

# Evaluative place-making of the arts and craft movement: A sustainability framework

Jeanette Burman<sup>1</sup>, Brian R. Sinclair<sup>2</sup>

<sup>1</sup>University of Calgary | Haskayne School of Business (MIS), Calgary, Alberta, Canada

<sup>2</sup>University of Calgary + sinclairstudio inc., Calgary, Alberta, Canada

**ABSTRACT:** Present day and mass architectural practices do not always account for the finer points of place-making; in fact there is a pressing need to re-evaluate trends of modernity to sustain the practice itself. To consider our future in a more creative manner, the researchers argue that viable, holistic and sustainable systems approaches to professional architecture must consider environmental, social, and economic conditions in connection with buildings and the people who occupy them.

Although history can bind us in terms of tradition, it can also provide guidance towards a sustainable future. Due to its inherently idealistic and humanistic approach, the founding principles of The Arts and Craft Movement (1850 – 1920, active until 1940s) inspired a flexible framework and systems approach to building and design for today's economies. As architectural research looks to the future, it needs also to look to past resistances of architecture using integrated approaches to overcome holistic challenges. The disciplines of architecture, design and planning can utilize Nature, Vernacular, Craft, and Materials; for dwellings equipped to meet both the long-term needs of localized occupants and the urgency to pursue global sustainability.

The present paper outlines these four tenants of the Arts and Craft Movement as a novel sustainability framework using the work of Kenneth Frampton as a catalyst for needed change in modern and post-modern architecture. It was Frampton who, during the sterile industrial periods of modernity that he heavily criticized, looked back in history to Morris and Webbs' Red House as a starting point for resolution and resistance. Whether Red House, Morris' wallpaper, Mackintosh's Library, the Greene Brothers' bungalows or Frank Lloyd Wright's Fallingwater, such hallmarks of the Movement have borrowed heavily from the past and across cultures. Herein lies a paradox: How do we maintain place-making and honor history in a local and sustainable context while by default being part of an emerging pervasive global community? A holistic assessment of the Movement's guiding principles reveal elements of Integrity, Physicality, Dignity, and Functionality—transforming perceptions of its historic ideologies into a movement arguably ahead of its time.

Design today confronts intense challenges due to the complexity of problems and the common approach of narrowed disciplinary focus. In contrast to such constricted viewpoints, the current research aims to deploy systems thinking and more holistic methods in order to better resolve design. Through the critical examination of the Arts and Crafts Movement, and a reconsideration of aspects of Nature, Vernacular, Craft, and Materials, the authors propose a framework for sustainability. Core elements of said framework, namely Integrity, Physicality, Dignity, and Functionality, afford designers an innovative means of analyzing problems with an aim to achieve more meaningful spaces, more potent places, and a more sustainable environment.

**KEYWORDS:** Architectural History, Place-Making, Sustainability, Systems Thinking, Conceptual Framework

## INTRODUCTION

*Holism: (from ὅλος holos, a Greek word meaning all, whole, entire, total) a theory that the universe and especially living nature is correctly seen in terms of interacting wholes (as of living organisms) that are more than the mere sum of elementary particles (Merriam-Webster)*

*A building occupying, so to speak, four dimensions of space – the name of the fourth being Time - which had sailed across the centuries its vessel, which from bay after bay, chapel after chapel, seemed to conquer and stretch across not merely a few yards of soil, but each successive epoch from which the whole building had emerged triumphant (Swann's Way, Marcel Proust)*

In sustainable systems thinking, how design works or doesn't work is influenced by internalities and externalities—the inclusion and exclusion of pre-determined factors impacting each other through delivery. Sustainability in architecture is the result of these design influences producing the least negative impact on each other through the most integrated approach—determining the extent to which a building will work for and with its users, economies, environment, etc. Conceptual frameworks present mechanisms, or vehicles, with which complexity can be better grasped and managed in our pursuit of sustainability. For example one of the authors, in his Holistic Framework for Design + Planning, underscores the vital need to evoke systems thinking, integration (e.g. Agility, Fitness, Diversity, Delight) and interdisciplinarity to address such complexity, to challenge endemic fragmentation, and to confront separation/isolation that defines an increasing number of contemporary crises (Birch and Sinclair 2009). Architecture today, in light of sustainability, ushers in both obstacles and opportunities—where the physical and social construct of place-making is a crucial human element. In the essay "Towards a Critical Regionalism: Six Points for an

