

A holistic approach to urban and architectural design with housing sustainability paramount

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ABSTRACT: The field of sustainable development began to draw public attention in the mid-1970s – over ensuing years the pursuit of sustainable design has sought to benefit residents through positive influence on rate, type, location, and the cost of growth. Ideally, sustainable urban design should support the provision of high quality spaces and healthy places. Our roles as Architects and Environmental Designers remain, fundamentally, to improve the quality of life for people living and working in our projects. We strive to attain this goal despite growing obstacles, including depleting resources, increasing pollution, tightening budgets, escalating regulations and a milieu increasingly known for its isolation, indifference and even hostility.

Sustainable communities and greener projects are often correlated with overall higher costs of housing, whether through purchase or rental. This paper argues that truly sustainable developments must aim for greater diversity, heightened accessibility and more affordability. How might designers best approach the challenge of attaining greener, more integrated and inclusive communities? With regard to creating such communities, and realizing more sustainability in existing cities (often struggling with rampant urban sprawl), what possibilities are there to transform and modify the urban fabric in sensitive, sensible and sustainable ways? To answer these pressing research questions, this paper presents a new platform of knowledge for reconsidering/redesigning current projects, communities and cities in ways that are far more integrated, inclusive and balanced than have been seen before. Using both Sinclair's Framework and Gestalt Theory, the research suggests that our steps should be more considerate, open-minded and over-arching. Sustainability in urban design and architectural design, keeping housing affordability in mind, must not be narrow and restrictive, but rather should embrace a collection of qualities seen in interwoven and interrelated ways. Considering the intense pressures and spectrum of challenges confronting designers, finding new, potent and responsible paths forward proves paramount.

There is pressing need for more integrated, innovative, comprehensive and holistic ways of addressing urban & architectural design with greater housing sustainability in mind. While other scholars have approached sustainable design through a variety of discipline-specific methods, the significance of the present researchers' contributions is to underscore and incorporate a far more integrative strategy. This paper investigates and identifies key qualities of holistic urban design and architectural design with greater sustainability of housing front-of-mind.

KEYWORDS: *design, conceptual framework, integration, holism, housing sustainability*

INTRODUCTION

"Everything must be made as simple as possible. But not simpler." Albert Einstein

Our contemporary world is intensely challenged to travel a path towards greater sustainability. Our planet is now more urban than rural. Our cities are under pressure to steward resources while raising quality of life. Separation, isolation and fragmentation all too commonly define an ethos of emergency. To achieve the goal of sustainable and holistic urban design, in concert with housing sustainability, more partnership, collaboration and interdisciplinarity between various sectors is required. Sustainable development and New Urbanism are terms frequently used between creative classes for the provision of livable and green urban neighborhoods (Florida, 2002). In this regard, Gehl recommends the provision of new urban areas where places are complete, affordable, people-friendly, walkable, accessible, and connected (Gehl, 2010; Gehl, 2011).

Today, over half of the world's population lives in cities (Fraker, 2013). The incorporation of social, psychological and cultural dimensions of urban design, together with sustainable housing, needs to meet the diverse and complex needs of residents living in our communities. Friedman (2007) emphasizes that "the need for space adaptation to on-going life circumstances is important in New Urbanism and Architecture." Designers need to create environments which are far more fluid, flexible and responsive (Sinclair, 2014).

In the creation of sustainable urban design, including an array of associated housing types, many factors, including green design, suitable location, sufficient production, and effective policies and instruments must be

Sustainable urban design often comprises a more compact fabric and includes a rich mixture of commercial, residential and other uses. It realizes a broader range of housing sizes and types, cultivating diversity in cities. Such mixed-use developments, with an accompanying assortment of sustainable housing choices, transit oriented development (TOD), pedestrian-friendly areas, and reduced sprawl, prove to be important ingredients in a formula for more livable communities. Conversely, poor urban planning risks include a lack of spirituality in spaces, the isolation of older people from mainstream society, heightened traffic problems, and daunting environmental issues including degraded air quality and water pollution.

