A

Awareness of Sustainability Issues

Holistic Housing Sustainable Thinking

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Definition: Awareness of Sustainability Issues

Awareness of Sustainability Issues is to understand the fragility of the environment and the importance of its protection, thinking in terms of an ecological consciousness. It is related with the growth and development of awareness, understanding and consciousness toward the biophysical environment and its problems, including human interactions and effects.

Introduction

This work aims to analyze the theme sustainability awareness and what must be done so that such a consciousness is incorporated as a fundamental factor to the human species survival and life on the planet. In this way we intend to make an analysis of the application of this theme and also holistic practice, in sustainable housing projects.

In order to do so, it is necessary to reflect on how these concepts have been applied in such projects, since it is important to understand that business initiatives, especially those that generate great impacts by extracting resources for their economic activities, both to the environment and society, which is the case of the civil construction industry, should be fully aware of the consequences of their activities and minimize such effects (Bassetto 2010).

To Abidin (2010) the factors that will stimulate the incorporation of sustainable actions and movements are awareness and knowledge. The author highlights that with these factors incorporated come interest and demand and follow with implementation. He also agrees with views that emphasize that behavioral changes will only occur through personal commitments.

Gonçalves-Dias and Teodósio (2012) point out that changes in production patterns and consumption imply an increase in the level of information of the population, awareness of people, elimination of waste, development of technologies, shared responsibilities, and recycling, but above all changing from a behavioral pattern of the current society toward a sustainability awareness.

Roos and Becker (2012) stress that a sustainable system will only bepossible through the intellectual evolution of human beings, in addition to establishing environmental education processes in

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each society and promoting awareness of what sustainability really is.

According to Gadotti (2005), it should be noted that we live in a scenario where globalization implies a search for permanent technological development. Such development and the resource needs that they demand, according to the author, create a moment in which the idea of sustainability, although desired, undergoes great friction and tension. How can we promote full development and a real sustainable situation? According to the author, such concept is only a label for some while for others a logical absurdity since sustainability and development seem many times incompatible.

For Gadotti (2005, p.2), the term sustainability refers to much more than the preservation of natural resources as "it implies the balance of human beings with themself and with the planet, even more, with the universe." The author suggests a sustainability that is directly related to what the human being is and understands where he comes from and where he goes, a broader aspect before the vision of a being that gives meaning to everything that surrounds him.

Gadotti (2005) mentions that this subject will provide ample debate in educational media in the years to come. Education and openness to this broader perception of reality is undoubtedly the biggest challenge for the sustainability issue to be incorporated.

It should be noted that both the word sustainability and holism have been used very often and very comprehensively. Therefore, it's necessary to revisit the emergence of such concepts for only then to observe how they are applied, or should be, in a practical way and what are their possible uses in housing projects.

It also seeks to observe the influence that the housing projects receive from a strong consumer market, caused by a globalized world, where there is the stimulus to the constant creation of new products, most often not sustainable, and that takes the quest for social status through exclusivism.

Some data on the difficult times in which the current society and the planet are in will be presented, as well as aspects and techniques on sustainability regarding the construction sector.

Thus, it created a research path that can be structured as follows: first, the development of a study on the concept of sustainability and holism; second, what are the challenges presented in the current times for their effective application in sustainable housing projects; third, analyzing the characteristics of sustainable housing; and, finally, the attempt to understand if sustainability and holism have been incorporated in current building processes.

Sustainability, Holism, and Construction Practices

To deepen this issue is important to understand the concept of sustainability. Humanity in its process of evolution and social organization has created major changes in the environment. These changes allowed a life undeniably more comfortable and stable than previous generations. However, a generalized notion of development related to a naturally progressive and positive process to human societies has been questioned (Almeida 1999).

According to Almeida (1999) economic, environmental, and social crises have undermined the idea that progress as occurred in developed countries should be copied in full and that it would generate the same results obtained in developing countries. The author states that the humanistic character assigned to the development term has made the expression to be assimilated with a positive connotation of a favorable prejudgment, acknowledged as a good in itself.

Development generates industrial production techniques on a large scale in order to create products aimed at mass consumption, which, stimulated by economic theories, support the generated consumer society. According to Gadotti (2005), production unbalances lead to a situation where life on the planet can be greatly affected and even destroyed, without the use of atomic weapons. This can occur by environmental degradation and the misuse of all kinds of resources.

