Territories of Educational Design-Build: Toward an Evidence-Based Discourse

The Design-Build movement continues to lack meaningful connections with broader scholarly discourses. It has never been a *movement* in the traditional sense, as if having been birthed by fiery manifestos. Its growth has been more like a series of *moments*. This default condition, however, undercuts a growing oeuvre of built work and pedagogical innovation across the past four decades. Educational Design-Build no longer need operate from its cherished *outsider* status within the academy. A both/and discourse is possible. To its credit, this area has continued to prosper while operating in the margins more often than not. It maintains an unusual degree of freedom to experiment outside conventional curricular boundaries. To extend the impact of this important body of built work and the at times obscure processes its entails, however, ten *territories* of Educational Design-Build (E-db) are outlined, in an attempt to capture its most salient streams of activity and to both inform and be informed by broader discourses within and beyond architecture. In order to operationalize this approach, an evidence-based perspective, focused on this area of inquiry, is briefly outlined. This perspective is premised upon a systematic approach to conducting and documenting case studies, on their accumulated scholarly knowledge content, and on the mobilization of their knowledge into other disciplines and society at large.

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INTRODUCTION

Educational Design-Build, or E-db has prospered by operating in the margins, experimenting outside conventional curricular boundaries. At times, this freedom has quietly defied the wishes of acquiescent administrators. [1] But if this area is to evolve into an area of genuine scholarship, and become connected to broader scholarly discourses within architecture and beyond, it cannot continue to operate from its default condition. To be regarded as research and scholarship, rather than a form of magic realism (as if the artifact just magically appears) the time is now to examine how this can be achieved, although the aim of this discussion is not to proselytize. [2] One upshot of its default condition is that participating faculty continue to face hurdles in attaining tenure because E-db remains underdeveloped from a research and scholarship perspective. The implications of this become especially glaring from the standpoint of doctoral education, which continues, for better or worse, as the main pipeline for budding theorists and historians. Relatively few doctoral dissertations have focused on this subject area. With this said, the aim of

the following discussion is to advance the scholarly breadth and depth of the E-db movement.

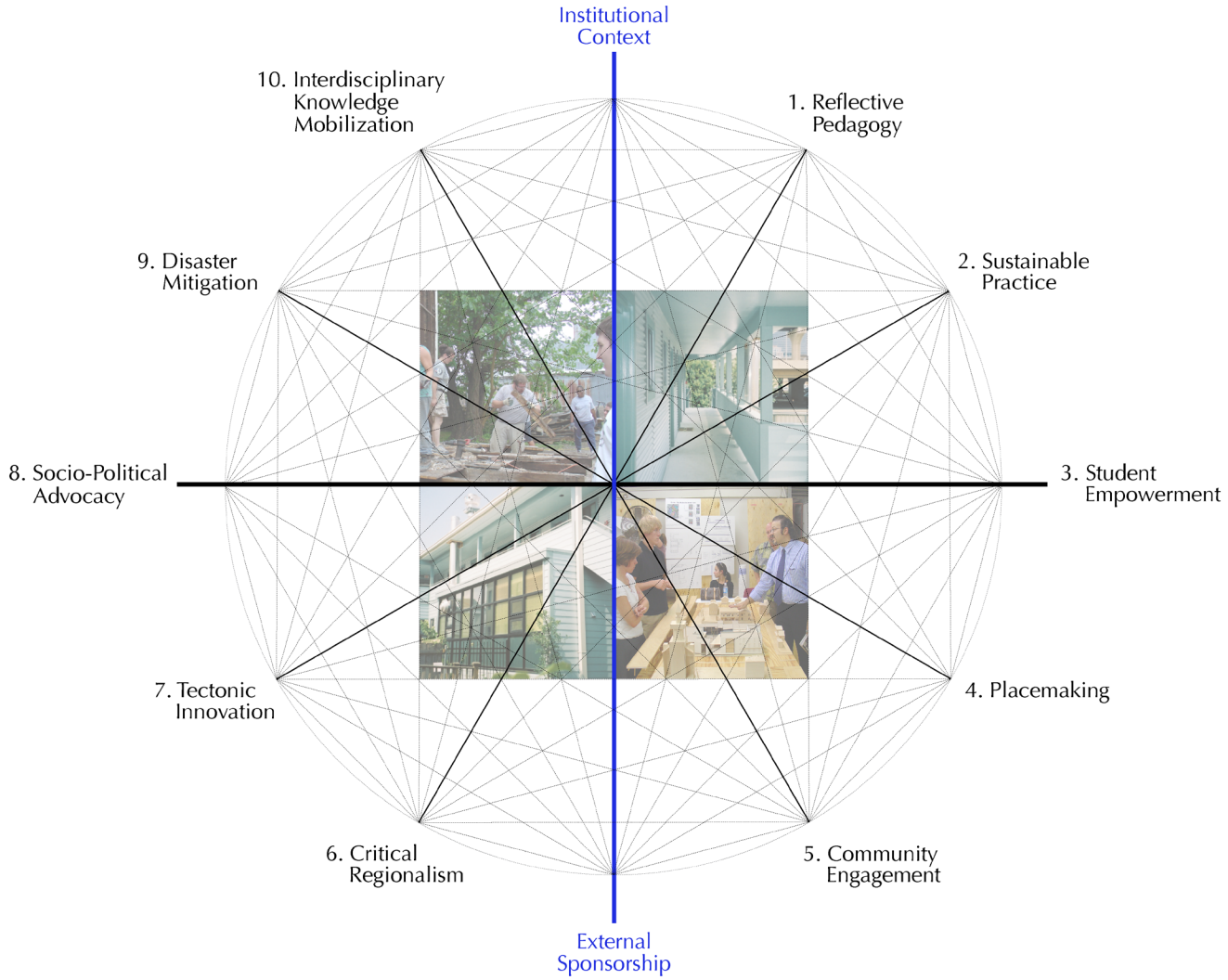
TERRITORIES OF EDUCATIONAL DESIGN-BUILD (E-DB)

