

Making the Global Local: Designing and Building a Mobile Studio to Research the Impact of Industry, Globalization, and Climate Change on Coastal Communities and Ecosystems

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ABSTRACT: This paper proposes a radical, multi-phase approach to architecture studio education that combines design-build, expeditionary learning, and analysis-based design research to embed students in the mobile study of the shipping industry, globalization, climate change, and their impacts on coastal communities and ecosystems. The modern shipping industry is the backbone of international trade, accounting for more than eighty percent of world trade, and its impact on the environment, coastal communities, and culture in general has become increasingly problematic. The model presented here proposes a series of interconnected courses, including design-build studios, history theory seminars, and research methodologies classes to allow students to form a comprehensive understanding of the core phenomenon while utilizing research and architectural production as a mode of inquiry. In the first phase begun in spring of 2023, students will design and build a mobile studio housed within a modified shipping container, sited temporarily on campus but designed to be periodically transported aboard an ocean-going cargo container ship. During concurrent and subsequent theory courses, students will establish research agendas focusing on links between the shipping industry and climate change, cultural globalization, and the economy while concentrating on the transformative effects it has on coastal communities and the environment. Students will engage in gathering data, mapping, marking, and making while searching for the intersection between architecture and the impacts of modern global trade on the world. The following paper includes a historical and contemporary analysis of the core issues, an assessment of the first stages of phase one begun in spring 2023 and makes a case for the value of design-build, expeditionary education, and the importance of travel, not just in learning, but in learning to employ architectural production to examine in-situ the most critical issues currently facing society and the environment.

KEYWORDS: design build, expeditionary learning, sustainability

INTRODUCTION

On March 23 2021, the cargo container ship Ever Given veered off course in a sandstorm and lodged itself into the side of the Suez Canal, immediately halting numerous vessels on either side and, over the course of the next six days, blocking the way of more than four hundred other ships. While the total social, economic, and environmental impact of the event is still being calculated and will likely cause ripples for years to come, initial estimates of the economic losses were over fifty billion dollars. Almost ninety percent of all global trade is transported by ship and up to twelve percent of that moves through the Suez Canal. The accident affected nearly every industry from pharmaceuticals and insurance to construction, involved every kind of product from dinner forks to doorknobs, and disrupted the global supply chain to become one of the key factors of rising inflation. The event forced companies to ship around Africa, threatened a bottleneck in the Panama Canal, and halted major world development strategies, such as China's Belt and Road Initiative. With investments in more than seventy countries connecting China with Europe and Scandinavia, the initiative is heavily reliant on shipping imports and exports through the Suez and acts as a modern silk road (Lee and Wong 2021).

The accident occurred at the height of the Coronavirus pandemic that found much of the population of the planet in lockdown, many isolated with their own travel severely restricted and perhaps more dependent than ever on the shipping industry. It was, as one article put it, an event that "broke the world." And while much of the media was commiserating with the Ever Given's twenty-four crew members being equally stranded, that same article went on to describe the crew's conditions as routine. While they waited, it was life as usual performing their regular training, tasks, and drills with all the usual amenities available at the end of the day, including access to counseling and wireless internet (Christian 2021). While reading this, two details stood out. First, that the number of crew members was only slightly greater than that of a typical architecture design studio and, second, that although the Ever Given itself was stuck, the crew were not. They were far from being stranded in the middle of nowhere and, for all intents and purposes, they were home.

Motivated by these realizations, a radical approach combining experiential, transformational, and expeditionary learning was developed to lead students into unknown territory to study the most critical issues facing society where they happen. Unlike most study abroad programs in which students either move from place to place or live in one location for the duration of study, this new tactic will provide students with a floating home, like the crew of the Ever Given, allowing them to remain localized while the world comes to them. The proposal includes an analysis of the

impact of the shipping industry and climate change on coastal communities and ecosystems, makes a case for travel and experiential learning as a key method of developing students as global citizens, and presents the outcomes of the first phase of the project, the design and construction of a modified shipping container into a mobile design studio. Like the Outward Bound model, the project intends to engage students in

a complete reorganization of time, space, and relationships among persons, across disciplines, between persons and learning technology, and between the school and community” (Campbell et al. 2012) to provide a total educational experience.