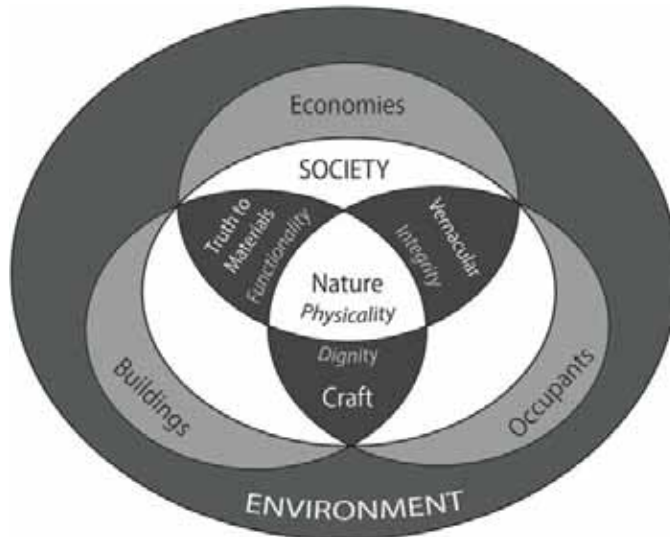
Architecture of Resistance”, Kenneth Frampton develops his own theoretical framework while explaining that universal modern and post-modern architecture of that time neglects to address essential aspects of the human and social condition resulting in “*placelessness*” (Frampton 1983, 25). He also identifies several principals that coincide with this research and support the notion of Arts and Craft architecture as a resistance to neglectful design. We also suggest that by doing so, Frampton implicates Arts and Craft principles as pre-cursors to the sustainability movement for a new era of concerns. Frampton laid the groundwork for addressing ahistorical, allochthonous and unsustainable universal practices in modern architecture movements such as the International Style as well as postmodern architecture—instead championing historical reverence, human significance, and connection to nature and indicating the Arts and Craft Movement and Red House (1859) as an impetus for resistance to “utilitarianism and the division of labour of modernization” (Frampton 1983, 18). However, while addressing the need for altering neglectful trends of progress in architecture, Frampton (1983) also stresses not trying to reenact nostalgic architecture of the past, calling for a delicate balance of ideals and reality. Furthermore, Frampton identifies the framework of the Arts and Craft Movement to include:

“Structural integrity, a desire to integrate buildings into their site and into the local culture, practical design, sensitive site layout, the use of local materials, as well as a profound respect for traditional building methods.” (Frampton 1992, 43)

Currently, there is substantial literature on the history of the Arts and Craft Movement identifying the main tenants without intrinsically linking them to sustainability today or considering systems operations (Cumming, E., and Kaplan, W. 1991; Buchanan, W. 2004; Davey, P. 1980; Falet, D. 2007; Makinson, R. L. 1984; Stansky, P. 1985; Wright, F. L. 2005). There is support regarding interdependency and flexibility of green building systems guidelines such as LEED credits and the development of new models for improved communicative networks in the pre-design phase using agent-base modeling and the eco-charrette process (Said, H et al. 2014; Kibert 2013). Yet, these types of guidelines developed to provide sequential sustainability approaches do not address holistic implications of place-making and even ignore major components of sustainable systems operations. Existing green building construction systems guidelines, such as LEED and BREEAM (Kibert 2013), do not identify holistic systems implications of building and overall have not proved effective in embedding meaning in otherwise anonymous spaces. While considering place-making in their writing, Bennetts, H. et. al. (2003) have identified the systems and subsystems of sustainability—environmental, social, economic, occupants, and buildings; we add the key Arts and Craft principles and synthetic guidelines as the basis of systems operations to facilitate our discussion. There are also effective approaches to key and foundational sustainability systems (Bennetts et al. 2003; Bokalders, V., and Block, M. 2010; Obata et. al. 2004; Pye, D. 1986; Rappaport, A. 1990; Sassi, P. 2006; Stea, D., and Mete, T. 1990). However, these qualifications do not approach the topic of holistic and interoperable systems sustainability in the place-making arena or consider the historical implications of the Arts and Craft Movement. In fact, little has been written on the Arts and Craft Movement as a holistic approach to sustainability in systems, place-making or art historic literature making the value of this research both novel and a contribution to multiple professional and academic disciplines.

The rise, magnification, and transformation of modern building practices in the profession of architecture have had an undeniable impact on sustainability. Although the profession has reconciled many of its concerns with modernist ideals to shape more sustainable spaces, there is still a need in architecture for guiding sustainable systems approaches whereby environmental, social, and economic conditions are considered in holistic relation to occupants, spaces, and places (Bennetts et al. 2003). Conceptual sustainable design is approached by ensuring these principles—occupants, environments, social structures, and economies—exist in cooperative and integrated systems—whereby interoperability determines the extent of sustainability and place-making is rendered possible. However, implementation requires that these concepts, systems, and subsystems effectively communicate with each other in relatively seamless modes. The alliance of nature and culture within the Arts and Craft Movement provides an effective model for re-evaluating architectural practices in multiple phases as well as critical issues of sustainability facing the profession today—whereby the foundational principles can be re-contextualized to provoke thought and holistic considerations in design and potentially used in pre-existing models. The four foundational principles of the Arts and Craft Movement are widely represented in both the theory and structures of architects such as Charles and Henry Greene, Frank Lloyd Wright, and Charles Rennie Mackintosh: Nature, Vernacular, Craft, and Truth to Materials. We propose that these principles act as a counterbalance to otherwise neglectful design and as a communicative network to foundational sustainability systems and subsystems. In Figure 1 we present a modification of Bennetts et. al. (2003) systems and subsystems view by integrating the four foundational Arts and Craft Movement principles as interacting systems with imperative ‘subsystem’ synthetic place-making guidelines—Physicality, Integrity, Functionality, and Dignity. Our revised systems approach begins to delineate technique-orientated operations and functional interoperability with holistic implications in space and time. This research employs a re-contextualized view of the buildings and ideals of

and design, but rather to provoke thought, discussion, and consideration to the complexity of issues at play in sustainable design, while providing an explicit but not definitive approach to place-making. The synthetic framework presented within the present paper aligns with the aforementioned synthetic elements and the four tenants of the Arts and Craft Movement as a holistic process inclusive of autochthonous building and evaluative place-making—identifying and further delineating requisite sustainable systems and key interoperability principles for a sustainable future in architecture.



