted and delayed approvals when permissions were initially sought delaying projects and causing havoc with student schedules and client expectations. Others reported attempts to complete work hidden in plain sight or extolled the benefits of being far from the main campus and out of the sight of the administration" (Canizaro, 2012).

In addition to teaching and managing the projects, faculty must adhere to a safety-first mentality. Establishing clear on-site rules, behaviors, and protocols prior to commencing construction is critical to ensure students clarity and understanding of on-site safety. At the University of Washington, classes begin each session with a meeting prior to starting work where students are reminded of safety protocol and best practices. Students are encouraged to be observant at all times and remind peers if their safety measures fall short.

### 3.3 Recognition and Promotion

The criteria for promotion in academia typically relies on achievement in the areas of teaching, research, and service. Most EB programs contribute explicitly to promotion cases in both service and teaching. Research has been, one could argue, less clearly embedded in the EB model. That said, many LA faculty leading EB programs have published research based papers relevant to LA practice and pedagogy. For example, EB as an important vehicle for community service (Forsyth and McGirr, 2000). The time required to manage an EB program is significantly more demanding than a non-building studio and this creates a challenge for faculty to produce the quantity and quality of research required for promotion. The time demands to develop, fund, organize and administer an EB program minimizes time allocated to seeking funding for and conducting research. This is particularly significant in programs housed in agricultural colleges where research is more narrowly defined, and expectations follow a more analytical model when compared to LA programs housed in design colleges.

**Figure 3. This sauna and outdoor kitchen were implemented to increase social interchange among recent Syrian arrivals and established local inhabitants in a small rural village in Sweden. This type of community service combined with implementation offers a unique "soup to nuts" amenity that few other teaching models can replicate.**

There is evidence that suggests faculty engaged in EB teaching are uncertain about their colleagues' support and the importance of EB to the department and program. At times they may feel compelled to refute the perception that EB is technically oriented and not a scholarly endeavor. Gjertson (2011) surveyed 43 faculty from 36 architecture programs and found a perceived lack of support from colleagues and institutions. He noted that "Within the academy design/build is constantly under attack as being less that rigorous and unscholarly." If this is a common perception within academia, and these colleagues are later asked to review the promotion cases for EB faculty, the trepidation about developing EB programs and its impact on promotion may be justified. Doyle and Whitehead (2017) argue that academic recognition needs to be re-positioned and that EB should be re-tooled as a form of research relying on innovation and experimentation as intended goals, not just the simple act of building a project to fulfill the requirements of a client. The venues for dissemination of scholarship that focus on EB are understandably a modest part of thematic academic conferences. However, a growing number of architectural meetings have design/build as their focus and explore its role as a valued and innovative model of teaching/learning, and scholarship. The Association of Collegiate Schools of Architecture's 2014 Fall Conference */WORKING OUT: Thinking While Building* is one notable example. The proceedings have a strong focus on research produced within EB programs, many of which address issues current within the landscape architecture discipline. These and other annual meetings, CELA, ASLA and EDRA, offer forums to present, share and expand the role of scholarship focusing on EB processes, outcomes, and pedagogy, and use a peer review process thus qualifying for promotion.

Institutional leadership at all levels (departmental, college, and university) is often relatively conservative. Chairs and deans take a cautious approach to new "alternative" teaching/learning models, and are at times slow to adapt to change. This conservativism is at times manifested in a lack of support or at worst a cloaked hostility towards EB programs. They may have similar reservations (EB is too trade oriented, lacks of scholarship, is light on design rigor), but also the EB teaching model is viewed as too demanding of staff and faculty time, hard to fit into the existing curriculum, and perceived as greater in its risks. The successes of EB projects and their “publicness” when garnering awards, featured in articles and media can increase positive visibility for the university. While these examples acknowledgement the impact of the work, they do not fit neatly into the review process for promotion and tenure though we argue that they can and should be.