Other curricular areas within schools of architecture are experiencing similar growing pains to the condition characteristic of the early years of E-db; these include the legacy of the past fifty years in urban design, and the nascent area of digital 3D Printing. It makes some sense, here, to attempt what Alex Krieger accomplished with respect to his overview of urban design education and practice. His recent, influential essay 'Territories of Urban Design' provides a roadmap of sorts. [3] Krieger's essay consists of ten streams of inquiry that currently inform both education and practice. In the case of E-db, the following discussion reflects a review of the literature, interviews with numerous faculty, and personal experience. Ten territories of E-db are identified, each as a dynamic, fluid stream of inquiry. Each is defined and briefly elaborated upon by means of examples drawn from one-off case studies multi-year curricular initiatives in North America. The body of evidence substantiating each stream of inquiry is of significant depth; though a fuller review of its content lies beyond the scope of this discussion. Nearly every example cited below crosses into many (if not every) of the ten territories of educational Design-Build (Figure 1). First and foremost, every project and curriculum seeks to express:

1. E-db as Reflective Pedagogy

The project/curriculum is a case study in reflective discourse on best teaching practices as much as the making of architecture and other built artifacts.

The roots of educational Design-Build run deep, with origins in the late nineteenth century. The aim remains the same: conjoining design with the act of building as a single process. Ideally, the design leads directly to the build. The act of designing-then-building is the overarching pedagogical objective. Its expression has since become bifurcated and diverse, expressed in small-scale furnishings to large-scale freestanding buildings of at times striking formal clarity and tectonic sophistication. For a variety of reasons E-db has continued to function in parallel to the desk-based, digitally driven design pedagogies common to most architectural design curricula. Still, the underlying premise of E-db has remained constant — students' immersion in a real project with a real client, in learning about new materials and construction assemblies, setting schedules and having to abide by them, working with budgets, and engaging the technical demands of on-site design decision-making and construction—all in the name of producing better-informed future architects and simultaneously making a positive contribution to the physical environment. The largest and most well known programs tend to dominate (often by default) design pedagogy within their institutions. In the case of the top ten programs, students elect to attend those schools more often than not because of its Design-Build curriculum. On the other hand, at less illustrious universities, and in schools offering sporadic, one-off studios, this is typically not the case. But with the act of building maintaining its primacy as the common denominator virtually everywhere, each program strives to adopt its own pedagogical imperatives to suit its own aims, ambitions, and audience(s). [4] The question arises: Is focusing on the Design-Build alone, as an isolated act, still a salient pedagogical imperative? [5] Is this a sustainable position in the long run? [6] Engaging beyond architecture-construction per se, extending into the social sciences and humanities, for example, or the environmental sciences, will accrue rewards by approaching:



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2. E-db as Sustainable Practice

The project/curriculum advances the cause of sustainable, resilient design and construction practices, and causes no ecological harm.

Sustainable design and building methods have for decades been central to educational Design-Build, from the geodesic domes built by Buckminster Fuller and his students at Southern Illinois University, and earlier builds completed in New Zealand in the 1940s. [7] Energy-efficient builds later were completed with faculty-student studio teams in the 1960s in low-income urban neighborhoods, often as collaborative efforts between a local university and the local storefront Community Design Center. [8] Further advances were made after the 1973 Arab Oil Embargo, and up to the global sustainability movement. Ecological design remains a primary driver in E-db and this manifests in projects that feature off-grid solar power, recyclables, and offsite prefabrication. Eight students in a sculpture course at Pomona College, in California, designed/built furniture for the campus's new fine arts building, using repurposed detritus scavenged from the construction site. [9] This practice has been a hallmark of the Rural Studio since its inception. In 1994, after securing a $250,000 grant from the Alabama Power Foundation, the studio designed and built its first

Figure 1: Taxonomy Diagram

house, in Mason's Bend, Alabama. Its most unique feature: donated hay bales for walls. Since then, every build has made use of some type of recyclable—72,000 surplus carpet tiles were used in another house; worn-out tires were reused in the walls of a chapel; Chevy Caprice windshields were used for a roof in another build.[10] The Rural Studio has constructed more than eighty homes and civic buildings in Hale County, demonstrating how sustainable builds contribute to:

3. E-db as Student Empowerment

The project/curriculum succeeds as a vehicle to engage students' understanding and appreciation of the art and science of building, and hence, to empower.