Today it is clear that the natural resources for the maintenance of society are finite and need to be used judiciously. Various experiments and human activities have made clear that inefficiency and carelessness in their productive activities create situations of immense risk, high impact either local or global. According to Langer (2017, p. 5):

> On one hand, capitalism has an enormous capacity to create wealth and goods, in addition to mobilizing, for this purpose, powerful technical, intellectual, material and financial. On the other, it presents an enormous capacity to ignore poverty and misery and transform landscapes, societies, norms and values.

Ribeiro (2002) states that one must consider that globalization, which took place from the 1980s, sought to create a homogenization of world culture. Clearly, this homogenization occurs based on consumer culture.

It should be considered that consumption is at the same time, according to MacCracken (2015), the process by which the creation of goods and services necessary for the maintenance and construction of the world and society may be sustained. But it is also a cultural phenomenon that involves desire, lifestyle, and demonstration of social status.

Understanding this search for social status promoted by consumption is extremely important when observed the way in which construction methods are applied. This is evident when it's considered that the "goods that are so often identified as an unfortunate and destructive concern of a materialistic society, are in fact one of the main instruments of its survival" (MacCracken 2015, p. 4).

Thus, it can be concluded that the practices and patterns of consumption and, consequently, the applied technological methods are the support base of a lifestyle and a society already established.

The changes needed to promote sustainable methods involve often immense efforts to demonstrate the mistake of these established social and cultural patterns. The author MacCracken (2015) demonstrates that the consumption of a product, including housing, shoot a very broad process which generates activities and resource exploitation that goes far beyond what can be observed as a final product, and it involves changes of deep cultural patterns. MacCracken (2015) shows how consumption is associated with the desire and often good portion of the population that aims to consume objects that are beyond their reach and that these desires promote the assumption that, through them, you can get new happiness, although such consumption is unsustainable, both regarding the economic aspect of the consumer and, more broadly, to the survival of the planet.

In the face of such placements, a question should be asked: what is sustainability?

According to Ferraz (2008), the concept of sustainability, the way it is understood today, emerged in the 1970s, from the Club of Rome, with its proposal for zero growth, with the claim that it is impossible to sustain a continued economic growth. Later, there is a good definition of the concept with the publication of the Brundtland Report, prepared by the World Commission on Environment and Development (1987), which defines: "Sustainable development is development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs."

Sustainability is therefore bound to the idea of continuity. For this, we need to create a harmony between economic and environmental issues, a balanced marriage between these two factors (Ferraz 2008).

For Baudrillard (2016) unbridled consumption, which creates an imbalance between the economic and environmental aspects, gives up the worship and admiration for the new. This admiration in turn makes new products; new appeals to the consumer arise constantly; it creates then a vicious circle of desire-consumption-production. This cycle generates waste, which, in turn, causes severe pollution and exploitation of natural resources.

And the idea of holism? The term holism has its origins in the eighteenth century presented by naturalist Gilbert White (Tristão 2004), based on the Greek cosmic vision, in which the word *Holos* means any or all and *Oikos* means home. In this concept, nature has a soul and a female

intelligence. There is a unity between nature and humanity in a cosmic order (Naess et al. 1981).

The holism in part presents a reductionism, according to Tristão (2004), for the parts are understood as parts of a whole, but the complexity within this unit is not properly represented. For Tristão it must include "all as more or less than the sum of its parts (p. 106)." According to the author, the tensions and conflicts of contemporary society and its complexity hamper the understanding of holism as an entire aspiration paradigm. Tristão (2004) adds that holism, although will produce a major attraction and enchantment and is widely used in environmental education teaching, represses the heterogeneous, the sense of difference and cultural diversity that feed and stimulate the relationship between life and knowledge.

According to Sato and Carvalho (2008), the adoption of an anthropocentric view of the world proposes to control natural phenomena so that the earth is mastered and used in order to meet the needs and desires of human beings and their Cartesian thought. It is a vision that completely unbalances the holistic relationship between human beings and the environment in which they live.

Thus, it is urgent to understand the immense challenges that determine the application of such concepts in the lives of individuals. Clearly it presents itself with all the points raised so far, a huge dilemma: how to keep moving forward as a society and, at the same time, to preserve natural resources to allow future generations and biodiversity to be sustained?

