

Applying sustainability standard in the interior design of a center for developing the skills of gifted children in Aswan

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Abstract

This research explores the establishment of specialized centers for the development of gifted children in Aswan, focusing on achieving sustainability standards in interior design. The study aims to identify the best strategies to improve educational opportunities for gifted children while ensuring that the learning environment is both stimulating and sustainable. By examining previous literature and analyzing current experiences in Aswan, the research will provide valuable insights into the challenges faced by these children and propose innovative solutions for creating an optimal educational setting.

A key aspect of this study is the integration of sustainability principles in the interior design of such centers, ensuring that they are environmentally friendly, energy-efficient, and conducive to the cognitive and creative development of gifted children. The research relies on observations, the collection and analysis of data and draw conclusions, That's for providing a comprehensive understanding of the current conditions and potential improvements.

This research aims to Support gifted children in Aswan and enabling them to achieve their full potential In addition to Providing practical solutions to reduce the educational gap.

The results will highlight the importance of applying sustainable design, selecting sustainable materials and flexible spatial planning, to enhance the functionality and aesthetics of these centers. In addition, the study will discuss the role of advanced technology and smart design solutions in enhancing interactive and engaging learning environments , in order to preserve the skills of talented children, and and bridge the educational gap in that region.

Keywords

Gifted Children,
interior design,
Talent Development,
sustainability, Gifted
Development
Centers

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Introduction:

In light of global trends toward sustainable development, sustainable interior design has become a fundamental pillar in developing educational and training environments, especially those targeting gifted children. Children are the true wealth of societies, and developing their abilities and skills is an investment in a bright and sustainable future. This comes within the framework of countries' efforts to achieve the Sustainable Development Goals, which focus on providing safe, healthy, and stimulating environments for learning and creativity. In Aswan Governorate, characterized by its rich heritage and environmental diversity, there is a growing need to establish children's skill development centers based on sustainability principles.

The design of children's skill development centers in Aswan according to sustainability standards is not limited to the use of environmentally friendly building materials, but extends to include functional and aesthetic aspects that directly impact the children's experience within these centers. Sustainability in interior design means providing flexible, dynamic, and interactive environments that enhance children's ability to innovate and learn through simulation and direct experience. Employing natural elements, such as natural lighting, good ventilation, and locally available environmentally friendly materials, contributes to creating a comfortable and healthy environment that supports children's mental and physical development.

Furthermore, incorporating smart technology into

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the design of these centers can enhance the learning experience by providing multi-use spaces that can be adapted to the needs of different activities. For example, interactive areas using augmented and virtual reality technologies can be designed to help children explore new concepts in innovative ways. Furthermore, applying biophilic design principles, which aim to integrate natural elements into interior spaces, helps improve children's psychological well-being and stimulate their creativity by providing a calm and comfortable environment. From an economic perspective, adopting sustainable design strategies contributes to reducing resource and energy consumption, which positively impacts the center's long-term operational costs. The use of renewable energy sources, such as solar power, and the recycling of materials contribute to reducing the environmental impact and achieving economic efficiency for the project. This achieves the concept of comprehensive sustainability, which is not limited to environmental conservation but also includes promoting economic and social growth by creating educational environments conducive to gifted children.

This research aims to examine how to apply sustainability standards in the interior design of a children's skills development center in Aswan. This research analyzes the most important environmental and climatic factors that must be taken into account, and examines design patterns that contribute to improving children's educational and motivational performance. The research also highlights the importance of using sustainable materials and the impact of interactive design on skill development, while presenting proposed design models that are compatible with the local environment of Aswan.

Achieving sustainability in the design of these centers not only contributes to preserving natural resources and reducing environmental impact, but also helps create more stimulating environments for children, enhancing their creative potential and preparing them to become future leaders. Therefore, this research seeks to provide innovative and sustainable design solutions that meet the needs of gifted children in Aswan. (Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. *Journal of Design Sciences and Applied Arts*, 3(1), 275-283

Problem statement:

The research problem is the lack of gifted development centers in Aswan and the exposure of gifted children in this areas to major challenges that prevent them from developing their skills and potential effectively, which leads to the waste of this talent.