The goal of every program and project should be to heighten the student's skill levels, personal awareness, and self-confidence. Unfortunately, this is not always how things turn out. If and when a disconnect happens, it can be due to the student having miscalculated the scope of the task at hand. Or, she or he may eagerly anticipate working on a real project yet may soon become disenchanted with its onerous technical challenges. Others may become overwhelmed by the project schedule and the sheer workload. Still others may lack requisite skill sets and require some remedial training with tools. But perhaps the greatest challenge out in the field is to get everyone to work as one unit, as a team. Maturity levels, of course, can differ widely within a studio, causing interpersonal group dynamics to be a constant challenge to overall team cohesiveness. [11] This can have an adverse impact on the project schedule and the quality of the outcome. Self-empowerment can be inculcated through culture of teamwork with the student knowing that tangible benefits will be derived on a personal level, and as an aspiring professional. Mentoring can also be an effective vehicle. Small scale projects tend to be more effective vehicles to inculcate student empowerment because larger, more complex builds will likely require more time, money, setbacks, consultants, and outside tradespersons. The risk here is the student may inadvertently be relegated to a sideline role. The challenge is to carefully set and then adhere to the project's size, scope, and the build site in relation to the studio's size, the maturity level and work ethic of its members, and their technical abilities. If any one of these factors is off kilter, it is likely that the student's sense of achievement and self-empowerment will diminish. The students' new skills, and the satisfaction of being part of a productive team, are the greatest rewards of a successful build. When synchronicity occurs the student's appreciation of the nuances of the task-at-hand will inform and stimulate her/his desire to approach:

4. E-db as Placemaking

The project/curriculum contributes in a positive manner to the establishment and reinforcement of a sense of place and cultural authenticity, at multiple scales.

A key factor in student satisfaction with having been a member of a build team is the perceived degree to which the built outcome contributed to its larger context(s). The term 'placemaking,' itself, however, has been widely interpreted (and misinterpreted).[12] New condo projects advertized as creating a 'sense of place' abound. Catchy names, such as River Place, Prairie View Estates, and so on are absurdly-named 'non-places' yet all promise establishing some version of *genius loci*, when in reality, no such sense of place is to be found. The main question here is the degree to which the E-db studio is able to create buildings and artifacts viewed as meaningful contributors in their surrounding physical and socio-cultural fabrics, and how the outcome reflects the core ideals of local community and its cultural traditions. Granted, in the confines of a one or two semester curricular sequence

there often is insufficient time to fully examine the inner profundities of *place* and its broader ramifications, i.e. site physicality, symbolism, infrastructural fabric, and socio-cultural and political contexts. [13] The reality is that sites for builds are often pre-selected and provided to the university on a take it or leave it basis. Logistical pressures may require jumping in immediately due to semester scheduling and budget constraints, resulting in inadvertently according scant attention to subtleties of the local culture, microclimate and site orientation, neighborhood context, landmarks, cultural heritage as expressed in vernacular building traditions, and local residents' lifestyles. Nonetheless, the virtues of placemaking warrant detailed investigation because they are so closely aligned with:

5. E-db as Community Engagement

The project/curriculum succeeds in engaging client/sponsors, key socio-cultural stakeholders, and broader constituencies in the community-at-large.

Nearly all Design-Build studio projects and programs partner with non-profit organizations devoted to some form of community service. [14] Many at first 'cold call' the local university seeking out free assistance in the building of some public space such as a park structure, bus stop, urban farming depot, and so on. The Architecture + CommunityBUILD program at Clemson University recently completed two open-air structures for the Greenville County (South Carolina) SPCA (2012 and 2013) with three other future builds planned for this organization. Students are eager to be part of a legacy being created across a period of years, and this is a powerful attraction. Such partnerships require first engendering the sponsor's or client's trust, a coherent studio culture, led by the faculty coordinator, and the buy-in of other key stakeholders. The Rural Studio at first offered its services to do whatever was needed to help with small renovations throughout Hale County, Alabama. [15] This led in time to what is now arguably the most well known E-db curriculum in North America. At the New Orleans Women's Shelter Family Center, a Tulane University E-db studio in 2005 and 2006 (led by this author) at first worked to gain the trust of the client-sponsor by volunteering as mealtime food servers, and later volunteering collectively to demolish a dilapidated structure at the rear of what was to be the build site for a 35-bed shelter for exhilder, returning mothers and their children after Hurricane Katrina. [16] The completed project contributed significantly to a three hundred year-old community's rebirth, with a major share of the build focused on:

6. E-db as Critical Regionalism

The project/curriculum fuses indigenous building traditions, aesthetic vocabularies, and building methods with progressive influences.

Design-Build Bluff is a nonprofit organization with a two-fold mission: to build energy-efficient and sustainable homes for the people of the Navajo Nation in Southeastern Utah, and to engage students in this indigenous culture through exploring the possibilities of the E-db studio. Between 2003 and 2014, nine homes have been built, all of ecologically sustainable, salvaged, and recycled materials. Fundraising and grants from HUD has provided about $50,000 in funding per build. Students spend the entire semester working out of the Bluff, Utah basecamp. During the fall of 2010, twenty-two students built the 'Windcatcher House.' Having spent the preceding summer selecting the client(-family), the site, and being engaged in design. The dwelling was completed in thirteen weeks, on a schedule of two weeks on and one week off, from September through December. Navajo culture inspired the design throughout, as did the severe yet spectacular desert site. The private areas of the home are oriented to the east in accord with Navajo tradition,

which holds morning light as sacred. Rainwater is collected in a large cistern, and a trough provides drinking water for horses and for irrigation. The focal point is the Windcatcher, a thirty-foot tall chimney at the center of the parti' that provides both cooling and heating. Since many Navajo live off-grid, the dwelling is completely operable off-grid. [17] In 2011, Design-Build Bluff became a year-round program with student teams from the University of Utah and the University of Colorado Denver joining, now capable of constructing up to four homes per year while simultaneously pursuing:

7. E-db as Tectonic Innovation

The project/curriculum succeeds in showcasing innovative materiality, new applications of traditional materials, and innovative construction methods.