To try to answer that question, it is essential to understand that society is facing a challenge of managing key resources to the survival of life. Matias (2014) presents the current situation of the contemporary global society, as a tragedy of public welfare. The author mentions that public welfares are freely available for all to use in any way deemed suitable. However, it should be noted that, in a practical way, what is available to all is not administered or cared by anyone. And, at first, each one does whatever they want. Even though Matias (2014) mentions, theoretically, that public welfare is a market error related to property rights, therefore, to be collectively owned, they become, strictly speaking, owned by anyone, hence the lack of incentives for their protection. Its preservation is at the mercy of institutional and social rules often uncertain. The solutions that have been observed are the privatization and nationalization of these resources to ensure that they are managed and preserved. However, both solutions have their problems. Therefore, they are not exactly solutions, but elements that integrate this complex and controversial issue.

According to Matias (2014), in 2009 scientists that were studying anthropogenic pressures – induced by human being – on the global environment, stipulated nine planetary "limits" or "boundaries" which, if exceeded, would cause disasters that would put humanity at risk. These "limits" are:

1st – Ocean acidification, which absorbs a quarter of human emissions of CO_2; the presence of this gas in water increases its acidity, damaging marine biodiversity.

2nd – Ozone depletion, which, in turn, is responsible for filtering the sun's ultraviolet radiation stemming from the sun. The international community has dealt this problem with efficiency.

3rd – Chemical pollution, including radioactive compounds, heavy metals, and a wide variety of organic compounds of human origin. This pollution that was once considered localized and regional today shows itself as a global problem.

4th – Atmospheric aerosols that are organic and inorganic particles suspended in air as dust and soot from diesel engines, for example. These elements can either generate the atmosphere cooling by reflecting sunlight, or increase the heat, as soot generated by the combustion of biomass. In addition, such soot produces diseases such as asthma and bronchitis.

5th – Biogeochemical, human interference in the global cycling of phosphorus and nitrogen generated from food demand and hence fertilizers. Excess of nitrogen fertilizers is dumped into waterways causing expansion in the emergence of algae that affects the lives in rivers and lakes and causes abrupt changes in these ecosystems. This creates true dead zones in coastal regions.

6th – Freshwater, the global use of freshwater and pollution of this resource (one common good par excellence), which is used far beyond

acceptable levels, especially in agriculture. This causes, among other problems, the reduction of soil and air moisture, generating droughts and hence the degradation of these soils. This problem already makes the situation critical for 40% of the world population suffering from water stress.

7th – Land use and the devastation of forests (agricultural expansion and livestock). The devastation of forests is a serious problem not only because of the wood being used as important raw materials but also because they preserve watersheds, protect the soil from erosion, and are essential as part of the water cycle, besides being habitats that provide biodiversity.

8th – Biodiversity loss and the extinction of several species associated with human actions. This is happening a thousand times faster than would be natural.

9th – Climate change generated by the greenhouse effect, which, in turn, is due to the presence of certain gases, released into the atmosphere, that do not allow part of the solar radiation that generates heat which would normally be reflected the space to be eliminated. This phenomenon leads to the rise in global temperature. The CO^2 produced by burning, by industry, by using fossil fuels, and by breathing and methane (CH4) generated by landfills, the cattle, and the mangroves, for example, are the two gases that have greater participation in greenhouse effect causes.

To what extent housing construction methods exceed the abovementioned limits and how to make them to be truly sustainable? What does underlie a sustainable housing? According to John et al. (2001), the construction industry is the sector of the economy that consumes more materials worldwide including, among others, steel, cement, lime, sand, wood, water, and energy. All of it generates huge demand, degradation, and pollution in places where such resources are extracted and even where the works happen. The authors have signed yet that 50% of raw materials in Japan are consumed by construction and in the USA this natural resource consumption rises to the order of 75%. To further illustrate the "weight" of civil construction, the authors' state that 3% of the CO^2 generated globally derives only from the decomposition of lime to produce Portland clinker cement.

Half of all annual energy consumed in the USA, according to the Energy Information Administration System of the USA, refers to the construction industry (Ching and Shapiro 2017).

