

## ACHIEVING HUMAN NEEDS THROUGH DESIGNING AN INTERIOR DESIGN RATING TOOL

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### ABSTRACT

This study's purpose is to increase interior designers' sustainable attitude through suggesting a strategy for an Interior Design Rating Tool designed for that purpose. Pearl Rating Tool of Estidama of Abu Dhabi is the first tailored to the Middle East region. Its aim is to create more sustainable communities, cities and global enterprises and to balance the four pillars of sustainability: environmental, economic, cultural and social. As sustainability in designing interior spaces is the same in importance as in designing and constructing buildings and designing communities; this study suggested a strategy for an Interior Design Pearl Rating Tool for Estidama. Ten sustainable interior design criteria are included with the most important strategies to be met so that the interior designer should be aware of the four pillars of sustainability it has to balance between. In addition, designers have to learn about the maximum credit score they can achieve through fulfilling human needs, wants and values in the built environment. This strategy is designed to be presented to designers before starting their project in order for their project to be rated.

**Keywords:** sustainability, human needs, interior design rating tool.

### INTRODUCTION

The built environment is the creation of human minds and the result of human purposes; it is intended to serve human needs, wants, and values. It is

created to help us deal with the overall environment for our comfort and well-being (McClure, Bartuska 2007). Every component of the built environment is defined and shaped by context; each and all of the individual elements contribute either positively or negatively to the overall quality of environments both built and natural and to human-environment relationships (Habraken and Teicher, 2000).

**Why humans build:** There is a clear cause-and-effect relationship between human purpose and the things they create. To help in understanding this relationship, it is useful to explore more specifically the nature of human needs, wants, and values. (Reekie, 1972)

**Human's needs theory:** Human needs are things all humans require for normal growth and development. These needs have been studied by psychologists and categorized in a number of ways. The work of psychologist Abraham Maslow studied human needs, motivation, and personality; he described these needs as being either biological or psychological. In 1954, Maslow published what has become known as Maslow's Hierarchy of Needs which remains valid today for understanding human motivation. According to Maslow, human needs are satisfied in order of importance. Once a need is satisfied, humans work to satisfy the next level of need. This underlines the fact that elements of the built environment do correspond, often directly, to expressions of human needs and wants.

Simon Hertnon (2005) proposes the Theory of Universal Human Needs based on just two needs: survival and betterment. Under survival needs he

identifies physical and mental well-being, respect from others, and self-esteem (all required for happiness) and a safe and healthy environment, logical reproductive practices, appreciation of life and doing good things all required for contentment (Danesh, 2011).

**Needs and wants:** What are the criteria that something has to be satisfied in order to be classified as a human need?

Since every human being is in some social environment or other, two criteria are used to designate something as a need (David Philips):

- If it is a necessary condition for a human being to exist, then it is a need.
- If it is a necessary condition for a society to exist over longer time, then it is a need.

For every need and want, there must be an adaptive response, an adaptive design strategy. The design response requires the use of material and energy resources and the combining of various components into some portion of the built environment. Recognizing that needs are generally more basic than wants helps to establish priorities in order to minimize costs, to reduce the use of finite resources, and to mediate human impacts on the environment (McClure, Bartuska, 2007).

**Human Values as Manifested in the Built Environment:** The built environment is an expression not only of human attempts to fulfill personal and societal needs and wants, but also of personal and collective values and aspirations. Values affect subjective attitudes, and many of these find expression in the built environment.

Life is a universal objective value. We might take this point for granted in architectural design, but we all have the life value or we would not be alive. Design matters because our lives are connected through our common built environment. When we invest in the built environment, we must consider the impact of design on the life of occupants and the places in which they are located. Building's cost and benefit analysis should also be expressed in terms of the life values and impact upon the life of occupiers, users and visitors.