Since 2004, the ecoMOD program at the University of Virginia has completed twelve housing units on eight sites. The intent has been to provide high quality design for moderate-income families by means of offsite prefab modularity. Renovations and upgrades to existing historic residences have also been completed under the umbrella of UVA's ecoREMOD program. Five existing historic dwellings have been transformed. Both studios were an outgrowth of the University's 2002 Solar Decathlon Competition entry. [18] The University of Arkansas' Design-Build Workshop (D/BW) shares a similar goal: the use of prefab components. [19] Other schools have explored common materials in uncommon ways. Explorations in tectonics and materiality have included lightweight gridshells fabricated in wood, the focus of a number of studios conducted at Dalhousie University. [20] The University of Kansas' Studio 804 is one of the most established programs in North America. Its recent Ecohawks Research Facility (2012-2013), built on the campus in Lawrence, is for the purpose of conducting research on the conversion of fossil fuel-powered vehicles into battery and solar-powered vehicles. The aluminum strips of the building's upper skin were interwoven with horizontal aluminum tubes, requiring precise hand welding at every corner connection. The twenty students in the studio researched the alloy's properties to ensure every joined surface would weather equivalently and a series of welding training workshops were held. The parti' consists of two enclosed volumes for working on electric vehicles, and an open-air workspace. This is the Studio's sixth LEED Platinum project in a row. [21] These programs' aims and outcomes are aesthetically and tectonically among the more advanced in North America at this time and yet are by no means disconnected from the pursuit of:

8. E-db as Socio-Political Advocacy

The project/curriculum succeeds in improving the socio-economic, political, and overall well being of those for whom one builds.

The Yale Building Project has been conducted every year since 1967. Conceived by Charles Moore, it was begun in the context of the massive social upheaval of the 1960s. Each year, graduate students design and construct a building for a not-for-profit entity, and competed builds have occurred from rural Appalachia to community centers and a health clinic, to pavilions and recreational structures constructed throughout Connecticut. More recently, single-family residences have been built on narrow, non-conforming lot parcels in economically distressed neighborhoods in New Haven. These recent partnerships have been with Habitat for Humanity, Home, Inc., Neighborhood Housing, and Common Ground. [22] Many programs have been modeled on Yale's. In the past four and half years, and over fourteen trips, more than sixty students from the University of Tennessee School of Architecture have worked on projects in post-earthquake Haiti, led by John

McRae in collaboration with a local NGO, the Haiti Christian Development Fund. [23] Recent completed builds include a solar panel installation, an elementary school, an ongoing survey research project, and the design and construction of Caleb House. Its LIFEHouse is a construction how-to manual for rebuilding housing and neighborhood infrastructure in Haiti. These programs combine advocacy, technology transfer, service learning, and in-the-trenches work with disaster-stricken communities, often in the name of:

9. E-db as Disaster Mitigation

The project/curriculum succeeds in furthering the aim of mitigating the deleterious consequences of natural and human-induced disasters, and their aftermath.

In the past decade, the post-disaster strike zone has emerged as a powerful attractor for themed E-db studios in North America. Faculty are drawn from near and far to examine disaster strike zones and assess how their own studio can assist. Recent examples include the aftermaths of Hurricane Katrina (2005), the Haitian Earthquake (2010), the F-5 tornadoes in Tuscaloosa, Alabama (2011) and in Joplin, Missouri (2011) and Superstorm Sandy on the U.S. Eastern Seaboard in the New York-New Jersey Region (2012). University-based studios working in these contexts, for their part, have been hit and miss over this past decade, with few attaining any measurable level of design efficacy or long-term sustainability. [24] The URBANBuild program at Tulane University stands out, as does the aforementioned New Orleans Mission build, as it has completed eight single-family dwellings to date in association with Neighborhood Housing Services (NHS). NHS provides the building sites, chosen from among four lower income inner city neighborhoods in New Orleans. [25] Led by Byron Mouton, this ongoing program has been reflective from the outset, and is well received by the local community. In stark contrast, many universities charged into New Orleans, and especially the Lower Ninth Ward, right after Hurricane Katrina, often, as 'bulls in a china shop,' so to speak, with the attitude 'Dammit, we're here to help!' The best of these intentions often fell flat, coming off far more like 'Fire, ready, aim,' from a pedagogical perspective. On-the-spot guerrilla architecture coupled with social engagement definitely has its place in such contexts. But the problem is that architects are by training and predisposition poor first responders. Working in tandem, methodically, across diverse disciplines in these and other contexts, can significantly extend:

10. E-db as Interdisciplinary Knowledge Mobilization

The project/curriculum succeeds in drawing together architecture students and specialists from non-design disciplines with the shared aim of advancing society.