According to John et al. (2001), beyond the construction, we must also rely on demolition, which generates a huge amount of waste with high impact on the environment. The authors suggest the untying of development to the environmental burden that it promotes. This means that there is a need to optimize the use of resources, with reduced generation of waste to a minimum which should be recyclable. This new paradigm is called closed-loop or cyclical production model.

Regarding the idea of sustainability in civil construction, it is important to consider durability that is directly related to the useful life of the components used. For the durability of materials, it is necessary to analyze the climatic conditions where the components will be used, considering factors such as the incidence of solar radiation, temperature, salinity, pollutants content in the air, and humidity, among others.

In September of 2015, leaders of all United Nations state member (ONU 2015) formally adopted an action plan for the eradication of poverty, protection of the planet, and achievement of prosperity and peace. This plan, Agenda 2030 for Sustainable Development, has 17 goals, and the number of Goal 11.1 refers to "making cities and human settlements inclusive, secure, resilient and sustainable (ONU 2015)."

This agenda is undoubtedly very ambitious considering the challenges ahead and the period in which it should be implemented. It consists of plans "integrated and indivisible and balance the three dimensions of sustainable development: the economic, the social and the environmental" (ONU 2015).

According to Ching and Shapiro (2017), the Architecture 2030 group, created in 2002 by architect Edward Mazria, launched the challenge in 2030 that requires all buildings and major renovations consume less than half the amount of energy they consume normally. The Architecture 2030 endorses the reduction in fossil fuel

Awareness of Sustainability Issues, Table 1 Sustainable architecture and its goals

Reduction of global warming, with the reduction of greenhouse effect gases and carbon sequestration processes performed on biological processes. Whereas such biological processes are given by reforestation and recovery of water sources
Minimize the environmental impact by reducing the use of oil and coal and avoiding hydraulic fracturing for the extraction of the natural gas
Reduce the pollution of air, water, and soil
Protect drinking water sources
Reduce light pollution that can harm nocturnal ecosystems
Protect natural habitats and biodiversity, with special attention to endangered species
Avoid unnecessary and irreversible use of agricultural land for use for nonagricultural purposes
Protect topsoil and prevent flooding
Reduce the use of landfills
Reduce the risks generated by nuclear contamination

Source: The authors based on Ching and Shapiro (2017)

Awareness of Sustainability Issues, Table 2 Sustainable architecture, health, and awareness

Improve air quality within the construction environment
Improve the quality of water in buildings
Improve thermal comfort
Reduce noise pollution
Improve the mood of the people who inhabit it
Reduce energy consumption

Source: The authors based on Ching and Shapiro (2017)

consumption rate by 70% until 2015, 80% until 2020, and 90% until 2025 and ultimately to become carbon neutral in 2030.

Sustainable architecture, according to Ching and Shapiro (2017), should seek not to fall into the trap of new products that promise to be environmentally friendly and sustainable, which are often expensive and inefficient. It is necessary to use common sense to avoid falling into fads, but at the same time, remain open, with a critical eye, always looking to learn new techniques.

What to expect, at last, from a sustainable architecture? According to Ching and Shapiro (2017), the most recognized goals are those wishing to avoid environmental degradation. For that, we need to consider the items shown in Table 1.

Sustainable architecture also stands out health of residents, so it included the improvement of housing conditions through the following objectives presented in Table 2.

Ching and Shapiro (2017) show that the constructions are increasingly evaluated for its environmental efficiency. According to the authors, "the weight of history assessments has begun to fall on the buildings that waste energy. Especially those who claim to be environmentally friendly and sustainable" (p. 11). The authors define sustainable building as one that causes significantly reduced impact on the environment and at the same time provides beneficial environments for health.

It should be established for this, a holistic planning, which is to say that the housing project must understand the building and its surroundings and, once observed the surrounding components, plan from the outside in.

The authors also present the operational processes of a building as important elements to be taken into consideration regarding sustainable construction. These operational aspects deal with factors such as heating, cooling, and lighting of buildings, for example.

Therefore, when designing a building, both the materials used and a projection of the proper use and maintenance of such equipment should be thoroughly studied and sized to have the best result in sustainable terms.

The climatic changes that are taking place on the planet have already become evident, and they should also be considered in the development of housing projects, both in relation to risks that they can provide to the building and the opportunities in the use of new more efficient and safe technologies. According to Ching and Shapiro (2017, p. 5), "the field of sustainable architecture is young and offers endless possibilities. There are abundant new opportunities to design and build improving energy efficiency and resources."