**Sorting values:** In the era of fast changing technological advancements and changing scenario of functional requirements of built environment, still following different value types are to be considered by building professionals in all their decisions;

- a) **Human Values:** There is a need to practice inculcating values in architectural and interior design; all architects and interior designers should feel their social responsibility and must be instrumental in maintaining human values in our society because architecture is as well an expression of the strengths of the society as well as their technological progress. Humans value this art so much because it's a permanent expression of the society's values, desires, ways of thinking and ideals, ideology and many other things at a particular point of time.
- b) **Environmental Values:** The best route to approaching a sustainable future is to make the built environment in a way so that it has less or zero adverse impact on natural environment. Construction and operation phase of built

environment affect climate change by using natural resources and producing waste. Urban development is carried out in a sustainable manner can help us live within the limits of environmental resources and slow down demand for energy and materials through efficiency measures and recycling. These aspects can also have effect on life quality by constructing a well considered urban design with an ecological footprint. Considering environmental problems and addressing all associated challenges, is important to the planning, design, construction, and preservation of the built environment (Garg, 2017).

- c) Socio Economic & Cultural Values: The system or condition of living together as a community is based on VALUES, which are observed by all people collectively and regarded as constituting values of a community of related, interdependent likeminded people. Culture and value based creativity of built environment helps to promote well-being of all concerned, to promote healthy lifestyle among its members and to stimulate strength in communities as well as sustainability & cohesion in society.

In a society, where quality of life is determined by affordability of individuals, values are vanishing day by day. Public parks, streets, and centers are subject to transformation from open market space to indoor malls or shopping arcades to facilitate materialistic living at the cost of loosing life values in the society. Cultural and aesthetic values feature as strongly as economic, social and ecological values in understanding the importance of

heritage of a place and need of its conservation. If culture and heritage is lost, then values are lost and hence society or civilization may decline.

**The need for sustainable interior environments:** Humans need shelter, which is considered a basic human requirement. The concept is wider reaching than just investment in housing. It is also a need that, if fulfilled, helps to improve the living environment of humans.

Interior design is a profession that serves for the human habitation in the environment. In the context of human needs, there are many different dimensions and levels of satisfaction. The interior space can satisfy the need of security, or it can lead to a satisfaction level from security to self-esteem. Recent global debates focus on to a basic need that is to survive. Need of sustainable environment is an obligation rather than a will, in order to survive. This study aims to discuss the interior design elements in the dimension of sustainability. The practice of interior design is also considered in the context of sustainability.

**Sustainable development and the interior architectural design:** Sustainable development became a significant problem in international commissions. Especially, Bruntland Commission in 1987 declared a report about the leading items in sustainable development. The definition of need was redefined with this report as “sustainable development is first and foremost about ensuring that everybody-both in poor and rich countries, and today as well as in future generation scan have their basic needs meet. This must be obtained without jeopardizing the natural systems; on which life on

the earth is dependent. In European Union Countries, total 40% consumption of energy, 30% of CO<sub>2</sub> gas emission, and 40% of synthetic waste are produced in the construction industry. That means, the environmental design has a big role in the course of sustainable development. Moreover, 50% of natural material resources are used in the construction industry. From this perspective, there occurred the need of developing environmental assessment criteria for built environments (NUR AYALP).

Environmental assessment tools are methods to formalize a sustainable approach of the design. And then, explore how to make sustainable design choices about energy system and products. The role of these tools varies according to designers, owners, occupants' interests (Richard Hyde, Steve Watson, Wendy Cheshire, Mark Thomson, 2007). For example, it helps designers to develop project toward a minimal environmental impact; then, satisfy the financial aspects for owners and create comfort environment for occupants. Leadership in energy and environmental design (LEED) and Building Research Establishment's Environmental Assessment Method (BREEAM) are perhaps the best known and most widely used (Eman Ahmed Suliman, 2013). Pearl Rating Tool of Estidama of Abu Dhabi is the first tailored rating tool to the Middle East region. Its aim is to create more sustainable communities, cities and global enterprises and to balance the four pillars of sustainability: environmental, economic, cultural and social.