Importance of research:

- 1- Supporting gifted children in Aswan and enabling them to achieve their full potential.
- 2- Providing practical solutions to reduce the educational gap and develop gifted human cadres

Research Objective:

This research aims to study the possibility of establishing a center for the development of gifted children in Aswan, and to develop strategies and mechanisms through which these children can be supported and an appropriate environment can be provided to develop their abilities.

Reasons for choosing this research:

- 1- The need to enhance the capabilities of gifted children in Aswan.
- 2- improving the environment for talent development in that area

Research hypotheses:

- 1- Establishing gifted development centers in Aswan will improve the capabilities of gifted children and increase their future opportunities.
- 2- Providing social and educational support to gifted children in that area can enhance their creativity and achieve future successes.

Research methodology:

Descriptive analytical approach: to analyze the current situation of gifted centers in Aswan and study the methods followed in some existing centers

Research steps:

- 1- The importance of sustainability in interior design.
- 2- The impact of sustainable design on the environment and society.
- 3- Psychological and architectural foundations for designing environments for gifted children.
- 4- Characteristics of gifted children in Aswan.
- 5- The impact of the physical and technological environment on creativity and learning.
- 6- A case study of a gifted children's care center in Egypt.
- 7- Proposed designs of an interior space for implementing the standard.
- 8- Conclusion, results and recommendations.

The concept of sustainability in interior design:

Sustainability in interior design is an approach to creating environmentally friendly interior spaces that balance economic, social, and environmental aspects, while conserving natural resources and minimizing negative environmental impact. This

concept relies on the use of sustainable materials, improved energy efficiency, and the creation of healthy and comfortable environments that support the long-term well-being of users. (Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. Journal of Architecture, Arts and Humanities, 7(33), 515-527.)

The primary goal of sustainability in interior design:

The primary goal of sustainability in interior design is to provide environmentally friendly indoor environments that reduce the consumption of resources such as energy and water, and enhance the quality of life within residential, commercial, educational, and other spaces. This is achieved by selecting materials and technologies that are environmentally friendly. (Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. Journal of Architecture, Arts and Humanities, 7(33), 515-527)

Foundations of Sustainability in Interior Design:

Sustainability standards in interior design rely on several aspects aimed at achieving energy efficiency, responsible use of resources, and improving indoor environmental quality, contributing to the creation of more comfortable and environmentally friendly spaces. This includes maximizing natural light through large windows and transparent ceilings, which reduces reliance on artificial lighting and enhances a sense of comfort. LED lights and smart lighting and air conditioning control systems are also used, contributing to reducing energy consumption and improving operational efficiency, along with the use of motion sensors to automatically adjust lighting when

Symbols & Motifs:

The importance of sustainability in interior design:

N	WHAT	HOW
1	Reducing environmental impact	Reducing resource consumption and carbon emissions
2	Achieving economic sustainability	Reducing energy consumption and lowering building operating costs
3	Promoting user health	improving indoor air quality and reducing the use of harmful materials
4	Providing flexible environments	Redesigning interior spaces according to changing needs

Figure1, Proposed design for one of the spaces in the center

(Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. Journal of Architecture, Arts and Humanities, 7(33), 515-527.)

needed.

The selection of sustainable materials is crucial to promoting sustainability. Recycled wood, natural stones, and low-VOC paints are preferred to maintain indoor air quality and reduce adverse effects on occupants' health. Natural ventilation systems also contribute to improving fresh air flow, helping to create a healthier indoor environment. Soundproofing materials are also used to reduce noise pollution, improving productivity in indoor spaces.

On the other hand, effective water management plays a key role in achieving sustainability. Techniques such as graywater recycling and low-flow faucets are adopted, reducing water waste and conserving natural resources. Additionally, natural elements such as indoor plants and green walls are incorporated to create calming environments that mimic nature, contributing to improved mental health and a sense of relaxation.