**Figure 1:** Arts and craft movement principles systems integration adapted from systems and subsystems view (Source: Bennetts, Radford, and Williamson 2003, 85).

## 1.0 REVERENCE FOR NATURE

*Synthetic Guideline: Influenced by physicality, the ability to integrate into and be influenced by the natural environment, natural ecosystems, and Eco-ethnography.*

Issues of environmental degradation due to industry's actions in the world today are not entirely different from those faced by the founding father of the Arts and Craft Movement, William Morris, and his companions. As response and resistance, nature plays a central role in the design and influence of the Movements' and Morris' work—not only in Morris' legacy of patterns and designs as seen in the textile Wandle but also in his writings and purposeful respect for the natural environment; especially the Thames River—of which he saw its horrendous exploitation during the industrial revolution (Falet 2007). Further examples of reverence for nature are found throughout the Movement—we look at how these examples of historical architecture holistically interact with and impact their environments as well as how accounting for physicality in design can create place.

### 1.1. Physicality: integration, influence, engagement

Today, the ecological integration of settlements and infrastructure into natural surroundings act as a guide to inform design, planning, and building in sustainable architecture (Bokalders and Block 2010). Although the current use of green building rating systems may account for protecting natural habitat (Kibert 2013), there is neglect of the significance of physicality in design. The integration of architecture and nature is found in the Arts and Craft Movement as far back as Stoneywell Cottage's (1899) earthen wall and as a concept deeply entrenched in the founding principles of some of its most memorable architects. For example, Charles and Henry Greene practiced natural integration as the first two major conditions of their own strategy, believing the style of a house should be determined by four conditions: "climate, environment, materials available, and habits and tastes – i.e. life of the owner" (Makinson 1984, 161). These concepts were executed by the Greene brothers in their hundreds of structures, both in interior and exterior settings, and are dramatically emphasized by Charles Green in D.L. James house (1918) whereby the landscape receives and extends out of the structure's form; the building acts as the peak of a cliff towering over the crashing Carmel, California waves below, and the building, with stone masonry growing out of the rock itself, utilizes the view from both public and private spaces (Makinson 1977). Frampton addresses how negating the natural environment by, for example, leveling the naturally hilly or robust topography of a building site so that it is flat results in "placelessness" and that geographical place with its topographical, climatic, vegetative, and lighting variables should be considered significant in a building's inception and creation (Frampton 1983, 26). In this way and as seen in the Greene's design, the natural site can be used to inform the design:

“terracing of the same site to receive the stepped form of a building is an engagement in the act of cultivating the site.” (Frampton 1983, 26)

Taliesin West, as seen in Figure 2, is another example of the interplay of material and nature such as the canvassed ceiling in the drawing room where natural light filters into the room through the material—Frampton describes this type of interaction of nature and culture as the “place-conscious-poetic” (Frampton 27). Frank Lloyd Wright’s Fallingwater hyperbolizes the flow of water into its design by transforming the meditative setting of a waterfall into its structural landscape, effectively allowing for the structure and nature to communicate. Both serve as examples of physicality operating within the sustainability subsystem of human economies and ultimately the holistic goal of place-making. Sinclair (2013) reiterates this displayed notion of physicality in the spiritual realm by describing the significance of engaging occupants in connection to natural forms—in the context of biophilia and biomimicry. In this view, sustainability in place-making is dependent on the human experience and relationship between occupying space and the physicality of nature. Charles Greene’s interest in spiritual spaces and use of Eastern forms exemplify both literal representations of nature and more subversive integrations: the horizontality of a structure’s view meeting the skyline or a widened porch dissolving into a Japanese rock garden as seen in the William R. Thorsen house (1908-1910)—the enclosed and “cradling” placement of the house integrated on a sloping hill also acts as a sound barrier from traffic noise (Makinson 1977, 175). Additionally the traditional bungalow structure of which both the Greene’s and Wright were known, account for climate changes, allowing cooling from shading roofs and is a ‘borrowed’ form, to be discussed in the next paper section on ‘Vernacular’. Thus when physicality is neglected, space is unable to elevate to place. By only enhancing ecosystems and mitigating heat island effects, for example, current sustainability ratings systems that attempt to address nature are holistically inoperable with their interacting systems. By engaging the site, architecture can advocate interoperability to ultimately save costs to other parts of the system—both capital (e.g. heating and electricity systems) and non-capital (e.g. holistic economies and ecological sustainability). The landscape’s ability to influence, integrate, and engage the structure must be enabled for sustainability and place-making to be possible.

Through implementation of this framework, we can identify Frampton’s *place-conscious-poetic* and the first sustainability principle of the Arts and Craft Movement as allowing an interaction between the natural environment and culture, versus the limitations and harmful postulations of industrial and technological progress that can neglect holistic implications (Frampton 1983, 27). These two opposing positions can, at the most basic level, be a comparison of holistic functioning systems versus non-functioning systems, or rather interoperability versus exclusionary operability, and within the context of complete life-cycle costs, sustainable place versus potentially unsustainable space. Engaging the natural environment in relation to the built environment allows for the synthetic element of physicality to be addressed, the gateway for integrity and the next element of sustainability in Arts and Craft architecture: vernacular.