## CONCLUSION

As interior environment is the first and the closer place to fulfill human needs; the factors related to water conservation, energy efficiency, minimization of use of harmful materials, achieving thermal, visual and acoustic comfort are the most important aspects of sustainability in the context of interior design.

Sustainable interior design is defined as “interior design in which all systems and materials are designed with an emphasis on integration into a whole for the purpose of minimizing negative impacts on the environment and occupants and maximizing positive impacts on environmental, economic, social and cultural systems over the life cycle of a building” (NUR AYALP). Sustainability in designing interior spaces is important as sustainability in designing and constructing buildings and communities. This led the study to suggest a strategy of an Interior Design Pearl Rating Tool for Estidama.

### **Suggesting a strategy of an Interior Design Pearl Rating Tool for Estidama:**

The components of the suggested Interior Design Pearl Rating Tool for Estidama are:

- Ten rating categories which in turn contain sub categories.
- Credit points which will be awarded based upon criteria given and in some cases a category will have one or more minimum requirements without obtainable points; it will be referred to by the letter R.



**Layout of each category:**

- Strategies and objectives for each category
- Introducing each category and its importance and impact
- Criteria for the requirements of each category and sub category

**Categories of the Interior Design Pearl Rating Tool of Estidama:**

Precious Water is becoming an increasingly rare natural resource. Green buildings aim to develop systems to minimize the consumption and pollution of this resource. Interior designers are responsible for isolating heat water pipes if it wasn't isolated yet, installing water efficient products and appliances.

**Objectives of the category:** Reducing the requirement for large-scale water and sanitation infrastructure that consumes energy and can be highly wasteful.

**Strategies to be considered:**

- To encourage the selection of water efficient products and appliances
- To pay attention to heat pipe insulation

**Table (1):** Precious water maximum credit points

PW	Precious Water	Maximum Credit Points
PW-R1	Water meter	R
PW-1	Water efficient fixtures and appliances	<input type="checkbox"/>
PW-1.1	Low flush toilets	<input type="checkbox"/>
PW-1.2	Low flow shower heads	<input type="checkbox"/>
PW-1.3	Efficient bathroom taps	<input type="checkbox"/>
PW-1.4	Efficient bidet	<input type="checkbox"/>
PW-1.5	Efficient urinals	<input type="checkbox"/>
PW-1.6	Efficient sink faucet	<input type="checkbox"/>
PW-1.7	Water efficient appliances	<input type="checkbox"/>
PW-1.8	Water efficient heaters	<input type="checkbox"/>
	Total	<input type="checkbox"/>

**Efficient energy use:** sometimes simply called energy efficiency, is the goal to reduce the amount of energy used indoors. Improvements in energy efficiency are generally achieved by adopting a more efficient technology or production process or by application of commonly accepted methods to reduce energy losses.

Objectives of the category: Increasing energy efficiency is the objective in order to reduce the amount of energy required indoors.

**Strategies to be considered:**

- To encourage energy monitoring,
- selecting energy efficient products and appliances
- To pay attention to lighting strategies
- Using renewable energy sources

**Table (2):** Resourceful energy maximum credit points

RE	Resourceful Energy	Maximum Credit Points
RE-R1	Energy monitoring	R
RE-1	Energy efficient lamps and sustainable electrical installations	<input type="checkbox"/>
RE-2	Dimmer switches	<input type="checkbox"/>
RE-3	Power strips	<input type="checkbox"/>
RE-4	Adaptable lighting for multiuse spaces	<input type="checkbox"/>
RE-5	Visual comfort and effective lighting for different interior spaces	<input type="checkbox"/>
RE-6	Effective window sizing and orientation for day lighting and ventilation	<input type="checkbox"/>
RE-7	Energy efficient windows for day lighting	<input type="checkbox"/>
RE-8	Energy saving blinds and shades	<input type="checkbox"/>
RE-9	Optimize energy performance for air conditioning and HVAC systems with minimum energy consumption	<input type="checkbox"/>
RE-10	Energy efficient appliances	<input type="checkbox"/>
RE-11	Renewable energy sources	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Finishing materials are used to improve the service and decorative qualities of buildings and structures, as well as to protect structural members from atmospheric and other effects. The main finishing materials in modern construction include finishing mortars and concretes; natural and artificial masonry materials; decorative ceramics; materials and items made from wood, paper, glass, plastic, metals, paints and varnishes.