Biophilic design plays a key role in fostering a connection with nature by incorporating natural elements such as natural light, running water, and green spaces, creating environments that stimulate creativity and focus. Finally, flexibility and adaptability are key factors in interior design sustainability, as spaces are designed to be reconfigured and reused according to future user needs. (Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. Journal of Architecture, Arts and Humanities, 7(33), 515-527)

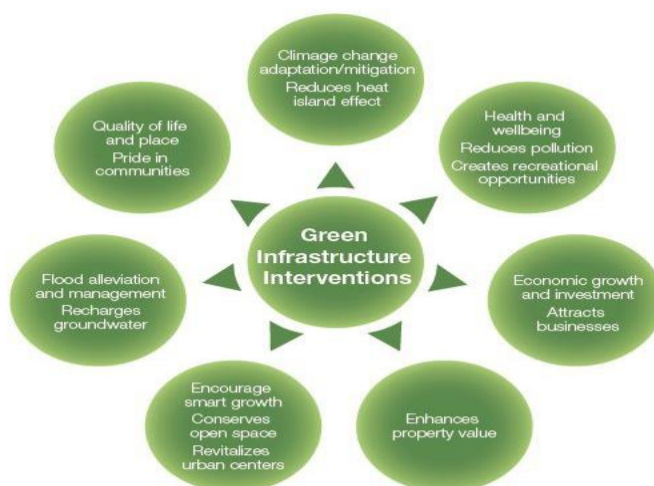


Figure2, Proposed design for one of the spaces in the center
Discuss in detail the climate Green infrastructure benefits Ccssprepforum,
<https://images.app.goo.gl/rcmNyAqjU4KwgqS6>, (2023).

Green infrastructure plays a vital role in promoting environmental sustainability by reducing the negative impacts of human activity on the ecosystem. It relies on integrating natural elements with urban planning to achieve a balance between urban development and environmental conservation. This infrastructure contributes to improving air quality by increasing green spaces, which helps absorb carbon dioxide and produce oxygen, as well as reducing the urban heat island effect by lowering temperatures in cities. It also enhances water resource management through techniques such as green roofs, rain gardens, and permeable infrastructure, reducing the risk of flooding and improving groundwater quality. Furthermore, green infrastructure supports biodiversity by providing natural habitats for wildlife within urban areas, thus maintaining ecological balance. It also contributes to reducing noise and visual pollution, creating a more comfortable and healthier living environment for residents. Thanks to its ability to promote sustainability and reduce reliance on traditional industrial systems, green infrastructure is an effective approach to building more resilient cities that are more adaptable to climate change, ensuring a sustainable environment for future generations. (Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. *Journal of Architecture, Arts and Humanities*, 7(33), 515-527)

The impact of sustainable design on the environment:

Sustainable design contributes to reducing the consumption of natural resources by using recycled or biodegradable materials. This reduces the depletion of wood, minerals, and water, and helps reduce the need to extract new resources, thus

easing pressure on the environment. It also encourages the use of local building materials, which reduces the carbon footprint resulting from transportation and shipping operations and boosts local economies by supporting sustainable industries. Additionally, sustainable design plays an important role in reducing environmental pollution by reducing carbon dioxide emissions. It relies on effective thermal insulation systems that reduce the need for heating and cooling, as well as employing solar energy and other renewable energy technologies that reduce reliance on fossil fuels.

In addition, sustainable design promotes effective waste management by reducing waste generated during construction and finishing processes, encouraging the recycling and reuse of materials rather than disposal. It also supports the use of compostable and reusable products, such as furniture made from sustainable materials, which reduces waste and prolongs the lifespan of products, thus limiting their environmental impact. Operationally, sustainable design contributes to improving energy efficiency by enhancing the use of natural light through the thoughtful design of windows and architectural openings, reducing the need for artificial lighting during the day. Smart energy control systems, such as lighting and air conditioning that operate based on motion and temperature sensors, are also incorporated, reducing energy waste. (Youssef, B. M., & Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. *Journal of Architecture, Arts and Humanities*, 7(33), 515-527)

The impact of sustainable design on the society:

Sustainable design contributes to improving quality of life and public health by creating comfortable and healthy indoor environments that promote

natural ventilation and improve air quality, reducing health problems associated with indoor air pollution, such as allergies and respiratory diseases. Relying on natural lighting instead of artificial lighting also contributes to reducing visual stress, improving mood, and increasing productivity, especially in workplaces and educational spaces. Additionally, sustainable design reduces noise pollution through the use of soundproofing materials.