Expectations for promotion are specific to individual departmental/college/university standards that may vary in their foci and nuance. In academia, promotion is commonly based on scholarship that is defined more broadly than research, often including creative works, national or international awards and exhibitions that in some departments are given credit equal to peer review papers. National awards, given by established design/research organizations including ASLA, EDRA, ACSA, and CELA are in most cases considered equivalent to published research. The EB model has been a growing presence in the ASLA awards particularly in the categories of student collaboration and community service, and there is a parallel emergence of EB awardees from international landscape architecture. The following are some of the programs that have received awards for EB projects from ASLA (https://www.asla.org/HonorsAwards.aspx):

| | |
|---|---|
| 2017 | University of Texas Austin |
| | Mississippi State University |
| | University of Washington |
| 2018 | Iowa State University |
| | University of Washington |
| | Illinois Institute of Technology |
| 2019 | Mississippi State University |
| | Cal-Poly Pomona |
| | Gangneug-Woniu University |
| 2020 | Texas A&M |
| | Mississippi State University |
| | Anhui University Department of Design |
| | University of Washington |
| | Peking University |

The Association of Collegiate Schools of Architecture has a Design-Build Award, “To honor the best practices in school-based design-build projects”. Projects completed in landscape architecture programs, often in collaboration with architecture students, could apply for this peer reviewed recognition (https://www.acsa-arch.org/awards/design-build/). The multi-disciplinary focused program at Mississippi State University is a good example of leveraging their work for both ASLA and ACSA awards for the same projects.

The documented service benefits of many EB programs suggest that community service might be a more significant focus and value in EB promotion cases (Forsyth, Lu, and McGirr 2000; Winterbottom, 2002; Gregory and Heiselt, 2014). While not explicitly stated, service is required but not necessarily valued in comparison to teaching and/or scholarship in promotion cases. Many EB faculty have explored service-learning as a form of scholarship through peer reviewed conference papers and presentations and many of the ASLA student awards granted to EB studios are in the category of community service and collaboration. Many of these projects also intentionally serve BIPOC and communities in need (https://www.asla.org/HonorsAwards.aspx). As equity and social justice is gaining student and faculty interest in landscape architecture, it could be a fruitful avenue of scholarly EB focused research.

### 3.4 Learning Outcomes and Student Assessment

Exploratory Building studios cover a wide range of topics and learning themes (Melcher, 2013). However, a comprehensive experience and actual engagement with that process is critical for a student to gain a wholistic view of what these courses have to offer. Documented learning outcomes have varied depending on the author’s perspective and interest. In practice, the process is not as consistent as we might hope. Where one project might allow for a deep understanding of materials and jointing, another might reveal more about the importance of community engagement (Nicholas and Oak, 2020). Some of the most cited benefits include explorations of:

- materials and jointing,
- small-scale design refinement,
- design iteration from paper to reality,
- budgeting, and
- community engagement.

Outcomes might vary widely based on faculty, time constraints, client needs, student skills, and funding, which raises questions of creating standard outcomes for EB course typologies (Ware, 2013). It has also been noted that EB studios have the potential to explore beyond accepted practices as a form of research where students create new knowledge (Hinson, 2007). Students enter these courses with varied backgrounds and divergent skills that compliment and enrich the class experience but also suggest that each student has unique learning potential (Mohareb and Maassarani, 2018). This raises questions of parity between student efforts and outcomes (Canizaro, 2016). Another unique aspect of the EB studios is that learning outcomes must be successful while also meeting client expectations. Additionally, the safety net created by the instructor(s) can limit the risk of failure (Gjertson, 2011), which might be partially overcome when students are given a more direct hand in defining project goals (Melcher, 2013).