Objectives of the category: is selecting sustainable finishing materials, decreasing the consumption of raw materials and decreasing material waste in landfills.

**Strategies to be considered:**

- To encourage design strategies that reduce raw material consumption
- selecting non-hazardous, non- polluting materials
- To pay attention to different waste management strategies

**Table (3):** Finishing materials maximum credit points

FM	Finishing Materials: Ceilings, walls and floors	Maximum Credit Points
FM-R1	Hazardous Materials Elimination	R
FM-R2	Basic Waste Management	R
FM-1	Non-Polluting Materials	<input type="checkbox"/>
FM-2	Design for Materials Reduction	<input type="checkbox"/>
FM-3	Design for Flexibility & Adaptability	<input type="checkbox"/>
FM-4	Design for Disassembly	<input type="checkbox"/>
FM-5	Modular Flooring Systems	<input type="checkbox"/>
FM-6	Design for Durability	<input type="checkbox"/>
FM-7	Material Reuse	<input type="checkbox"/>
FM-8	Regional Materials	<input type="checkbox"/>
FM-9	Recycled Materials	<input type="checkbox"/>
FM-10	Rapidly Renewable Materials	<input type="checkbox"/>
FM-11	Reused or Certified Timber	<input type="checkbox"/>
FM-12	Improved Waste Management	<input type="checkbox"/>
FM-13	Organic Waste Management	<input type="checkbox"/>
	TOTAL	<input type="checkbox"/>

Sustainable furniture is an effort to address the environmental impact of furniture products on the environment by considering all aspects of the design and manufacturing process. Design considerations can include using recycled materials in the manufacturing process and using products that can be disassembled and recycled after their useful life.

Objectives of the category: is selecting sustainable furniture.

Strategies to be considered:

- To encourage selecting furniture manufactured with certified materials
- Selecting reused or recycled furniture
- To pay attention to hazardous polluting upholstery and fabrics

**Table (4):** Sustainable furniture maximum credit points

SF	Sustainable Furniture	Maximum Credit Points
SF-R1	Materials durability	R
SF-1	The Forest Stewardship Council certified wood	<input type="checkbox"/>
SF-2	Furniture from recycled raw materials	<input type="checkbox"/>
SF-3	Reused old furniture	<input type="checkbox"/>
SF-4	Recycled waste furniture	<input type="checkbox"/>
SF-5	Nonhazardous upholstery and fabrics	<input type="checkbox"/>
SF-6	Furniture sizing and ergonomics	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Indoor air quality (IAQ) is the air quality within interior spaces. IAQ is known to affect the health, comfort and well-being of building occupants.

**Objectives of the category:** is achieving air quality within interior spaces that affect the health, comfort and well-being of building occupants.

**Strategies to be considered:**

- To encourage air quality monitoring system
- Good ventilation strategies
- To pay attention to material data sheets and certifications for finishing materials

**Table (5):** indoor air quality maximum credit points

IAQ	Indoor air quality	Max. Credit Points
IAQ-R1	Air quality monitoring system	R
IAQ-1	Material Safety Data Sheets and certifications for finishing materials	<input type="checkbox"/>
IAQ-1.1	CRI IAQ Green Label Plus certified rugs & vacuum cleaners	<input type="checkbox"/>
IAQ-1.2	FloorScore IAQ certified resilient floorings	<input type="checkbox"/>
IAQ-1.3	Formaldehyde-free acoustical ceiling and wall systems	<input type="checkbox"/>
IAQ-1.4	Least toxic, formaldehyde-free paint	<input type="checkbox"/>
IAQ-1.5	least toxic/lowest VOC adhesives and sealants	<input type="checkbox"/>
IAQ-1.6	Hardwood Plywood Manufacturers' Association certified engineered wood products	<input type="checkbox"/>
IAQ-2	Installation sequencing	<input type="checkbox"/>
IAQ-3	Materials Encapsulation	<input type="checkbox"/>
IAQ-4	Materials Minimization	<input type="checkbox"/>
IAQ-5	Ventilation	<input type="checkbox"/>
IAQ-6	Air cleaning devices	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Thermal comfort is the condition of mind that expresses satisfaction with the thermal environment and is assessed by subjective evaluation.