The term 'knowledge mobilization' is acquiring currency in many disciplines and as a rallying cry to step up research and far more clearly demonstrate its benefits to society. [26] In the case of E-db, millions have been invested over the past forty years. Despite this, its advocates remain unclear as to the fundamental differences between research and innovation. Research universities are committed to generating new knowledge, and are tasked with engaging industry and society to find outlets for this new knowledge being created on campus. A series of builds, by contrast, may result in a one-off mountain of accumulated knowledge over a period of years at a given school, although the 'transfer quotient' of this accumulated knowledge is immaterial if it remains unreported in peer-reviewed outlets. Other disciplines are unable to harness it. [27] Knowledge mobilization, and innovation itself for that matter, on the other hand, is rarely discipline-specific. A completed build can be an exemplar of the service-learning dimension of knowledge mobilization. For this,

ENDNOTES

1. Steve Badanes, "The Transformative Power of Architectural Education," in Bryan Bell and Katie Wakeford, eds. *Expanding Architecture: Design as Activism* (New York: Bellerophon, 2008): 248-255.
2. Vincent B. Canizaro, "Design-Build in Architectural Education: Motivations, Practices, Challenges, Success and Failures," *International Journal of Architectural Research* (Archnet-IJAR) 6, no. 3 (2012): 20-36.
3. Alex Krieger, "Chapter 1: Territories of Urban Design," in Alex Krieger and William S. Saunders, eds., *Urban Design* (Minneapolis: University of Minnesota Press, 2009): 18-28.
4. Canizaro (2012). Common to most programs is hands-on service learning.
5. Jori Erdman, "Hands-on: The Pedagogy of Design-Build." *Proceeding of the 2006 Building Technology Educators Symposium* (College Park: University of Maryland, 2008): 79-80.
6. William Carpenter, *Learning by Building: Design and Construction in Architectural Education* (New York: Van Nostrand Reinhold, 1997).
7. Anon, "The Demonstration House," *New Zealand Design Review* 1 no. 4 (1948): 8-9.
8. C. Richard Hatch, *The Scope of Social Architecture* (New York: Van Nostrand Reinhold, 1984).
9. Sneha Abraham "Students Recycle Materials to Create Furniture for New Studio Art Building." *Pomona College News*, August 12, 2014, http://www.pomon.edu/news/2014/08/12-studio-furniture.html (accessed September 28, 2014); Christopher D. Trumble, "Interstitial Installation: Site Specific Furniture as an Architectural Microcosm" in John Stuart and Mabel Wilson, eds. *Globalizing Architecture: Flows and Disruptions*. (Proceedings of the 102nd Annual Meeting of the Association of Collegiate Schools of Architecture, 2014).
10. Anon, "Samuel Mockbee: History and Philosophy," *The Rural Studio* (2014), http://www.samuelmockbee.net/rural-studio/about-the-rural-studio.html (accessed August 10, 2014).
11. For the faculty studio team leader, day-to-day issues can easily overshadow larger goals.
12. Stephen Verderber, *Sprawling Cities and Our Endangered Public Health* (London and New York: Routledge, 2012).
13. Bryan Bell, "Finding Clients," in Bryan Bell, ed., *Good Deeds, Good Design: Community Service Through Architecture* (New York: Princeton Architectural Press, 2004): 26-28.
14. David Sokol, "Teaching by Example: Design-Build Educators Talk Pedagogy and Real Politick," *Architectural Record*, October (2008): 125.
15. Andrew Freear, Elena Barthel, Andrea Dean Oppenheimer, *Rural Studio at Twenty: Designing and Building in Hale County, Alabama* (New York: Princeton Architectural Press, 2014).
16. Stephen Verderber, Breeze Glazer and Rodney Dionisio, "LEED and the Design-Build Experience: A Shelter for Homeless Families Returning to Post-Katrina New Orleans," *International Journal of Architectural Research* (Archnet-IJAR) 5, no. 1 (2011): 55-72.
17. Bridgette Meinhold, "Windcatcher House," *In Urgent Architecture* (New York: W.W. Norton, 2013): 237-241.
18. John D. Quale, *Sustainable, Affordable, Prefab: The ecoMOD Project* (Charlottesville, VA: University of Virginia Press, 2012).