**Figure 2:** Taliesin West in Scottsdale Arizona by Frank Lloyd Wright. (photo: Brian R. Sinclair, 2014)

## 2.0 VERNACULAR

*Synthetic Guideline: Influenced by integrity, the ability of the project to be serviceable and assess real costs to occupants—social, political, and spiritual economies.*

In the place-making realm of vernacular, sustainability includes traditions of building, the economies of people, cultural identities, and wellbeing (Bennetts et al. 2003). The Arts and Craft Movement approaches vernacular in two distinct ways: firstly, as token and symbolic and technological reprieve from environmental degradation as discussed in physicality—the iconographic medieval country church serving as the ideal model and refuge from the industrial cityscape (Cumming and Kaplan 1991); secondly, in the practicality of living and building through the architectural virtue of use whereby the builder adapts the building to the



needs of the user—adding a window, a room, a buttress—based on need of use as opposed to symmetry of architectural design or commodified consumption (Davey 1980). Frampton's concept of *arrière-garde* parallels vernacular, acting as a resistance to the commodity and media-driven economies of modern building practices while celebrating traditional forms in universal "world culture" (Frampton 1983, 20). Current green building rating systems approach style through a schematic interpretation of innovation without the scope of inclusive sustainability and holistic ingenuity. We address the systems operational discourse of vernacular, embracing traditions in the Arts and Craft Movement and their service to holistic economies while establishing integrity in place-making.

### **2.1. Integrity: economies, serviceability, adaptability**

The holistic sustainable systems approach to vernacular is horizontally integrated, inclusive of interacting subsystems and the synthetic element of integrity, allowing for interoperability and ultimately a more potent place for users. Vernacular building situates itself within holistic sustainable systems building by addressing environmental, economic and political, and social factors. Conceptual frameworks for vernacular architecture effectively identify the multiple economies and factors of building (Lawrence 1990), but do not identify the synthetic elements needed to deploy holistic sustainability and are therefore limited in functional implementation for place-making. The traditional building techniques of ancient Chinese and Japanese vernacular—with political, cultural, and spiritual identities, heavily influenced the Arts and Craft Movement. From design delivery of site layout to include the central spiritual retreat of Japanese gardens to the simplicity in use of materials, design, and structural integrity of mortise and tenon construction, intercultural influence is at the forefront of design (Cumming and Kaplan 1991). There is an immediate conflict raised in the infinite possibilities of universal technology approaches to building and design in an ever increasingly connected world, where tradition in technique and culture is often replaced with what are deemed systemic efficiencies but result in a loss of information. As Frampton (1992) addresses, the modern day paradox and conflict of retaining tradition in a global context is recognized as problematic by Paul Ricoeur when he states:

"But in order to take part in modern civilization, it is necessary at the same time to take part in scientific, technical, and political rationality, something which very often requires the pure and simple abandon of a whole cultural past. It is a fact: every culture cannot sustain and absorb the shock of modern civilization. There is the paradox: how to revive an old, dormant civilization and take part in universal civilization."  
(Ricoeur, 1965, 277)

The intercultural building techniques used in the Arts and Craft movement were not regional to the architects who used them such as Frank Lloyd Wright and Charles and Henry Greene—and consequently their use addresses the Ricoeurian paradox: if modern civilization is universal regardless of culture, then tradition in building, design, and technology can be as well, embracing technology and design through tradition as opposed to refusing culture. The risk is appropriation or negligent amalgamation, meaning sustainable interoperability of systems and subsystems such as fundamental human economies must be addressed to avoid alienation or 'watering-down' of potent places. In contrast, Amos Rapoport describes the style trajectory of the built environment in a vertical continuum: "Primitive→Vernacular→Popular→High-Style" (Rapoport 1990, 79). This exclusionary vertical alignment does not allow for linkages between each style with any depth and results in excess of formation—the ratio of vernacular, primitive, and popular buildings vastly outweigh those designed by professional architects (Rapoport 1990). Thus the relevancy of vernacular building to the majority of users in a global context reiterates its significance as paramount to holistic sustainability and place-making for future and localized international development. It is through exclusionary integration that present-day architecture heavily risks circumventing vernacular and ignoring interconnected systems—resulting in *placelessness* (Frampton 1983, 25). The Arts and Craft Movement is also able to identify human elements and occupants in relation to use and impact of space and place. In considering vernacular as an integrated horizontal operational system with positive externalities, the Movement allows for inclusionary operating principles with natural competitors for implementation. For example, sympathy and interest in the life of the user was instrumental in the many designs of Charles Rennie Mackintosh. Mackintosh observed the occupants' behaviors, daily needs, and routines—determining and delivering integrity in design by thoughtfully considering use throughout the interior and exterior settings for different occupants based on their individual needs (Cumming and Kaplan 1991). These adjustments to design spillover holistic benefits to interconnected systems such as views and eco-integration. In a contemporary light, computer modeling can systematically replicate the famous Glasgow School of Art library, Mackintosh's most well known creation recently destroyed by fire, but will it be elevated to place in this time? The role of the creator in the following paper section 'Craft' will attempt to resolve part of this issue, but the holistic implications of integrity through use suggest the need for further analysis. To assist, a more robust analysis of holistic economies can describe the direct act of user participation as the "*use value*" of the building, where "non-reciprocity in the place-making arena" is representative of crisis in building and seen most often in the modern socio-economic strata (Stea and Turan 1990, 113). Furthermore, by removing the participation of the occupant in the process of building through sales or "*exchange value*" in a modern political economy, the goal of place-making is circumvented (Stea and Turan 1990, 113). Thus, modern firm integration and policy development becomes necessary for implementation—and a whole work of art to be discussed in 'Craft'. The importance of the builder and occupant are intricately linked to sustainability in vernacular building and in terms of the synthetic indicator: integrity. It is only logical that the joy, skill, wisdom, and visual integrity of craft also play a significant role in developing sustainability in the