For the success of a sustainable project, it is important to know and apply established norms to ensure quality standards in buildings. The certification Leadership in Energy and Environmental Design (LEED) is an example of certification

related to sustainable architecture standards. In addition, there is also the Passivhaus, which is a standard that is intended to maximize energy performance of projects and reduce their carbon footprint; the BREEAM considered the oldest seal of certification of sustainable buildings, created in England in 1992; and PROCEL EDIFICA, the Brazilian certification system focused on environmentally responsive buildings and other certifications with similar purposes.

Another important aspect of sustainable construction is the protection of sensitive sites that are represented by arable land, forest parks, areas where floods occur, habitats of endangered species, coastlines, forests with native forests, wetlands and mangroves, and protected areas and water sources. It is also important to consider the waste generated by construction, transportation of materials, due to the emission of pollutants and energy consumption.

In addition, according to Ching and Shapiro (2017), sustainable construction must consider the proper management of rainwater, so that it does not aggravate the risk of flooding, does not lead to pollutants, and avoids soil erosion. The rainwater must have a runoff, which permits filtering, and groundwater supply without being affected by these contaminants.

Sustainable construction should, therefore, assess the environmental conditions within the environment where they are located, the proper application of natural resources used, and the technologies applied, contemplating the sustainability of both the building as the environment. It should also consider the interaction of the project with all the surroundings and of that with the well-being of the residents, which ensures the application of the holistic concept. So that the awareness of sustainability is widely incorporated into the project and, at the same time, assimilated throughout the production chain.

Final Considerations

From the development of this work, it can be concluded that to consider sustainable housing, it involves understanding that the health of people is directly related to the health of the environment in which they are in. Human beings have to choose the path they want to go from here on. It is necessary to become aware that the current situation is going to be made by permanent choices to be taken as a living species, once there is an interdependence of human life with all that surrounds it. Such choices must come as answers to the challenges posed by the present moment that the planet lives. They should be fruit of the human capacity to incorporate actions that promote real results in terms of sustainability.

Therefore, the lack of care for the environment, the irresponsible production of goods, and the reckless consumption of them generate, in fact, irreversible harm to the human species itself. There are, today, available tools and technologies that enable households to be much more efficient with respect to energy consumption, as well as in issues related to the use of natural resources used in construction. There are also studies that demonstrate the feasibility of recycling and reduce the use of such natural resources to a minimum.

One can understand the construction of sustainable housing as both an enormous challenge as well as an advanced opportunity in human experience in large cities and in other environments where individuals are settled.

Sustainability refers to the idea of continuity regarding the life of human beings on earth, but also considers the care of other life forms. This relationship with the preservation of life and the quality of that experience should always be a starting point to consider in construction projects.

The care with the quality of life of residents involves the concept of holism, the part of the link with the whole, and must be fully observed, since the health of the environment is directly linked to the health of people living in the buildings. Another aspect of holism in construction is on the choice of technical improvements and the use of materials that result in a considerable difference in the building as a whole.

It is, therefore, necessary an effort from everyone (public authorities, architects, engineers, contractors, industry, commerce, civil society in general) so that there is a change of consciousness and that this change decreases the impacts caused

by the construction sector in the entire planet. Such a change occurs, of course, from education and dissemination of knowledge able to change the culture of waste so deeply rooted in the most used construction methods.

Cross-References

- Behaviour Change for Sustainable Development
- Climate Change and Sustainable Development
- Education for Sustainable Development
- Energy Management Tools
- Engineering Education for Sustainable Development
- Environmentally Friendly Products and Sustainable Development
- Green Labeling and Sustainable Development
- Green Living Guide and Sustainable Development
- Green Revolution and Sustainable Development
- Importance of Sustainability Indicators
- Innovative Approaches to Learning Sustainable Development
- Overall Energy Efficiency and Sustainable Development
- Renewable Resources and Sustainable Development
- Social Responsibility and Sustainability
- Strategic Planning for Sustainability
- Sustainability Barriers
- Sustainability Implementation
- Sustainability Strategy
- Sustainable Urban Transformation
- Sustainable Values, Attitudes and Behaviour
- Technological Innovation for Sustainability

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