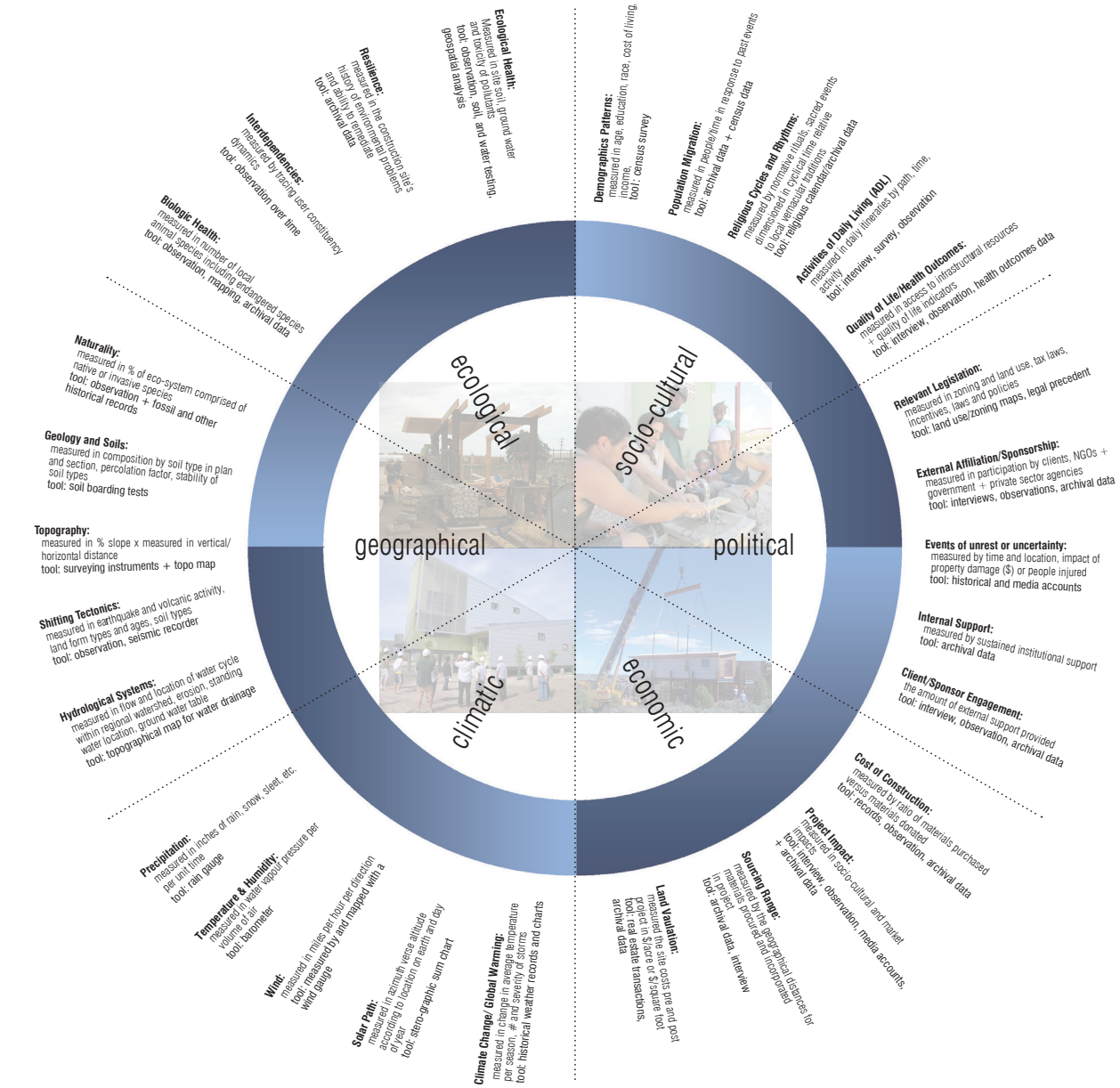

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Figure 2: Determinants of E-db

further knowledge dissemination is called for. [28] Why is no scholarly journal devoted exclusively to this area? In truth, no journal would succeed for very long unless interdisciplinary, and focused on knowledge mobilization. [29] The "show and tell" modus operandi is definitely passé.

TOWARD AN EVIDENCE-BASED DISCOURSE

Numerous professions, including the legal, medical, nursing, and the scientific and engineering disciplines are currently engaged in a process of seeking to reaffirm their professional stature and their contributions to society. As a means to achieve this, the term *evidence-based* knowledge has become widely adopted in the past decade. An evidence-based perspective holds promise as a vehicle for facilitating critical inquiry both within, and beyond, architectural discourse as it pertains to E-db. 30 The assumption being that it serves as a guide to document advances and propel them forward—mobilizing new knowledge into broader discourses and into society-at-large. [31] Beyond, it can further substantiate E-db pedagogy and practice without resulting in its dilution. [32] To further this conversation, a compendium of socio-cultural, political, economic, climatic, geographical, and ecological determinants is diagrammed (Figure 2). This is not to be construed as all-inclusive, but merely an aid in communicating with students, clients, research sponsors, and various other external collaborators.

In an evidence-based discourse, the first step is to articulate the given project/program's rationale and structure (1). In the case of the *Thinking While Doing* project, the construction of a large database—the *Design-Build Exchange* (dbX)—is to function as the centerpiece (Figure 3). [33] It will provide (when fully built) an interactive, open source compendium of completed builds in North America for access and use by virtually anyone, anywhere. It will be open to anyone seeking to add to or learn about others' work, according to building type, geographic location, team composition, types of sponsors, funding sources, images of completed projects, construction cost, and the documentation of the inner profundities, challenges, and setbacks encountered during a given project (2). A given project or curriculum first needs to determine its level of intervention (defined as Level 1 through Level 4). The four levels range from informal to formal, with the most intensive intervention (Level 4) consisting of reporting (publishing) the built outcome in via peer-review. The process is equivalent to the aforementioned disciplines which have already embraced an evidence-based paradigm (3) where the results of research are published in peer-reviewed scholarly journals, proceedings, and increasingly, on peer-reviewed online websites. [34]

Next, the pedagogical imperative(s) are stated, with the build's overall performance metrics clearly and unambiguously determined from the outset (4). The critical theoretical context of the project is also articulated (5). Next, the site selection process and level of site intervention is identified in the form of a narrative, which describes the scale, and scope of the building or artifact to be constructed (6). This is followed by policy ramifications likely to affect stakeholders in the built outcome (7). Also, regarding the built outcome, the performance goals for the final product are determined at this time (8) as well as any associated service-learning outcomes (9). The final stage consists of assessing the studio's (and other schools') ability to replicate the process and the built outcome at another time and place. The entire process is then assessed after a period of in-use inhabitation—typically achieved through a post occupancy performance evaluation. Finally, the mobilization of any new knowledge acquired is then disseminated to broader critical discourses within, and beyond, architecture (10).

19. Gregory Herman, "Market Modular," In Brian Bell and Katie Wakeford, eds. *Expanding Architecture: Design as Activism* (New York: Bellerophon, 2008): 193-198.