place-making realm—these human elements are indicative of a Whole Work of Art and the next synthetic place-making guideline: dignity.

### 3.0 CRAFT

*Synthetic Guideline: Influenced by dignity, projects must be pursued with skilled and localized labour. The durability, aesthetic, and maintenance of the project are intertwined with the joy of building and using.*

The idea of “correct building” is a fundamental aspect of healthy and sustainable buildings as well as longevity and practicality (Bokalders and Block 2010, 171). William Morris describes craft by hand as the key element to a Whole Work of Art and the happiness of those who build and those who dwell, indicating the spiritual economy of building inclusive of delight or joy (Stansky 1985). As discussed in the vernacular arena, the structural functions of mortise and tenon building as well as the tectonic form indicate universality within the movement and a resistance of the machine-driven skeletal framework of modern buildings (Cumming and Kaplan 1991). The rigidity of mass-produced output has tended to be less reflective of holistic and interoperable frameworks than output that allows for human input and dialogue. That said; emerging deployment of mass customization through digital tools has potential to shift this scenario bringing, for example, richer human dimensions to prefabrication, modularity, and industrialized building. We address the concept of a Whole Work of Art in relation to interoperable sustainability principles and best practices while considering the dignity of spaces in place-making.

#### 3.1. Dignity: joy, durability, aesthetic

As a reaction to skilled workers being replaced by machines that produced inferior industrial outputs, craft is the pinnacle of retribution in the Arts and Craft Movement; it also serves as a significant representation of the human element within the sustainability framework. The quality of “workmanship of risk”—hand designed and created production—in regards to durability and quantity of consumption is such that mass production of modern technology requires mass single item plants and product; and that due to the individuality of human wants and needs, the quantity of these mass single item plants continually increases while the objects created are inferior and holistically neglectful forms (Pye 1986, 7). Hand designed and created production acts as resistance to an over-dependency on light industries, where made-to-order is, more often than not, not an option. However, our framework is not solely interested in handmade construction but rather the significance of human input in constructing and crafting design as well as the consideration of place-making versus technological processes that can limit spaces. The role of mass production, to date arguably characterized by repetition and the risk of banality, is by principle in dispute with holistic thinking—prefabrication versus instilling place-making through handmade or made-to-order production is a dichotomy unto itself.

In support of simplicity, and in part reaction to the excesses of Victorian opulence, artists and architects of the Arts and Craft Movement, such as Charles Rennie Mackintosh and Margaret Mackintosh, created simple, undecorated, and purely geometric designs that most certainly influenced the modern aesthetic, combined with mythical imagery to engage connecting subsystems, were unique as inputs for their time. The Mackintosh’s approach to create an art of its time as opposed to re-creating forms of the past is symbolic of their ingenuity but also represents localized sustainability (Cumming and Kaplan 1991). Their buildings pioneered form and functionality with craft input while balancing yang-focused geometric forms with yin-focused organic designs. Most famously, the Glasgow School of Art is a distinctive unity of craft with simplicity in design—a complete work of art where subsystems are integrated within the tectonic form to service the entire operating system (Buchanan 2004). Specifically, and as previously discussed, Mackintosh’s design of the library most recently destroyed by fire integrates the construction of each of its intricate parts with Mackintosh’s emotive economy as well as with the overall mood and cadence for knowledge of the room (Buchanan 2004). Thus the joy of building is translated into the economy of use. Furthermore, when addressing the economy of scale of handcrafted designs of the Arts and Craft Movement, the scale informs the aesthetic—rhythmic and organic forms that are reflective and operable with the subsystem of reverence for nature, whereas industrial machine-driven designs create duplicated standardized outputs disconnected from the larger system (Cumming and Kaplan 1991). The tectonic form was used throughout the Arts and Craft Movement not only as a means to approach vernacular but also as the most structurally sound and versatile in hand-based building (Cumming and Kaplan 1991). Frampton’s reverence for the tectonic form emphasizes hand crafted inputs and systems thinking:

“The Tectonic remains to us today as a potential means for distilling play between material, craftwork and gravity, so as to yield a component which is in fact a condensation of the entire structure. We may speak here of the presentation of a structural poetic rather than the re-presentation of a façade” (Frampton 1983, 28).