In conventional practice, sustainable and affordable housing has rarely been considered alongside sustainable urban design. In our cities, sustainability and affordability are negatively correlated with each other because “more sustainable” often means “less affordable” (Friedman, 2012). Neighborhood amenities such as proximity to TOD stations, pedestrian safety, access to complete streets and innovative housing structures have important roles in determining the affordability of living and sustainability of neighborhoods (Friedman, 2012). Residents who can spend a greater percentage of their income on housing are more likely to have more favorable attitudes about their life standards. To the contrary, residents who cannot invest more towards their housing circumstances tend to be less satisfied with their housing situation.

There are concerns about land development, quality of urban environments, cost and security of energy, environmental impacts of energy production, and associated environmental emissions (Anderson, Kanaroglou, & Miller, 1996). Present research underscores that designers and planners need to more aggressively develop strategies to address such concerns, including attention to climate change and reduced reliance on fossil fuels. While energy aspects are a key to greater sustainability, the authors suggest it is only one part of a far bigger picture that must be more holistic, integrative and interdisciplinary.

Designing sustainable environments is an intense holistic process that needs to balance social, cultural, environmental, economic, political and other aspects. The features of sustainable urban design are multi-dimensional and contextually-sensitive, including such aspects as: increased density, mix of uses and users, inclusion of accessible and affordable housing, transit-oriented development, livability, walkability, community gardens, energy strategies, adaptable design, etc. The nuances of location, including cultural qualities and geographic character, factor into the equation as architects endeavor to realize more sustainable buildings, developments, neighborhoods and cities.

While other scholars have approached sustainable design through a variety of discipline-specific methods, the present researchers underscore and incorporate a more holistic, integrative strategy. The present method builds from a more inclusive model that has been developed by one of the authors (Sinclair, 2008). The framework embraces the interdependency of social, cultural, natural and built dimensions of the environment. Sinclair's Holistic Framework for Design + Planning requires any development to encompass four major interconnected elements of sustainable design & planning including agility, fitness, diversity and delight. Elements such as flexibility, adaptability and durability as well as mixed-use goals with surrounding livable and complete streets, walkable areas, convenient access to transit-oriented development, and green housing – together contribute to more sensitive and more sustainable outcomes.

1.0 RESEARCH QUESTION AND METHODOLOGY

Research explorations in Architecture and Urban Design, given their rich connections to dimensions both artistic and scientific, commonly stand as varied, inventive and stimulating. The primary research question that this paper probes is: With regard to creating sustainable communities, and realizing more sustainability in existing cities (often struggling with rampant urban sprawl), what possibilities exist to transform and modify the urban fabric in more sensitive, sensible and sustainable ways?

To answer this question, this paper critically reviews the issues surrounding sustainable architecture and urban design through new, more inclusive lenses. While existing models pertaining to sustainability, urban design, and housing have been well defined, weaknesses still exist surrounding their integration within a holistic system. The present researchers contend that the approach to a more successful urban design needs to be far more holistic, innovative, and sensitive to key issues. The solutions proposed by our research are less fragmented and more interconnected, providing a new vantage point in both the creation of new and retrofitting of existing communities.

This paper proffers an approach to creatively weave existing models into a new more integrated and holistic framework. The methodology specifically used to reach such ends includes meta-analysis of the literature, critical

assessment of prevailing theories, and logical argumentation and creative synthesis in the design, development and delineation of the new holistic framework.

2.0 STATUS QUO

Over the past few decades, various approaches have been proposed and/or practiced for achieving sustainable urban design. Each of these approaches tends to address different elements of this field – and each develops rather unique perspectives. However, the authors suggest that none of the approaches consider together the gamut of aspects truly needed for greater sustainability. In his book, *Good City Form*, Kevin Lynch mentions critical dimensions in planning such as: Vitality, Sense, Fit, Access, Control, Efficiency, and Justice. Regarding the importance of design with sufficient knowledge and wisdom, Canter (1977) writes, “Environments or places are defined by, and understood as, the physical characteristics of the place, the activities in them, and the meanings they hold for people.” While these points are vital, the push must reach farther and the integration must be deeper.