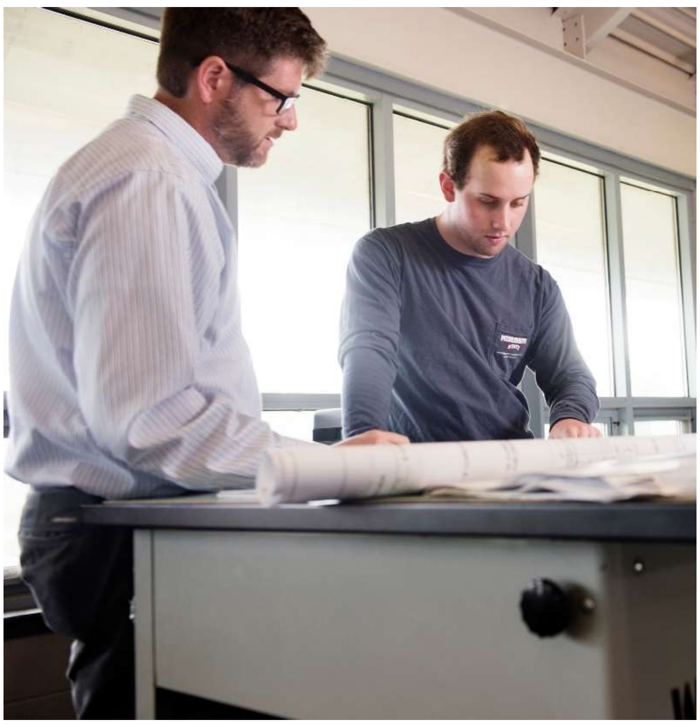

**Figure 4: The initial EB design process is often similar to the traditional studio design process. Once in the field the flexibility and reality of EB suggest or required changes that are implemented through field sketches, on site mockups, and improvisation. It requires adaptability and flexibility that strengthens design competencies and self-confidence.**

With limited empirical research on EB student assessment and most case study literature focused on project process, there is a need for exploring how best to assess student efforts in an EB class structure. With limited time and ever-present deadlines, the format itself most likely excludes more critical learning assessment. However, learning outcomes from smaller projects can have similar learning outcomes to complex projects (Melcher, 2013), which indicates that faculty might best serve students by ensuring time is allotted for more robust assessment of student learning. Because of the varied nature of EB projects and the inherent challenges of group work, the process becomes much more critical to student learning than the final studio product (Gaber, 2014). This conflicts with typical master-apprentice pedagogical norms in design education which culminate in year-end critiques of student work by expert reviewers where the outcome is more heavily valued than the process.