The sustainability benefits of craft in both regional and global economies vastly outweigh the convenience and so-called efficiencies of industrial reproduction. Firstly, by providing localized skilled employment along the supply chain and direct labour. Secondly, with recognition of marginalization issues, by decreasing variability of longevity costs—the ownership of output is centralized locally, thus the accessibility and durability of the structure is interdependent with the success of localized economies. Consequently, a vision

carried through to fruition significantly identifies architects of the Arts and Crafts Movement as 'different' than current firm standards of fragmented facilitation for both the user and builder. However, vision does not exclude collaboration or facilitation whereby modes of firm integration are imperative to place-making. This research acknowledges the significance of sterility of modern firm structure in terms of craft and will address the potential for further research in this area in our conclusion. In the dignity of craft lies the synthetic place-making guideline of functionality, wherein materials are the central input.

#### 4.0 TRUTH TO MATERIALS

*Synthetic Guideline: Influenced by functionality, materials should be local, renewable and long-lasting; requiring little alteration of form or transformation; the healthy engagement of senses and ability to adapt for changing needs in reasonable cost cycles.*

The sustainability of materials used in building can be measured using a Life Cycle Analysis (LCA) —taking into account extraction, transportation, installation, use, and re-use/disposal (Bokalders and Block 2010). Although current green building rating systems do take material processes and LCA into account, via product ratings, material loops, and locality, they admittedly face challenges in accurate and verifiable data across universal supply chains as well as production and resource viability (Kibert 2013). Additionally, the current standards do not recognize the significance of holistic functionality in space and invariably lack constructive modes of resistant material building resulting in disposable spaces and holistically harmful processes. The Arts and Craft ideology of material awareness, locality, and natural harmony invariably decreases the life cycle costs (LCC) of a structure and has a decreasing environmental impact in the sustainability system while strengthening social and economic integrity (Cumming and Kaplan 1991). We further explore how maintaining material integrity is necessary for interoperability in sustainable systems and functionality in place-making.

##### 4.1. Functionality: availability, tactility, maintenance

Truth to materials and resulting forms in the Arts and Craft movement—stones, wood, ceramics, and glass—are grounded in production processes with interdependent systems. Morris' fundamental belief that good design can only be accomplished through knowing production and in turn knowing materials was the true impetus for resistance of environmentally and socially harmful industrial processes which drove the Arts and Craft Movement (Cresswell et al. 2003). Material production is holistically operable with nature, vernacular style, and craft; therefore sustainable material selection and lifecycle is dependent on this interoperability. The unadorned and 'organic' use of material in the Movement relies on the interconnected systems for true functionality to be achieved. For example, the use of timber frame building in the Arts and Craft Movement was popular for both aesthetic and economic reasons. The indigenous oak used in furniture, framing, and interior elements was mostly driven by economic necessity—when considering the scarcity of walnut or imported woods, oak became the most sustainable choice (Cumming and Kaplan 1991). By sourcing locally resilient and renewable materials in a sustainable manner and then limiting the transformation of the material itself there is a reduction in the energy required to produce the useable product, yet additionally in maximizing the use of locally sourced, natural, and renewable resources, other elements of health and aesthetic are also included in design (Sassi 2006). This process immediately and unavoidably introduces an element of scarcity; therefore durability in construction through craft is integral to LCC, increasing the longevity of the built environment and its constituent components. When considering the sustainability of materials, resiliency of cost cycles and local availability needs to be considered as similar to use value vs. exchange value (Stea and Turan 1990, 113). Take the current and historic use of corrugated metal siding in California as an example: although this material is not necessarily local in terms of resources, it has been used as an unaltered material for many years in the region for sustainable construction and is considered indigenous (Greene 2009). By being intrinsically linked to production processes, the ability to maintain these built environments also increases based on availability and interdependency versus the potential holistic challenges (i.e. wages, human economies, and environmental degradation) in light-industry-based replication from non-regional and potentially unstable sources. Instilling functionality via availability and maintenance assists in transforming spaces into meaningful places.