Our modern cities, on one hand, might include features such as Transit Oriented Development, Livable Streets, Complete Streets, and Energy Efficiency (LEED & LEED ND) which prove interesting concepts for design. However, on the other hand, they have frequently rendered costs of living higher and therefore become less affordable. Gehl (2011) notes that availability of housing that is located within sustainable communities, where places are complete, people-friendly, and accessible, walkable, and connected are important issues to be addressed. In reality, to date this goal has proven elusive because housing in such feature-rich developments warrant higher prices and demand higher rents. While the relationship between quality and cost is evident, it remains perplexing.

For instance, while there are clear benefits to Transit Oriented Development, there are significant challenges such neighborhoods must confront. Typical TODs usher in a number of concerns, as illustrated in the following list (Curtis et al., 2009):

- Dislike of change, concern about reduction of private gardens, green spaces, and increase in noise exposure commonly resulting from more compact development. Residents may feel that TOD developments do not belong in the area, exhibiting Not in My Backyard (NIMBYism), and an attitude that things are fine the way they are (Don & Tomalty, 2002).
- Fear of impact on their amenities and their lives (Bertolini et al., 2009).
- Fear of traffic and parking chaos (Renne, 2009).
- Concern about the development of natural environment, or in the case of “brownfield” sites, places that could be rehabilitated to have natural, recreational or open space value (Colquhoun & Hubbell, 2006).
- Fear that TOD will raise the housing costs of formerly affordable neighborhoods, pushing low and moderate-income residents farther away from jobs and transit. One criticism of TOD is that it has the potential to spur gentrification in low-income areas. “Gentrification” is a pattern of neighborhood change in which a previously low-income neighborhood experiences reinvestment and revitalization accompanied by increasing home value and or rents” (Greenwich & Wykowski, 2013).

Bertolini, Curtis and Renne (2009) argue that to best overcome the barriers of planning TOD areas, there needs to be rules to tackle and coordinate the entire process. Rules include “legislation, policy, practice, and responsibilities.” Relationships between organizations, institutions, organizations, and the wider community should be improved (Belzer et al., 2004; Dittmar & Ohland, 2003). Clearly there are many barriers erected that limit our current ability to generate more pluralistic, inter-connected, affordable and sustainable spaces, places, neighborhoods and cities. The present authors argue that more holistic strategies are in order if we are to advance the cause.

3.0 VALUE OF HEIGHTENED HOLISM

Given the multifaceted nature of sustainable urban design, we believe that adopting a more holistic approach would be an ideal and effective way of addressing this field. Sinclair’s Holistic Framework for Design + Planning was first introduced in 2009. This novel approach focuses on four action areas that are seen as having flexibility, interoperability and capacity for adaptation: Agility, Fitness, Diversity, and Delight. This all-encompassing framework has both robustness and resiliency, encouraging modification and customization depending on context, culture and circumstance.

In the design and planning of vibrant urban environments, it is essential to pursue, create and realize greater agility, better interrelationship of components, and more open systems (Sinclair, 2009). Important characteristics of agility include adaptability, durability, constructability, and materiality. With more agility in urban design comes elevated probabilities for improved health, increased satisfaction, more productivity, greater sustainability and enhanced interactions – in the end, better synergy between people and places (Sinclair, 2014).

Alexander's Theory of Wholeness teaches us to always bear in mind the overall structure and pattern of a place and to be mindful of a neighborhood's origins (Alexander, Ishikawa, & Silverstein, 1977). So, it seems essential to foster, invent and implement spaces, buildings and neighborhoods that are truly appropriate for the needs of people, the nuances of culture and the demands of context. The components of the category of fitness include the inter-related qualities of scale, detail, affordability, balance, natural/built, and resources (Sinclair, 2009).



Figure 1: Holistic integrated framework for design + planning (Sinclair, 2009)

Designers need to emphasize, envision and make spaces and places that contribute meaning, comfort and contentment into the lives of people (Sinclair, 2009). We must look at including and weaving together spirituality, health, wellness, beauty, attractiveness, safety, security, livability, and walkability (Sinclair, 2000). Delight is essential. Diversity is vital. Design is about connecting the dots, seeing the bigger picture, and realizing that the whole is indeed greater than the sum of the parts (Sinclair, 2005). Holism and Gestalt, in the minds of the authors, need to be passionately and successfully pursued in the urban design of more sustainable, affordable and livable communities.