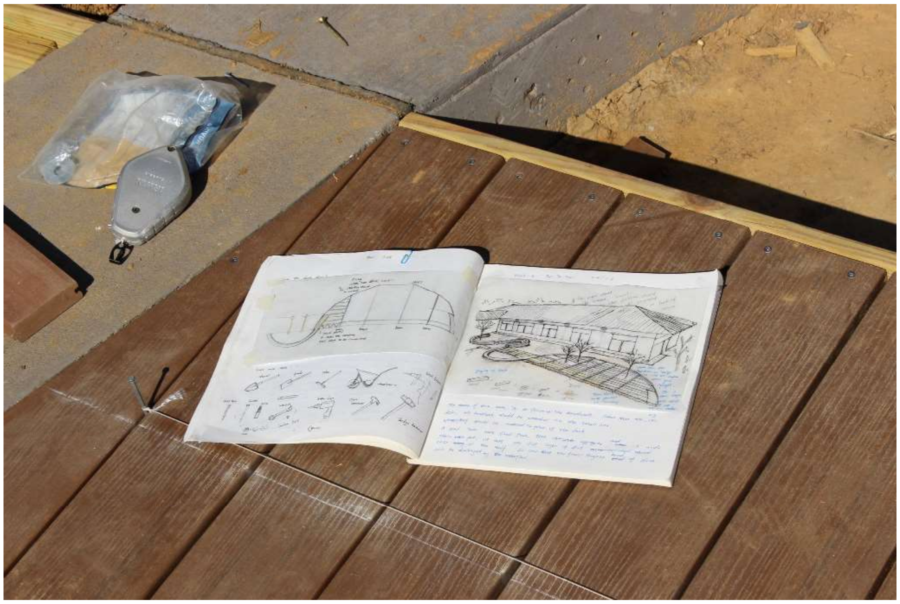

**Figure 5: Reconfiguring and testing design creates a cyclical process that extends throughout the course.**

The modes of assessment described in EB case study literature have been limited to journal or weekly progress/participation assessment (Winterbottom, 2020). Precedents for assessment may be more readily found in literature on broader service-learning pedagogy which stresses that assessment should be process and not product focused. This implies more traditional methods of assessing understanding of course content, which could be done through year-end exams that question processes and topics covered during the project, essays that explore themes or goals outlined through the project, and reflection through journals and writing assignments which link experience to learning, allows for feedback, and offers opportunities for further exploration (Bringle and Hatcher, 1995).

Possibilities for additional assessment might include critical peer reviews, which have shown to contribute to a more critical understanding of design theory and processes (Teixeira de Sampayo, et al., 2014). However, within the context of group work, care in implementing peer assessment should be given to avoid grievances against team members. While seemingly incongruent with the process of a design studio, exams and objective measurement tools may offer methods for ensuring student engagement through the entire process and allowing for a metric to measure how well students were engaged and absorbed content, theories, methods, and processes used over the course of the project. Similarly, essays where deep questions of meaning and impact can be explored to understand how well a student internalized the deeper goals of a project, may be utilized as part of year-end examinations or evaluations.

As EB becomes more widely adopted in landscape architecture education, educators need to expand assessment tools to ensure parity to other types of course delivery. Part of that is understanding that the EB platform is more closely aligned with a service-learning project than with a design studio. The course learning objectives are centered around process and therefore assessment of student work should test their understanding of that process.

## 4 DISCUSSION AND CONCLUSIONS

Terminology matters as it conveys the intent of prescribed activities. The word “exploratory”, in Exploratory Building better defines the pedagogical goals and intentional learning activities used than does the term design-build that is often associated with the connotations of the project delivery method.

Experiencing and mastering the “soft” skills of adaptability, managing complexity, and developing a comfort level with multiple and shifting roles (designer, manager, negotiator, etc.) are critical to our students’ success in professional practice. The EB model places students in these roles under the guidance of supportive mentors. The fulfillment stemming from creating a meaningful project for a community in need is a strong motivator for both faculty and students. The bonding around this endeavor has a powerful impact on students, one that reinforces the benefits of collaboration faculty frequently preach about. EB demands a high degree of instructor flexibility and adaptability. Faculty leading EB projects are tasked with sourcing multiple streams of funding, meeting deadlines within academic teaching schedules with budgets often not resolved until design is finalized. Faculty implement these projects with students, the majority of whom have little experience in building and still must meet client’s expectations. Faculty are teaching and managing these projects as they navigate a continually shifting terrain, responding to unanticipated changes throughout the project, while ensuring safety and learning outcomes. While committed to EB, faculty are investing copious amounts of time, yet many feel uncertain about their colleagues’ support and the value of EB to their department and college.

The challenges, while significant, can be overcome as demonstrated by the authors’ success in their respective programs. The EB experience is unique in academia and in landscape architecture programs. It offers an experiential comprehension of concepts often superficially understood through lectures and images. The participants, still students, must balance multiple responsibilities and make decisions in “professional” time verses academic schedules, thus the bridging of practice and academic is best manifested in the EB model. For many students the EB experience is a transformative moment when abstract concepts are fully realized and the interconnections between design and implementation are more fully understood.

Faculty responsibilities typically fall solely upon the faculty leading the projects and stresses incurred by those doing so are considerable. While committed to the pedagogy and benefits derived by students and communities, they are uncertain if their efforts will be parlayed into merit for promotion. With limited time for research and scholarship, should EB instructors consider their studios as laboratories of scholarship instead of places of production, re-vision studio goals around innovation and experimentation, offer data informing papers and presentations, and support award applications? Deans, chairs, and administrators are often quite conservative and cautious when alternative teaching/learning methods are proposed. A growing body of research that documents the beneficial learning outcomes, service-learning innovation, and success are critical to EB validation and offer evidence to support future funding applications. Most of the assessment tools used in EB literature are limited to case studies, typically relying on journals or student evaluations. A broadening of evaluative tools could bring a more substantial rigor and accuracy to EB scholarship.