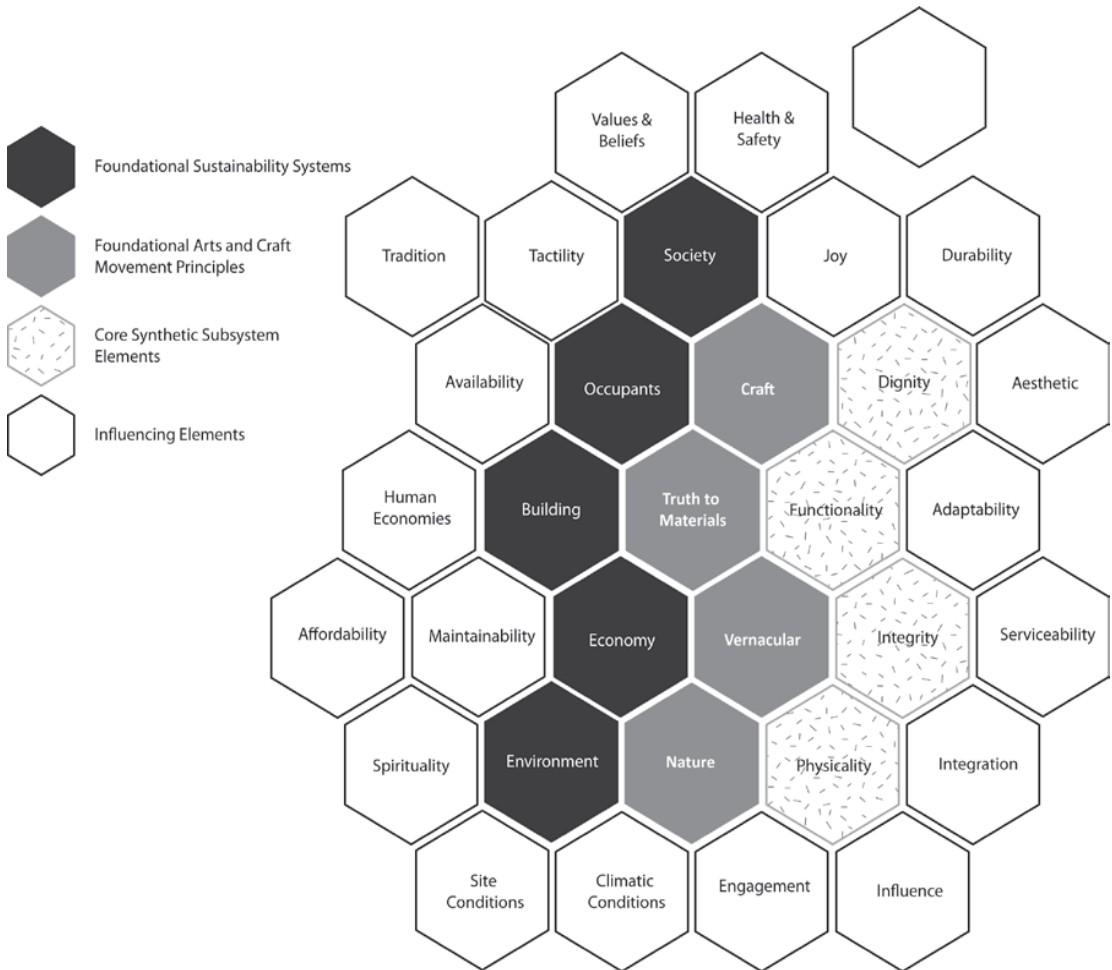
These natural materials are appealing for more than just economic and environmental considerations. In Taliesin West, Frank Lloyd Wright uses cased but unaltered stones as the primary structural wall, bare canvass skylights (as discussed) and integrated carved wood beams as structural support. Wright states that bare, unornamented, and truthful materials have "*organic plasticity*"—a term he correlates with holistic use value as well as whole systems thinking:

"Integration of even the very word "organic" means that nothing is of value except as it is naturally related to the whole in the direction of some living purpose, a true part of entity" (Wright 2005, 148).

In the holistic system, tactile environment acts as a resistor to universal technologies by allowing the body to read an environment through the materials used in senses of smell, sight, sound, and touch -- versus materials that lack the innate connectivity required for holistic sensation (Frampton 1983). When the human experience of space is given greater dimensions with holistically communicative designs, place-making is approached through tactility of functionality. The tactile environment presents functionality with limited

transformation of materials as opposed to the façades of light industrial prefabricated products, whereby experience becomes intertwined with production or craft. For example, the material of a wooden railing can be commended for its ability to retain warmth in changing climates versus an industrial metal or poly-based material, while additionally be more supportive to holistic environmental sustainability (Obata et. al. 2004) Unaltered material intentions in design support the holistic implications of place-making as well as foundational sustainability principles of human economies material, environmental, and social harmonization of systems operability.

*“Holism traditionally says that a collection of beings may have a collective property that cannot be inferred from the properties of its members.” (Churchman)*



**Figure 4:** Arts and Craft Movement sustainability framework for evaluative place-making

## CONCLUSION

The complete synthetic framework described within this paper, and seen as a fluid and unbounded visual representation in Figure 4, is dependent on the holistic sustainability systems interoperability approach whereby environments and societies interact with economies, occupants, and buildings supportively and communicatively. The place-making model advocates for the human scale that takes a plethora of factors of the built environment into consideration through the synthetic means of Physicality, Integrity, Dignity, and Functionality. Furthermore, the founding principles of the Arts and Craft Movement can be re-evaluated over time and in hindsight to create a compelling argument against *placelessness* and neglectful technology practices in relation to building—introducing systems interoperability where otherwise there is a disconnect and/or potential conflict. While at the same time, leaving room for a creative element of the Unknown, whereby non-sequential systems approaches render place—even when principles of Nature, Vernacular, Craft, and Materials are met, the synthetic and creative elements discussed need to facilitate place. The limitations of the research were indicated in Section 3 as relating to the inevitability of firm integration. Currently in North America, a majority of firms operate under contractual and fragmented labour and communications that ultimately impact the ability of the research to deliver and is opportunity for further research. However, the research still stands on its own as significant for future design delivery and historical recognition. Future opportunities for development of research based on these findings include holistic cost



modeling and costing integration with current green building systems guidelines and processes. This research calls for deeper commitment to holism, integration, and interdisciplinarity, creating further opportunities for continued research into the role of traditional and present day technology in the Arts and Craft Movement and sustainable systems architecture—using the described framework to facilitate discussion. With rapidly emerging technologies, including rapid prototyping, building information modeling, and computer numerically controlled fabrication means should be explored to better couple human needs with machined output. Our propositions around renewal, reconsideration, and engagement of the Arts and Crafts Movement unites the originators of the approach with Corbusier's Age of the Machine and Kurokawa's Age of Life. The sustainability of the future is in many respects propelled by embracing the past as the past embraced itself—creating, delineating, and utilizing the art of building in one's own time & place.