1.0 MISTER GO

Civilization is transportation (Kipling 1912). The earliest societies were established and developed by trade and commerce, through the exchange of not only goods and raw materials, but of ideas and culture. At the heart of this exchange is water. Ancient communities, isolated from each other by natural barriers, turned to rivers and seas to find links to world beyond. Over the centuries, this seafaring system has grown as a common, global interest in which all countries now cooperate as one, interconnected economic organism (Fayle 1933). The modern shipping industry is the backbone of international trade, accounting for more than 80% of world trade, and its impact on the environment, coastal communities, and culture in general has become increasingly problematic. As the shipping industry is forecasted to grow more than 130% by 2050, the future of global trade is the future of civilization (Kalouptsi 2021). Unfortunately, this association means that, despite recent efforts to reverse climate change, our ability to shape a sustainable future will become ever more difficult.



Figure 1: The House of Dance and Feathers, New Orleans. Source: (Author 2006)

Although it can be argued that modern shipping has improved the quality of everyday life for the average person, the cumulative number of ways that the ships alone adversely affect the environment is staggering and has devastating long term consequences. From grey, bilge, and ballast water and other kinds of liquid pollutants like industrial cleaning solutions and sewage, to solid waste, refrigerants, antifouling paints often containing chemical compounds like chromium, to the global mesh of destructive noise and the ocean-wide conveyor belt for stowaway invasive species, a single ship can do a tremendous amount of damage to marine ecosystems, wildlife, and the fishing industry in an average thirty-year lifecycle (Andersson et al. 2016). Shipping accounts for more than 2.4 percent of total global noxious emissions which, by some estimates account for some seven million premature deaths annually, meaning the industry is responsible for more than one hundred and forty thousand deaths, each year, through emissions alone (Hasanspahić 2021).

Like the Suez Canal, shipping industry infrastructure including ports, canals, and building and scrap yards are even more destructive and, in many cases, for much longer periods of time. At least in one case, the Mississippi River Gulf Outlet, the damage was exponentially greater. Initially proposed as an emergency outlet from the Mississippi

River east of New Orleans in the interest of general commerce and national defense, constructed for over \$580 million dollars and opened in 1965, the MRGO was “straight as a gun barrel” and, as critics pointed out, would serve as an inlet rather than an outlet. Coastal Louisiana wetlands populated by dense cypress forests that historically resisted storm surges from hurricanes were decimated by the MRGO, initially four hundred meters wide but, due to decades of erosion, over half a mile wide by 2005 (Freudenburg et al. 2009). In August of that year, category five Hurricane Katrina slammed into the coast of Louisiana and, acting like a straw, water surged through the MRGO and straight into the Industrial Canal at the heart of New Orleans’ Lower Ninth Ward. The resulting devastation cost an estimated \$110 billion dollars, destroyed nearly 300,000 homes, and killed almost two thousand people. Although initially public perception was that the hurricane had caused the damage, it became clear over time that the disaster was manmade (Dyess 2013). The Mississippi River Gulf Outlet had become a city killer.

When working with students from Kansas State University and schools around the country to rebuild the House of Dance and Feathers Mardi Gras Indian Museum a year later, understanding the relationship of industry, the coastal ecosystem, and the levees to the Ninth Ward community was invaluable (Allweil 2007). It informed how we approached details, materiality, and building systems but, more importantly, helped us to build bonds, grow trust, and to better understand the residents of the Ninth Ward and how the industrial landscape had impacted and upended their lives. At a neutral ground barbeque that summer we got a powerful insight from one resident of the Ninth Ward, Demetrius Alexander, who said, “you can’t blame God for what the government did,” showing that the larger political, economic, and environmental systems in play were not lost on the people on the ground. It was an understanding that you are not likely get from a book or an academic paper; you have to be there.

2.0 OUTWARD BOUND

Travel has played a central role in most of my projects and my life. Constantly on the move since birth and having lived in many places for no more than a few months to a year, I am a nomad. Not like one of Thesinger’s traditional Bedouin (Thesinger 1959), but a *new* nomad defined by rootlessness, global hypermobility, and an ability to adapt to new ways of seeing and judging the world (D’Andrea 2006). Much of my work revolves around the same themes of community, place, memory, and disappearance. Captivated by loss, whether to space or time, I find myself perpetually in-between. *Ghostlands*, a set of design build architecture studios conducted between 2011 and 2013 addressing dead and dying towns in central Iowa, was firmly situated within this in-between (Rhodes 2017).