4.0 SUSTAINABILITY + URBAN DESIGN

Sustainability is a pervasive term that has multiple meanings and diverse interpretations/applications. Sustainable urban planning, as highlighted by the authors, include such features as energy efficiency, higher-density development, mix of uses/users, provision of public & open spaces, walkable neighborhoods, access to transit, assurances of affordable housing, presence of community gardens, and attention to overall quality of life.

Advantages of a meaningful public realm, including community gardens, come in providing opportunities for cooperation and sharing among & between residents (Griffin, 2003). In a similar vein, cohousing developments with facilities such as shared kitchens and mixed-use developments with amenity centers, bring exciting opportunities from outside to inside, offering community building possibilities at the specific levels of architecture.

Urbanist Jane Jacobs argued that an essential feature of any healthy city is an elaborate and finely textured diversity of uses that provides one another with strong mutual support, both economically and socially (Jacobs, 1961). The increased density of townhouse communities, combined with the need to reduce automobile dependency, prompted planners to create more walkable communities where pedestrian and cycling paths are as common as streets and alleys (Farr, 2012). A survey by the Canadian Heart and Stroke Foundation (2005), found that people who live in higher-density areas are at a lower risk of heart disease due to their active lifestyle (Friedman, 2005). Benefits of more sustainable planning come via the combination of residential, commercial,

5.3. Transit oriented development (TOD)

Transit is playing a much more significant role in our lives as resources run thin and our cities expand (i.e., physically and demographically). Calthorpe defined the term TOD in the 1980s – he defined a Transit- Oriented Development (TOD) as a mixed-use community within an average 2,000-foot (ten minute) walking distance of a transit stop and core commercial area (Calthorpe, 1993). Calthorpe (1989) emphasized that an intense/dense mixture of residential, office, retail, open space and public realms, developed in well-designed and walkable environments, creates an urban milieu that proves convenient, satisfying and successful for dwellers, workers and visitors alike.

In sustainable urban areas, the advantages of TODs include: improving air quality (Curtis, Renne, & Bertolini, 2009a), promoting walkability, safety, relieving traffic congestion, revitalizing inner-city neighborhoods, and improving energy efficiency through supporting non-motorized forms of transportation. TOD stations increase the level of safety, comfort, affordability, and vibrancy in neighborhoods (Calthorpe & Fulton, 2001).

In a more sustainable community, there should be access to TOD coupled with sufficient sustainable, diverse and affordable housing (e.g., high-rise and low-rise, attached and detached, mixed-use or multi-functional buildings, etc.). When this range of housing types is available, communities grow in socio-economic richness, interest and vitality. To achieve such sustainable and holistic developments we need far more communication, and shared vision between the various players and organizations engaged in the enterprise of neighborhood design, district planning and city building.

5.4. Smart growth

Integration is fundamental to our success, yet difficult considering the specialization and fragmentation endemic to modern Western lifestyles. Sustainable communities must combine people, land, and buildings to improve the physical, economic, and social environment (Friedman, 2007). Smart growth benefits residents by development of plans and programs which are designed to influence the rate, type, location, and the costs of growth.

Prefabrication and mass customization afford possible paths forward. If there is a mass production in housing there will arguably be less energy consumption for construction with more energy/material saved (Pitt, 2007). Energy can also be reduced through far more efficient infrastructure (Pitt, 2007). Effective use of materials, conservation of water, and greater durability/longevity of building components tend to accompany the construction of small-footprint, higher-density housing solutions. Friedman (2012) mentions; “Energy consumption is not limited to within the walls of a home, but extends to the neighborhoods as well”. Blurring boundaries between inside and outside, and eroding borders between architecture and urban design seem both sensible and necessary in our quest for sustainability.

Social mixing is of course part of a sustainable housing policy – the authors suggest heightened accessibility for social housing means the full range of incomes found in the broader society are brought into conversation. This mix of users, conventionally segregated in modern American cities, ushers in the possibility of ‘messy vitality’. History demonstrates that large-scale projects in many cities, with their high concentrations of low-income tenants (e.g., Pruitt-Igoe in St. Louis, Missouri, USA), is simply untenable and unsustainable. Such social exclusion strategies, common in efforts to manage post-WW2 growth, started to decline in the 1960s -- leading to the eventual stigmatization and labeling of such projects as “ghettos” (Van Dyk, 1995).