**Objectives of the category:** is achieving occupants' condition of mind that expresses satisfaction with the thermal environment.

**Strategies to be considered:**

- To encourage surface insulation
- Good ventilation strategies
- To pay attention to shading strategies

**Table (6):** Thermal comfort maximum credit points

TC	Thermal comfort	Maximum Credit Points
TC-R1	Surface insulation	R
TC-1	Shading strategies	<input type="checkbox"/>
TC-2	Ventilation strategy	<input type="checkbox"/>
TC-3	Operable windows	<input type="checkbox"/>
TC-4	Window glazing	<input type="checkbox"/>
TC-5	HVAC, fans	<input type="checkbox"/>
TC-6	Humidifiers, dehumidifiers	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Visual comfort is also an important factor that involves the provision of natural light, external view/s, reduction of glare and so on. To ensure occupant controls are considered at the design stage to ensure best practice in visual performance and comfort for building occupants.

**Objectives of the category:** is achieving occupants' condition of mind that expresses satisfaction with the visual environment.

**Strategies to be considered:**

- To encourage natural daylighting
- To eliminate glare
- To pay attention to indoor aesthetics and quality views

**Table (7):** Visual comfort maximum credit points

VC	Visual Comfort	Maximum Credit Points
LC-R1	Natural daylight	R
LC-1	Electric lighting strategy	<input type="checkbox"/>
LC-2	Glare control	<input type="checkbox"/>
LC-3	Visually appealing indoor and outdoor environment	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Acoustic comfort is the science of controlling a room's surfaces based on sound absorbing and reflecting properties. Sufficient control ensures space functionality and is often required based on building use and local municipal codes.

**Objectives of the category:** is achieving occupants' condition of mind that expresses satisfaction with the acoustic environment.

**Strategies to be considered:**

- To encourage acoustic insulation
- To take care of the location of interior spaces
- To use white noise masking techniques when needed

**Table (8):** Acoustic comfort maximum credit points

AC	Acoustic comfort	Maximum Credit Points
AC-R1	location of interior spaces	R
AC-1	Specify quiet HVAC equipment	<input type="checkbox"/>
AC-2	Building Green-Approved Acoustic Insulation	<input type="checkbox"/>
AC-3	Sufficient sound-absorptive finishes	<input type="checkbox"/>
AC-4	Window glazing	<input type="checkbox"/>
AC-5	White noise masking techniques	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Biophilic Design: is an innovative way of designing the places where we live, work, and learn. We need nature in a deep and fundamental fashion, but we have often designed our cities and suburbs in ways that both degrade the environment and alienate us from nature. The recent trend in green architecture has decreased the environmental impact of the built environment,



but it has accomplished little in the way of reconnecting us to the natural world, the missing piece in the puzzle of sustainable development.

**Objectives of the category:** Satisfying the human need for contact with nature in the modern built environment.

**Strategies to be considered:**

- To encourage nature in the space strategy,
- Natural analogues strategy,
- Nature of the space strategy.