Figure 2: Ghostlands Studio, Mackey, Iowa. Source: (James Spiller 2014)

Only an eight-week summer design build studio, the first two weeks of *Ghostlands* was dedicated to travel, a six-thousand-mile expedition across the American west through national parks and abandonments. Inspired by the principles of *Outward Bound*, two of which are *The Natural World* and *The Having of Wonderful Ideas* (Campbell et al, 2012), the journey was designed to expose students to the fact that issues you face at home are faced by people everywhere, allowing them to form connections between disparate people and places across an unfolding

landscape. It also provided them with the space and time to design ways to take what they learned and apply it back home. As one student put it,

I think the most important thing I've learned is there is a reason that each place is special. I really didn't understand that before. People are here because they love the town and they want to do whatever they can to protect it. I think that kind of passion for a place is commendable. (Sauer 2012)

The formation of this kind of perspective is the foundation of becoming a “global citizen”, characterized by an expanded world view of responsibility and belonging opposed to ignorance and intolerance. Despite recent anti-globalist rhetoric, the US remains heavily invested in student study abroad, demonstrated by the 2005 House of Representatives bipartisan Lincoln Committee report leading to the Paul Simon Study Abroad Foundation Act which aimed to increase the number of students studying abroad over the next decade to one million, an increase of 400%. The key drivers of the legislation were both national security and global competency, with a desire to develop a global citizenry to ensure that the US remain competitive in an increasingly global marketplace and able to respond effectively to environmental concerns such as resource scarcity and climate change (Tarrant et al. 2014). A growing body of empirical evidence, especially concerning sustainability and global citizenship, suggests that if educational travel is used to develop global citizens, the focus should be on environmental issues, although there is evidence to show that merely participating in study abroad develops a global ethos (Tarrant et al. 2011). A series of studies demonstrated that, within a rigorous pedagogical framework rooted in bigger questions of social and environmental justice, study abroad programs can lead to shifts in students “values, beliefs, behaviors, skills, insights, and particularly one’s overall disposition to critical and self-reflection” (Stoner et al. 2014). In other words, the journey is the thing.

3.0 NEONOMADS

In the spring of 2022, students began designing and building a modified shipping container to be used as a mobile design studio and lab able to be transported on an ocean-going cargo container vessel. Aboard ship, the intention is that the modified container will be utilized as a classroom, workshop, and exhibition space in support of an expeditionary applied research and theory course, slated for the spring of 2025. The course combines expeditionary learning, applied research methodologies, and critical thinking with the analysis of forms of globalization, such as commerce, transportation, and communication. The course will focus on links between the shipping industry, globalization, ocean ecology, climate change and the transformative effects these have on coastal communities, while designing sensitive architectural propositions in response guided by the United Nations Conference of the Parties (COP) and Sustainable Development Goals (UN DESA 2023).



Figure 3: Installing entry unit. Neonomads, United Arab Emirates. Source: (Author 2023)

The container is being designed for a minimum twenty-five-year lifecycle, with system parameters developed in consideration of deployment, constructability, and operation, leading to a short list of fundamental components. The building will be programmatically and environmentally sustainable, utilizing reuse, repurposing, and recycling

strategies when possible and implementing innovative materials, systems, and technology selected for their durability and resistance to the unique climatic conditions of the Arabian desert and the open ocean. Special attention will be paid to ensuring the structural integrity and seaworthiness of the container for future transport.



Figure 4: Fabricating entry ramp. Neonomads, United Arab Emirates. Source: (Author 2023)

The project is phased over several semesters to slow down, to achieve more depth in each aspect of the design and fabrication process, and to take advantage of multiple funding. This also has the advantage of engaging more students and developing a legacy project, in which the work is passed down from one cohort to the next over time, increasing buy-in from students and administration. The phases obviously have some overlap but are designed to be distinct enough so that each batch is simultaneously designing and constructing something new, tying into the last phase and finishing up leftover details, and anticipating what will come next while providing flexibility and freedom for the next cohort. Although the first studio groups will likely not be present for the ocean-going journey, the ramifications of this eventuality are forefront in student design decision making from the start. The connected process encourages altruism as students, who may not benefit directly from the travel experience, are dedicated to ensuring its future success (Bartels 2013).