6.0 MODELING MORE HOLISTIC SUSTAINABLE URBAN DESIGN (SYNTHESIS)

The present paper has delineated some fundamental considerations, and a number of prevailing theories/practices, for more sustainable urban and architectural design. While many contemporary approaches are moving us closer to a more responsible and sustainable world, the authors contend that far more integration, interdisciplinarity and holism are required to tip the system. To this end a model is proposed whereby communication is extended, more voices are heard, greater collaboration is enacted and risks are taken.

By reconsidering Sinclair’s Holistic Framework with a greater emphasis on urban/architectural design with housing sustainability front-of-mind, the following model charts some new and important directions. In particular the model precipitates vital and valuable conversation across different topic areas in a more integrated and mutually beneficial manner.

The authors acknowledge the value of prevailing strategies, including attention to responsible housing, livable streets, transit-oriented development and smart growth. In general all of these vehicles bring greater value to our communities and cities. That said, the present researchers believe there is inadequate ‘cross-talk’ and insufficient attention to larger systems. In thinking beyond conventional approaches, the researchers propose a re-examination of these prevailing factors, a reconsideration of Sinclair’s Holistic Framework, and the addition of

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new dimensions/relationships concerning problem-seeking and problem-solving solving. We feel that a far more systemic interweaving of topics/issues can lead to far more meaningful strides forward.

While a more holistic project must consider important system factors such as social, environmental, and economics (Triple Bottom Line or TBL), we believe the efforts must reach farther. Designing sustainable neighbourhoods must embrace cultural, political, social, educational and other dimensions of living – in the end we need to ensure more inclusive healthy communities. This inclusivity, for example, can provide for more openness, celebrating diversity of people from different cultures, ages, and socioeconomic backgrounds.

The present model, synthesized based on perceived shortcomings of existing conceptual frames as well as limits of prevailing theories/practices, comprises four distinctive components that must work in concert (namely, Multiple Bottom Line, Site Synergies, Effective Transit & Principled Planning). Each of these components, in turn, evokes sub-components that should be explored, examined and included in the pursuit of more sustainable projects. Rather than relying on check-lists or formulaic methods of ‘greening’ projects, our model demands conversation, imagination and critical connections to transpire. Each project is unique in its complexities, circumstances, context and conditions. The new framework aspires to have projects assessed and discussed using a far more inter-connected series of lenses. The end goal is to ensure all aspects of the model have been tackled as a given project progresses – there is not a right or wrong outcome, but rather value in examining variables and values in more connected ways.

Multiple Bottom Line: The notion of transcending the conventional triple bottom line proves fundamental to this component of our model. Beyond environment, economy and equity, lie cultural richness, political maneuverings, spiritual charge, educational promise, etc. With respect to realize more sustainable urban design with housing quality paramount, we include the sub-components of ‘Sprawl Avoidance’ and ‘Innovation + Creativity’. While these features are sensible, the authors still consider their inclusion to be important to provoke thought and precipitate action.

Site Synergies: Too commonly buildings are seen in relative isolation to their context and the greater landscapes/ecologies in place. The researchers contend that building and site must speak together, and at the end of the day, should foster a Gestalt that captures place and cultivates community. Sub-components included to these ends are ‘Compact + Intense’ and ‘Brownfield Preference’. The drivers behind these items focus mainly on optimization of development, including right-sizing, remediation and regeneration.

