

Transformative interior architecture to create functionally and environmentally sustainable educational spaces

Mohamed Sayed Soliman

Professor of Interior Architecture, Department of Decoration, Faculty of Fine Arts, Helwan University
Artgirl_192@yahoo.com

Samah Salah El-Din Ali

Lecturer in the Department of Decoration, Interior Architecture, Faculty of Fine Arts, Helwan University
Comfortzone192@gmail.com

Alaa Youssef Mohamed Youssef

Assistant Lecturer in the Department of Interior Design and Furniture, Higher Institute of Applied Arts in the Fifth Settlement, Artgirl192@gmail.com

Abstract:

Educational spaces are considered one of the most important environments that directly affect the learning and creativity process of students. With the rapid development of technology and changing educational needs, it has become necessary to think about designing these spaces in ways that ensure flexibility and sustainability in the long term. Here comes the importance of combining transformative and sustainable interior architecture. Transformable interior architecture allows the possibility of modifying and reconfiguring educational spaces easily to meet different and changing needs, which helps in providing a flexible and multi-use educational environment. This type of design can include the use of adjustable furniture, movable walls, and clever storage solutions, allowing the educational space to quickly transform from a traditional classroom into a group work space or hands-on laboratory. Sustainable architecture, on the other hand, focuses on using resources effectively and reducing negative environmental impacts. This includes using environmentally friendly building materials, energy-saving technologies, and systems to improve indoor air quality. This approach contributes to creating a healthy and safe educational environment, and also enhances environmental awareness among students and teachers. Combining these two approaches to educational space design achieves an ideal balance between flexibility and cost-effectiveness, improves the quality of the educational environment, and enhances the sustainability of environmental and social resources. This approach is essential to keep pace with rapid changes in education and to provide stimulating and sustainable learning environments for future generations. Educational spaces are among the most important environments that directly affect the learning and creativity processes of students. With the rapid development of technology and changing educational needs, it has become necessary to think about designing these spaces in ways that ensure flexibility and long-term sustainability. This is where the importance of combining transformable and sustainable interior architecture comes in. Transformable interior architecture allows educational spaces to be easily modified and reconfigured to meet different and changing needs, helping to provide a flexible and multi-use educational environment. This type of design can include the use of adjustable furniture, movable walls, and smart storage solutions, allowing the educational space to quickly transform from a traditional classroom to a group work space or a practical laboratory. On the other hand, sustainable architecture focuses on using resources efficiently and reducing negative environmental impacts. This includes the use of environmentally friendly building materials, energy-saving technologies, and systems to improve indoor air quality. This approach contributes to creating a healthy and safe educational environment and enhances environmental awareness among students and teachers. Combining these two approaches in the design of educational spaces achieves an ideal balance between flexibility and cost-effectiveness, improves the quality of the educational environment, and enhances the sustainability of environmental and social resources. This approach is essential to keep pace with rapid changes in the field of education and to provide stimulating and sustainable learning environments for future generations.

Research Problem: 1. The lack of adaptation of educational spaces, whether functionally to the changes that occur in educational curricula and learning methods, which makes the space unsuitable for the user's various requirements, or environmentally with climate and environmental changes, which increases energy consumption. 2. The design of the interior architecture of educational spaces also faces a shortage of resources in terms of energy and materials used to achieve sustainability, so that the educational space is the first teacher for students about the importance of preserving the environment.

Research Objectives: 1. Adapting the emerging systems from which the transformative interior architecture emerged and linking them to the design of the interior architecture of educational spaces to create functionally and environmentally adaptable educational spaces. 2. The study aims to integrate sustainable and transformative interior architecture to solve the environmental and functional problems of educational interior spaces. 3. To enable the designer to use transformative interior architecture to address the formation and design of interior spaces and solve the various design problems that the user may face.

Importance of the research: The importance of the research lies in monitoring the positive aspects of transformative interior architecture when combined with sustainable interior architecture in developing educational interior spaces and how to benefit from them in developing appropriate future visions for educational spaces to be environmentally adaptable,

environmentally friendly, energy-saving, and functionally adaptable, meeting the needs of the user and improving his experience.

Research methodology: The research follows the descriptive analytical approach, where the transformative and sustainable interior architecture is described, as well as exposure to global experimental applied models and analyzing them in systematic scientific ways in order to reach an environmentally and functionally sustainable educational interior environment.

Outcomes: 1. Increased flexibility of learning spaces: • Transformable learning spaces can easily meet multiple and changing needs, enhancing space efficiency. • Facilitating rapid transitions between different learning activities, such as traditional classrooms, group work areas, and practical laboratories.

2. Improved quality of the learning environment: • Using environmentally friendly building materials improves indoor air quality and creates a healthy and safe environment for students and teachers.

• Enhanced visual and functional comfort, increasing student focus and productivity.

3. Reducing operational and environmental costs: • Reducing energy and water consumption through the application of sustainable building techniques, leading to lower operational costs.

• Reducing the need for frequent renovations thanks to flexible and sustainable designs that last.

4. Enhanced environmental and social awareness:

• Providing students with a practical example of the importance of sustainability and flexibility in design, enhancing their environmental and social awareness.

• Supporting the local community through the use of local materials and community participation in the design and construction processes.

Keywords :

Sustainable design, Sustainable design, Transformative interior architecture

References :

- 1- Collins, A. (2006). How society can foster self-directed learning. *Human Development*, 49(4), p 225.
- 2- M. A. A. Mohamed, and H. E. A. Elfadle, 2013, Transformable Architecture, A key to Improve stadiums & sports buildings. In *The First International Engineering Conference Hosting Major International Events Innovation, Creativity and Impact Assessment*. Housing & Building National Research Center, Cairo (pp. 15-18).
- 3- S. Durmus, 2012, Change and Transformation in Architecture: On the Concept of Zeitgeist. *Global Built Environment Review*, 8(1), 23-36.
- 4- <https://www.yatzer.com/mathieu-lehanneur-laboratoire>
- 5- <https://arcdog.com/portfolio/sdu-university-of-southern-denmark-campus-kolding/>
- 6- <https://www.archdaily.com/590576/sdu-campus-kolding-henning-larsen-architects>

Paper History :

Paper received July 24, 2024, Accepted September 27, 2024, Published on line November 1, 2024