While on board during travel, students will be lodged in crew quarters and have access to dining and recreational facilities, while operating out of the container studio and lab. Moving from one port to the next in Southeast Asia and MENA regions, selected for their unique environmental and cultural conditions relative to a research agenda, they will spend their time on board recording and documenting the natural and built environment, gathering data, mapping, marking, and making while searching for the intersection between architecture and the impact of modern global trade on the world. What they make along the way will evolve out of research, discourse, and experience. The course will disseminate its research and design outcomes, including the possibility of full-scale built work, through publication, installation, and exhibition.

CONCLUSION

Assessing the outcomes an unfinished project can be challenging, especially one at the beginning of an ambitious design build phase that promises to culminate in such a radical study abroad experience as to be, to some, a pipedream and, to others, wholly unnecessary. During the *Ghostlands* studios, we used travel to prepare for the design build phase, which was the point of the course, but in the case of the current project, educational travel to develop global citizenship is the ultimate aim. Building first has transformed what was previously an overwhelming and primarily conceptual worldwide set of issues and made it real by bringing it to our doorstep. A microcosm of the larger problem, the container is packaged appropriately in terms of scope and scale, while remaining interconnected with all the larger themes surrounding industrialization and the environment. Fully funded and two semesters into the design and fabrication of a modified shipping container mobile classroom, it is clear that the program and

institution remain invested in the larger idea and, like most design build projects, the learning so far has been immense.



Figure 5: Fabricating windows and doors. Neonomads, United Arab Emirates. Source: (Author 2023)

For many of the students, this was their first building experience, and it was comprehensive. They were introduced to and, in many cases, became experts in new methods of metal fabrication, including MIG and TIG welding, CNC milling, and the design and construction of complex jigs used to reproduce multiple but identical parts and assemblies more efficiently. We spent the spring of 2023 fabricating windows and doors for an ambitious envelope system and the following fall making most of them again, learning a critical lesson that windows are not doors, and doors are not windows. Due to time constraints but also in preparation for practice, students worked closely with outside fabricators, while designing and having machined a variety of component parts and details from custom hinges and doorhandles to hardware, fasteners, and lighting fixtures. Working with subcontractors and consultants in the construction, solar energy, and transport modification industries, students generated shop and construction drawings, coordinated, and managed every aspect of the construction process, to this point. They researched industry standards while innovating new systems, including an integrated, demountable cladding system using strut channels to house steel frames that contain both the exterior insulation system and the solar panel array. And they discovered new materials, like expanded cork block, a wonder material known for its sustainability and insulative properties, whose origins date back to the last nineteenth century, supplanted by petrochemical products after World War One, and little-known today. Students' assumptions that shipping containers are clear, simple, and standard were challenged through a complicated and near endlessly iterative design process that found that no two containers are alike, at least in our experience. And finally, their preconceptions of a project about water and an industry of movement meant to be fast, fluid, and constructed with high degrees of tolerance were overcome by a building process that has been heavy, slow, hard, and unforgiving.

My own education surrounding this project began much further back. As a boy, I watched a re-run of David Lean's *Lawrence of Arabia* on television, and I was awestruck by a scene that would stay with me. Just over two hours into the film when Lawrence and his friend, Farraj, are wandering through the Sinai desert and are near death, they are stunned by the top of a cargo ship floating through the dunes and sounding its horn. They had found the Suez Canal and civilization and were saved. At the time, the scene stirred a wanderlust in me, and I have wanted to be on that ship ever since. In 1962, when the film was released, it was unusually controversial for its time and, over the ensuing years, there has been much debate about its attitude towards imperialism and colonialism. Although many scholars have praised the film for its anti-colonialist stance (Dawson 1996), a more sensitive look through a current lens reveals that many problematic themes remain relative to cultural appropriation, masculinity and gender identity, and the myth of the white savior. Forty years after seeing the film and after more than a decade living in the Arab world, I realized before starting this project that I would have to check my romantic childhood impressions and cultural biases and carefully reconsider them. Like the project, that process is ongoing.



Figure 6: Craning container onto site. Neonomads, United Arab Emirates. Source: (Author 2023)

Whether we ultimately take the trip or not, the building project is an educational end in itself. More importantly, as a symbol of the larger idea its bold, in many ways inspirational, and begging to culminate aboard a ship on the open ocean. Like the Mardi Gras Indians of New Orleans who hang feather samples from their front porches each year, it says we are coming. One day soon, we will.

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