**Table (9):** Biophilic design maximum credit points

BD	Biophilic design	Max. Credit Points
BD-R1	Visual Connection with Nature	R
BD-1	Non-Visual Connection with Nature	<input type="checkbox"/>
BD-2	Non-Rhythmic Sensory Stimuli	<input type="checkbox"/>
BD-3	Thermal & Airflow Variability	<input type="checkbox"/>
BD-4	Presence of Water	<input type="checkbox"/>
BD-5	Dynamic & Diffuse Light	<input type="checkbox"/>
BD-6	Connection with Natural Systems	<input type="checkbox"/>
BD-7	Biomorphic Forms & Patterns	<input type="checkbox"/>
BD-8	Material Connection with Nature	<input type="checkbox"/>
BD-9	Complexity & Order	<input type="checkbox"/>
BD-10	Prospect	<input type="checkbox"/>
BD-11	Refuge	<input type="checkbox"/>
BD-12	Mystery	<input type="checkbox"/>
BD-13	Risk/Peril	<input type="checkbox"/>
	Total	<input type="checkbox"/>

Innovative practices deliver genuinely innovative features. This requires a design process that embraces innovation and creativity whilst respecting and responding to the cultural identity of the region.

**Objectives of the category:** Preservation of the society's culture through innovative practices, using biomimicry as a tool for learning from the environment in order to achieve sustainable technologies

**Strategies to be considered:**

- Learn about the sustainable and bioclimatic architectural heritage of the society
- putting an eye on the living organisms to learn how to solve sustainable problems

**Table (10):** Innovating practice maximum credit points

IP	Innovating practice	Maximum Credit Points
IP-R	Innovative Cultural & Regional Practices	R
IP-1	Innovating Practice	□
IP-2	Biomimicry	□
	Total	□

**Conclusion for the suggested pearl interior design tool of Estidama:**

The application of the suggested rating tool ensures the sustainable interior space and biophilic design goals by:

- Minimizing domestic water use through proper selection of plumbing fixtures and equipment while conserving water quality and availability.
- Efficient design strategies, natural and electrical light distribution systems and efficient appliances that reduce energy consumption.

- Selecting non- hazardous, low emitting, reused, recycled, regional and rapidly renewable finishing materials that conserve earth's resources and occupant's health.
- Using biophilic design strategies including nature in the space, natural analogues and Nature of the space to encourage the relationship between occupants and nature.

### **RECOMMENDATION**

- Raising the awareness of interior designers and architects about the goals of sustainability.
- Raising their awareness about health, safety and welfare of the interior occupants.
- Introducing the study of rating systems within the curriculum of universities and scientific institutions.

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## تحقيق الاحتياجات الإنسانية من خلال تصميم مقاييس معياري للتصميم الداخلي المستدام

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### المستخلص

تهدف الدراسة لتوجيه سلوك المصمم الداخلي نحو التصميم المستدام من خلال اقتراح استراتيجية لأداة لتقييم أداء التصميم الداخلي المستدام. أداة التقييم الخاصة باستدامة التابعة لحكومة أبوظبي هي الأولى من نوعها في الشرق الأوسط وتهدف الى خلق المزيد من المجتمعات والمدن المستدامة للموازنة بين الأربعة عناصر الخاصة بالاستدامة: البيئة، الاقتصاد، الثقافة، والمجتمع. بما أن الاستدامة في التصميم الداخلي لا تقل في الأهمية عنها في تصميم وانشاء الأبنية والمجتمعات العمرانية؛ اقترحت الدراسة استراتيجية للأداة لتقييم التصميم الداخلي للاحاقها باداة استدامة الخاصة بأبوظبي. تتضمن عشرة مقاييس للتصميم الداخلي المستدام مع استراتيجيات على المصمم تحقيقها حتى يستطيع المصمم الموازنة بين الأربعة عناصر الخاصة بالاستدامة. بالاضافة لمجموع الدرجات الذي عليه تحصيله من خلال تحقيق الاحتياجات والقيم الانسانية في البيئة المبنية، ليتم تقييم مشروعه من حكومة أبوظبي. وقد صممت الاستراتيجية لتقديمها للمصممين قبل البدء في المشروع حتى يتسنى لهم تقييمه.

**الكلمات المفتاحية:** التصميم المستدام، الاحتياجات الانسانية، أداة لتقييم التصميم الداخلي.