20. Ted Cavanaugh, "Diverse Designing: Sorting Out Function and Intention in Artifacts," in Pierter A, Vermaas, Peter Kroes, Andrew Light, and Steven Moore, eds., *Philosophy and Design: From Engineering to Architecture* (Berlin and New York: Springer, 2009).

21. Katie Gerfen, 'Ecohawks Research Facility,' *Architect*. August 2013, http://www.architectmagazine.com/Design-Build/eco-hawks-research-facility.aspx,html (accessed September 10, 2014).

22. Richard W. Hayes, *The Yale Building Project: The First 40 Years* (New Haven: Yale University Press, 2007). Also see the VLOCK 2013 Building Project Archive, at http://www.ysoa.archietcture.yalr.edu/sites/BuildingProject/bp13/gallery06.html (accessed September 10, 2014).

23. Tanner Hancock, "UT Students Help to Rebuild Haiti," *The Daily Beacon*. June 11 (2014), http://www.utdaily.beacon.com/news/2014/jun/11/ut-students-help-rebuild-haiti.html (accessed September 1, 2014).

24. At Tulane, we hosted no less than twenty-two E-db studios in the months after the University reopened. The effort was indeed appreciated but overwhelming to those of us who had only recently returned to the ruined city.

25. Neighborhood Housing Services, "Urban Build—A Partnership with Tulane School of Architecture," *Neighborhood Housing Services* (June, 2014), http://www.nhsnola.org/site95.html (accessed July 12, 2014).

26. Brian Lawlor, "Knowledge Mobilization through Interdisciplinary Professional Communication," *Journal of Electrical & Electronic Systems*, TD:e001.doi: 10.4172/2332-0796. 1000e001 (2013), http://www.omicsgrup.org/journals.html (accessed May 10, 2014).

27. Naomi Nichols, David J. Phipps, Johanne Provencal, and Allyson Hewitt, "Knowledge Mobilization, Collaboration, and Social Innovation: Leveraging Investments in Higher Education. *Canadian Journal of Nonprofit and Social Economy Research* 4, no. 1 (2013): 25-42. The Social Sciences and Humanities Research Council of Canada (SSHRC) Insight Program seeks to close the gap between new knowledge and its mobilization into society.

28. Social Sciences and Humanities Research Council, "Insight Program," *Social Sciences and Humanities Research Council of Canada* (2014), http://www.sshrc-crsh.gc.ca/funding-finance-ment/html (accessed April 12, 2014).

29. Perhaps a new, peer-reviewed quarterly journal is needed in this subdiscipline, i.e. *The Journal of Educational Design-Build.*

30. Heather Hall and Linda A. Roussel, *Evidence-based practice: An Integrative Approach to Research, Administration and Practice* (Burlington, MA: Jones and Bartlett, 2012).

31. Stephen Verderber, *Compassion in Architecture: Evidence-based Design for Health* (Lafayette, LA: The Center for Louisiana Studies, 2005).

32. Kenneth Frampton, "On the Fringes of the Empire," in Brian Mackay-Lyons. *Ghost: Building an Architectural Vision* (New York: Princeton Architectural Press, 2008): 101.

33. A consortium of seven schools of architecture are collaborating on the design and construction of evidence-based E-db projects in the United States and Canada under the aegis of the *Thinking While Doing* multi-year grant funded by the SSHRC of Canada.

RESEARCH INTERVENTION

3. Determine the Level of Evidence -Based Design Intervention*:
Level 1:
-Stay current with literature in the field
-Follow the evolving research related to the physical setting
-Interpret the evidence as it relates to specific projects
-Make judgments about the best design for specific circumstances
-Use design concepts based on benchmark reviews of other projects
-Produce work that advances the state of the art by developing tangible examples of improved designs
Level 2:
-Hypothesize the expected outcomes of design decisions
-Measure the results imperically
-Understand the research and interpret the findings
-Connect the decision to measurable learning/design outcomes
-Resist the temptation to report success while downplaying problems and risks encountered

RATIONALE

1. Develop and Implement:
A comprehensive studio-based E-db initiative that is:
-Multiyear
-Multifaceted
-Community-based
-Regional
by improving the quality of life of the host community by constructing new structures or modifying/adapting existing built environments
-Determining the desired scope of project

2. dbX Information Database:
-Search and interpret relevant precedents (dbX)
-Assess degree of institutional support and receptivity to educational design-build studio initiatives, opportunities, limitations, and reward systems, i.e. tenure/promotion
-Informally consult colleagues who have completed past similar E-db initiatives

3. Determine the Level of Evidence -Based Design Intervention*: Continued:
Level 3:
-Report results publicly with peers within the dbX community
-Share information beyond the institution or sponsor/agency
-Subject methods and results to scrutiny by informal peer review
Level 4:
-Publish e-d/b findings in national and international peer-reviewed journals
-Interdisciplinary collaboration
-Subject project to rigorous peer review

*Adapted from D.K. Hamilton & D.H. Walkins, Evidence-Based Design for Multiple Building Types, 2009

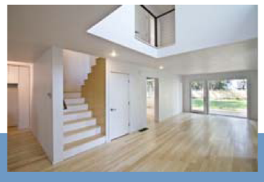
DESIGN PEDAGOGY

4. Theory and Criticism:
-Examine conceptual dimensions of the proposed design intervention
-Explore theoretical implications of the proposed intervention
-Identify links with parallel discourses in allied disciplines