In order to be embraced more thoroughly as a form of pedagogy, EB courses should consider expanding and increasing assessment and academic rigor through varied tools and processes. Most notably, looking to the depth of research in service-learning, courses that focus on process and not product are most beneficial to student learning. Assessment that is centered on learning outcomes associated with process can include reflection, regular individual student assessment, and even exams that may test on practical knowledge gained or allow students to explore broader goals of the course.

Finally, why should faculty consider developing an EB program? First, it is a significant benefit to the students’ depth of learning while offering an alternative experiential learning experience. Second, it offers a tangible benefit to the community, many of whom have not received the support or resources other communities have been given. This equity of distribution should be a societal goal and certainly one of our academic service, and many EB program are exemplified by their commitment to social justice. The personal rewards, as the community receives the project are powerful, and for the authors, demonstrates the power of landscape architecture, something often lost when the learning experience is removed from the community. Finally, it has helped advance our academic careers and served as a critical component of our shared promotion processes. All three authors have garnered awards, published papers and had featured articles done on their EB programs and projects. Certainly, EB is not for all academics, but for those with the skills and aptitude, it can play a significant role in the quality of our students’ education.

## 5 REFERENCES

Bringle, R. G., & Hatcher, J. A. (1995). A service-learning curriculum for faculty.

Canizaro, V. B. (2012). Design-build in architectural education: motivations, practices, challenges, successes and failures. *ArchNet-IJAR: International Journal of Architectural Research*, *6*(3), 20.

Doyle S., Whitehead R. (2017). The Lore of Building Experience: Deconstructing Design-Build, Iowa State University, Architecture Conference proceedings and Presentations

Forsyth, A., Lu, H. and McGirr, P. (200) Service Learning in an Urban Context: Implications for Planning and Design Education, Journal of Architectural and Planning Research, Vol. 17, No. 3, pp. 236-259

Gaber, T. (2014). The agency of making and architecture education: Design-Build Curriculum in a New School of Architecture. *ArchNet-IJAR: International Journal of Architectural Research*, *8*(3), 21.

Gjertson, W. G. (2011, October). House divided: Challenges to design/build from within. In *2011 ACSA Fall Conference, Local identities global challenges. ACSA Press* (pp. 23-34).

Gregory, A., Heiselt, A. , (2014). Reflecting on Service-Learning in Architecture: Increasing the Academic Relevance of Public Interest Design Projects, 102nd ACSA Annual Meeting Proceedings, Globalizing Architecture/ Flows and Disruptions

Hinson, D. (2007). Design as research: Learning from doing in the design-build studio. *Journal of Architectural Education*, *61*(1), 23-26.

Melcher, K. (2013). Leaving the Drafting Table: Students' Perspectives on the Design-Build Experience. *Landscape Research Record*, *1*, 72-82.

Mohareb, N., and Maassarani, S. (2018). Design-build: an effective approach for architecture studio education. *ArchNet-IJAR: International Journal of Architectural Research*, *12*(2), 146.

Nicholas, C., & Oak, A. (2020). Make and break details: The architecture of design-build education. *Design Studies*, *66*, 35-53.

Teixeira de Sampayo, M., Sousa-Rodrigues, D., Jimenez-Romero, C., & Johnson, J. (2014). Peer assessment in architecture education.

Ware, C. (2013). Design-Build: A Cornerstone in the Education of Landscape Architecture.

Winterbottom, D. M. (2020). *Design-build: Integrating craft, service and research through applied academic and practice models*. Routledge, Taylor & Francis Group.

Winterbottom, D M, (2002). Building as a Model for Learning, Landscape Journal, Vol. 21, No. 1, pp. 201-213, University of Wisconsin Press