## REFERENCES

- Bennetts, H., Radford, A., and Williamson, T. 2003. *Understanding Sustainable Architecture*. London: Spon Press.
- Birch, R. and Sinclair, B. "Spirituality in Place: Building Connections Between Architecture, Design, and Spiritual Experience," as provided to ARST 423 "Sustainability in the Built Environment", University of Calgary, Canada, Fall 2013.
- Bokalders, V., and Block, M. 2010. *The Whole Building Handbook: How to Design Healthy, Efficient and Sustainable Buildings*. London: Earthscan.
- Buchanan, W. 2004. *Mackintosh's Masterwork: The Glasgow School of Art*. Great Britain: Glasgow School of Art Press.
- Churchman, C. West. 1979. *The Systems Approach and Its Enemies*. New York: Basic Books.
- Cresswell, L., Lambert, B., and Goodier, A. 2003. *Product Design: Resistant Materials Technology, 2<sup>nd</sup> ed.* Oxford: Harcourt Education
- Cumming, E., and Kaplan, W. 1991. *The Arts and Craft Movement*. London: Thames and Hudson Ltd.
- Davey, P. 1980. *Architecture of the Arts and Craft Movement*. London: The Architectural Press Ltd.
- Falet, D. 2007. "The River at the Heart of Morris's Ecological Thought." in *Writing on the Image: Reading William Morris*, edited by David Latham, 73-84. Toronto: University of Toronto Press.
- Frampton, K. 1992. *Modern Architecture: A Critical History, 3<sup>rd</sup> ed.* London: Thames and Hudson Ltd.
- \_\_\_\_\_. 1983. "Towards a Critical Regionalism: Six Points for an Architecture of Resistance." In *The Anti-Aesthetic-Essays on Postmodern Culture*, edited by Hal Foster, 16-30. Seattle: Bay Press.
- Greene, D. A. "Diamond in the Rough (and Ready)." In *Dwell*, October 2009, 51-56.
- Kibert, C. J. 2013. *Sustainable Construction: Green Building Design and Delivery, 3<sup>rd</sup> ed.* Hoboken: John Wiley & Sons, Inc.
- Lawrence, R. J. 1990. "Learning from colonial houses and lifestyles." In *Vernacular Architecture: Paradigms of Environmental Response. Vol. 4 Ethnoscapes: Current Challenges in the Environmental Social Sciences*, edited by Mete Turan, series edited by David Canter and David Stea, 219-257. Aldershot: Avebury.
- Makinson, R. L. 1977. *Greene and Greene: Architecture as Fine Art*. Salt Lake City: Peregrine Smith, Inc.
- \_\_\_\_\_. 1984. *Greene and Greene: Architecture as Fine Art, 2<sup>nd</sup> ed.* Salt Lake City: Gibbs M. Smith.
- Obata, Y., Kanayama, K., and Furuta, Y. 2004. "Research on woods as sustainable industrial resources – evaluation of tactile warmth for woods and other materials." In *Sustainable Development of Energy, Water and Environment Systems, Volume 1*, edited by Afgan, N.H., Bogdan, Z., and Duic, N. 79-87. Lisse: Swets & Zeitlinger B.V.
- Proust, M. 2013. *Swann's Way: In Search of Lost Time Volume 1—The C.K. Scott Moncrieff Translation*, edited and annotated by William C. Carter. Yale University: Yale University Press.
- Pye, D. 1986. *The Nature and Art of Workmanship*. Cambridge: Cambridge University Press.
- Rapoport, Amos. 1990. "Defining Vernacular Design." In *Vernacular Architecture: Paradigms of Environmental Response. Vol. 4 Ethnoscapes: Current Challenges in the Environmental Social Sciences*, edited by Mete Turan, series edited by David Canter and David Stea, 67-101. Aldershot: Avebury.
- Ricoeur, Paul. 1965. "Universal Civilization and National Cultures," In *History and Truth*. Evanston: Northwestern University Press.
- Sassi, Paola. 2006. *Strategies for Sustainable Architecture* Abingdon: Taylor and Francis.
- Sinclair, B. R. 2009. Culture, Context and the Pursuit of Sustainability: Contemplating Problems, Parameters and Possibilities in an Increasingly Complex World. *Planning for Higher Education: The Journal of the Society for College and University Planning*. 38 (1).
- Said, H., Kandil, A., Nookala, S., Cai, H., El-Gafy, M., Senouci, A., and Al-Derham, H. (2013). "Modeling of the Sustainability Goal and Objective Setting Process in the Predesign Phase of Green Institutional Building Projects." *Journal of Architectural Engineering*, 20(2) June 2014.
- Stea, D., and Mete, T. 1990. "A Statement on Placemaking." In *Vernacular Architecture: Paradigms of Environmental Response. Vol. 4 Ethnoscapes: Current Challenges in the Environmental Social Sciences*, edited by Mete Turan, series edited by David Canter and David Stea, 102-121. Aldershot: Avebury.
- Stansky, P. 1985. *Redesigning the World: William Morris, the 1880s, and the Arts and Crafts*. New Jersey: Princeton University Press.
- Wright, F. L. 2005. *Frank Lloyd Wright: An Autobiography*. Warwickshire: Pomagranate Communications Ltd.