5. Advisory Protocol:
Internal:
-Define the academic institition's pedogogical aims
-Define sponsor/client aims and objectives
External:
-Assess overall project needs and conduct cost-benefit and ROI analysis
-Develop performance metrics (qualitative and/or quantitative)
-Insight Group review of data collection and research methods, i.e. Thinking While Doing (TWD) grant
-Negotiate budget/project schedule/deliverables

PLANNING

6. Site Selection:
-Assess multiple locations for highest and best use potential
-Assess parking requirements
-Assess public transit linkages
-Due diligence of site attributes, utility easements, and necessary infrastructure modifications
-Meet with elected officials and community representatives



7. Policy Interventions:
-Provide decision makers and/or community organizations with due diligence and strategic options
-Finalize with client/sponsor the project scope and budget
-Coordinate with the project Architect of Record (where applicable)
-Select project consultants and deermine scope of involvement
-Provide strategic leadership

OUTCOMES

8. Design:
A completed project that:
-Supports the goals, needs and aspirations of its occupants and the community-at-large
-Creates an inviting image, appearance, and aesthetic
-A facility or environment in compliance with local, provincial, and federal building codes
-A built outcome that contributes in positive ways to its civic context

9. Service-Learning:
-Empower and train students
-Empower and train faculty advisors
-Cultivate good relationships with clients/sponsor organization and benefactors

10. Replication:
-Add to existing post-occupancy knowledge base for academic institutions and policy makers in the public and private sectors
-Cite risks and threats confronted in the project
-Package the project and outcomes as a case study of a successful partnership between all active stakeholders
-Complete project profile in the dbX database

3

Figure 3: Educational Design-Build (E-db) Protocol

34. Stephen Verderber and Cabrenia Thomas, "Rebuilding a Statewide Network of Community Health Centers for the Medically Underserved: A Longitudinal Assessment," *Journal of Public Health Management and Practice* 19, no. 5 (2013): E10-E22, http://www.journals.lww.com/jphmp/pages/current-toc.html (accessed August 10, 2014); Stephen Verderber and Joseph Kimbrell, "The Role of the Architectural Environment in Community Health: An Evidence-based Initiative," *Journal of Public Health Management and Practice* 11, no. 1 (2005): 79-89.

35. Verderber and Kimbrell (2005).

36. Peter Augustine Lawler, "Higher Ed, Hollowed Out—The Poverty of Techno-Utopianism," *The American Interest*. 26 September, http://www.the-american-interrest.com/articles/2014/09/26/higher-ed-hollowed-out/html (accessed September 30, 2014).

37. Bernard Tscumi, "Architecture and its Limits II," *Artforum* 7, no. 3 (1981): 45.

38. Mark Jarzombek, "The Disciplinary Dislocations of (Architectural) History," *Journal of the Society of Architectural Historians* 58, no. 3 (1999): 488-492.

39. Workshop led by the *Thinking While Doing* grant Project Team at the Association of Collegiate Schools of Architecture Annual Meeting, Miami, March 2014.

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The illustrations in Figure 3 are from the Yale University Vlock Building Project 2011.

In sum, the ten conceptual territories are intended to inform the diagram of six types of E-db determinants, both of which inform the dbX, which is itself designed and constructed to function as an evidence-based, online repository. The dbX survey *roadmap* itself is multi-faceted insofar as it seeks to query the individual data provider on numerous aspects of the entire process from start to finish. For each curriculum, and each case study, the dbX survey begins with a profile of the completed project (a), followed by the profile of the faculty coordinator (b), followed by the profile of the program and institutional context in which the work was completed (c). When this information has been recorded in the dbX survey, the respondent is then queried on eight more specific aspects of the build (d). [35]

SUMMARY

A framework has been put forth to advance educational Design-Build within the academy. First and foremost, the student must be at the center of this universe. Everything must revolve around the student. With enrollment in these studios at many schools irreducible, does the popularity of this facet of architectural education continue because the student craves something more meaningful, more tangible, something more *real*? Second, the magic realism syndrome must not continue. Third, the more pernicious effects of an overbearing focus on a 'successful' build-at-any-cost can be that human-centered imperatives, namely, the student's emotional and physical well being, can be overlooked: the *product* must not trump the *person.* Yet this type of imbalance is a growing problem in universities slavishly devoted to the ideals of technological and scientific progress above all else. Many universities currently jumping on the STEM (education in science, technology, engineering, and math) bandwagon, for instance, have been shifting to utilitarian pedagogies, those more focused on machines than on the cultivation of the human mind. [36]

In terms of theory, now is the time for architectural historians and social scientists to engage. In the view of critics, E-db remains stubbornly anti-historicist, existing outside the canonical mainstream. Perhaps the problem here is not only what to research, but how to navigate a world split between scholars who wish to establish—or at least be equipped to properly contextualize—ever more critical positions, and architects, who, claiming to be critical themselves, demanding that the historian respect their efforts at reforming both studio pedagogy and the profession. Since architectural historians and theorists cannot completely sever themselves from the act of design or the act of building, they will remain awkwardly obliged to, in the end, interpret this dualistic narrative. [37] As Mark Jarzombek notes, "As the criticality of history becomes ever more out of step with the criticality of advanced design, the teaching of theory and history in schools of architecture will lose its once privileged position." [38] Social scientists, for their part, are not hamstrung as such. There remains, regardless, insufficient critical inquiry for so widespread a practice as educational Design-Build. [39] This is particularly striking in light of the more than one hundred programs currently in existence in North America alone. Broadening the discourse will extend its poetic *and* pragmatic dimensions, further drawing together individuals and institutions in common purpose.