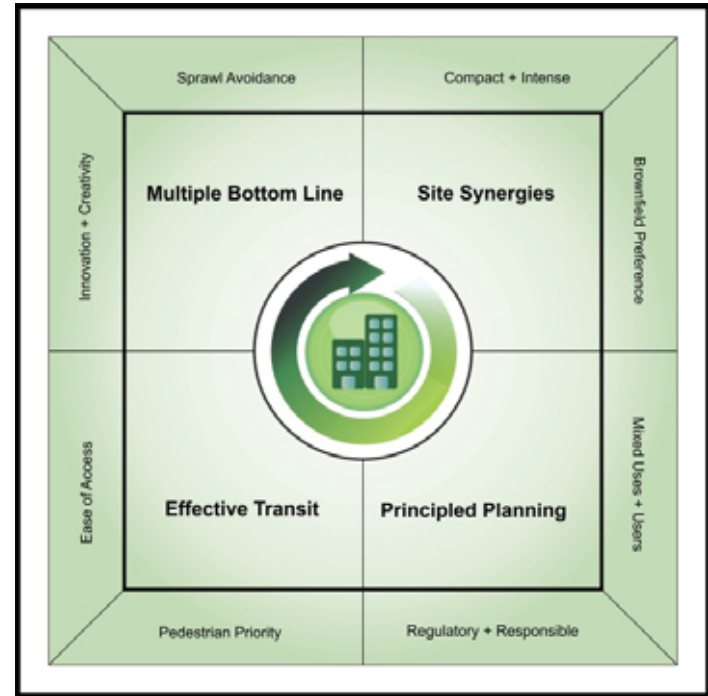


Figure 2: A Holistic Approach to Urban & Architectural Design with Housing Sustainability Paramount

Effective Transit: The arrival of automobile-based planning, and subsequent neighborhood developments, has been highly problematic on numerous counts. Engineering exercise out of our lives has disastrous health implications. Dismantling proven approaches for street network design results in isolation and disconnection. The researchers argue that transit is core to contemporary livable and enjoyable communities and better quality of life. Sub-components include "Ease of Access" and "Pedestrian Priority", ensuring that humans are valued above mechanics.

Principled Planning: Finally, clinical zoning which has been so prevalent over the last century must be abandoned and remediated. In its place, we call for planning approaches fueled and informed by ethics and values that place people first. Many design schools' curriculums are devoid of courses addressing Environmental Psychology and Urban Sociology. Place-making and community-building is more than form, space, bricks and mortar. To the contrary, place and community celebrate people and their interactions are paramount to livability, satisfaction and happiness. Sub-components include 'Regulatory + Responsible' and 'Mixed uses + Users', which emphasize the proper place of people in our recipes for appropriate environments. Regulatory and Responsible are coupled to underscore the need for order and rules to be put in balance with user needs, wants, desires and dreams.

In applying this new conceptual framework there needs to be engaged debate, open conversation, both bottom-up and top-down initiatives, and, above all, a conscious commitment to systems thinking and holistic design.

CONCLUSION

"An ocean traveler has even more vividly the impression that the ocean is made of waves than that it is made of water." Arthur Stanley Eddington

Environmental designers must assertively take into consideration a daunting array of environmental, social, economic, cultural and spiritual elements, and do so in a far more integrated and holistic manner in order to attain and exceed minimum levels of sustainability. This recipe for progress necessitates a mix of both uses and users, natural and constructed landscapes, amenities and services, and new ways of working, dwelling and playing. Identification of spaces, delineation of needs, and characterization of place must be intertwined and inter-related as we reimagine our communities and recreate our cities. Hough (1990, 188) says; "Environmental literacy lies at the heart of understanding the places with which we are familiar, and thus are at the heart of the issue of identity". In sustainable community design and development, it is essential to consider, cultivate, and ensure a compatible array of land uses, a complementary collection of building types and synergistic community of stakeholders (Sinclair, 2009).

The consideration of the triple bottom line, involving physical, social, and economic dimensions, is a critical yet insufficient starting point (Sinclair, 2005). Architects and planners must pursue holism, innovation and integration with courage and ingenuity. Education is concurrently needed to equip and empower the public with the knowledge needed to embrace and espouse sustainable urban design with housing sustainability paramount.

In terms of responsible development with housing in mind, the authors argue that holistic and balanced strategies for planning and design can and must contribute to more affordable, accessible, healthy and successful communities. In summary, the formation of a holistic sustainable city can be described through the richness of Gestalt theory: It is the whole system that needs to be considered, the behavior of which is not determined by that of the individual parts, pieces and components but rather where the individual aspects/processes are themselves determined by the inherent character of the whole" (Guenay, 2007). In an ethos of declining resources, escalating urban growth, uncertainty in markets and heightened crises at unforeseen scales, there is an undeniable need to tackle and solve problems with new mindsets, emerging tools and an eye to the whole ahead of the parts.

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