On the social level, sustainable design enhances community interaction by providing open green spaces and public parks that encourage communication and interaction between individuals, contributing to building more cohesive communities. Designing buildings and community centers according to sustainability principles also fosters a sense of belonging and creates more attractive urban environments, improving the quality of life in cities and urban areas. Economically, sustainable design helps reduce building operation and maintenance costs by relying on renewable energy systems.(Youssef, B. M., and Abdelrahman, D. (2022). Green Nanomaterials - Innovation in Interior Design, a New Era of Sustainability. Journal of Architecture,

Arts, and Humanities, 7(33), 515-527)

Sustainable development is an integrated approach that aims to achieve a balance between economic growth, environmental conservation, and the promotion of social justice, ensuring that the needs of present generations are met without compromising the ability of future generations to meet their own needs. Sustainable development is based on fundamental principles, including the responsible use of natural resources, reducing pollution, and promoting renewable energy, along with improving quality of life through healthy environments, quality education, and equitable economic opportunities. It also links to achieving the Sustainable Development Goals (SDGs) set by the United Nations, which seek to eradicate poverty, ensure food security, and promote inclusive economic growth while preserving biodiversity and addressing climate change. By adopting sustainable policies across various sectors.(Youssef, B. M., and Abdelrahman, D. (2022). Green Nanomaterials - Innovation in Interior Design, a New Era of Sustainability. Journal of Architecture, Arts, and Humanities, 7(33), 515-527)



Figure3, Proposed design for one of the spaces in the center

sustainable development, Researchgate, <https://images.app.goo.gl/a99g5CrWmgtBBK4h6>, (2020).

Sustainable development plays a pivotal role in achieving a balance between environmental, economic, and social dimensions, contributing to a more stable and prosperous future. Environmentally, sustainable development protects natural resources from depletion and enhances their efficient use through renewable energy technologies, waste management, and pollution reduction, thus preserving biodiversity and improving air and water quality. Economically, implementing sustainability principles enhances production efficiency and reduces long-term costs. Investments in the green economy encourage the

creation of new job opportunities in areas such as clean energy, recycling, and sustainable agriculture, contributing to sustainable economic growth. Socially, sustainable development contributes to improving quality of life by providing healthy environments, promoting social justice by reducing economic gaps, and ensuring universal access to basic resources such as clean water, education, and healthcare. Thus, sustainable development is not just an option; it is a necessity to ensure that the needs of the present are met without compromising the rights of future generations to live in a balanced and prosperous environment.(Youssef, B. M., &

Abdel Rahman, D. (2022). Green Nano Materials – Innovation in Interior Design, A New Era of Sustainability. Journal of Architecture, Arts and Humanities, 7(33), 515-527)

Psychological foundations for designing environments for gifted children:

P Psychological factors play a key role in designing environments for gifted children. These environments should foster creativity, focus, and independence, while providing a stimulating atmosphere that helps develop their unique skills and sharpen their intellectual abilities. Gifted children need spaces that encourage critical thinking and experimentation, requiring open and flexible designs that allow them the freedom to explore and interact with their environment without constraints that limit their creativity. Diversifying learning styles and spaces for different activities helps meet their varying needs, whether they prefer working individually or collaborating in groups.

Colors, lighting, texture, and other design elements directly impact their psychological state and behavior and must therefore be carefully chosen. Warm colors, such as yellow and orange, stimulate activity and innovation, while cool colors, such as blue and green, promote a sense of focus and relaxation, helping them achieve psychological balance. Furthermore, the environment should include special corners that provide children with a sense of security and psychological comfort, with the possibility of customizing them according to their individual needs. This contributes to improving their educational experience.(Hassan, S., & Fikry, D. (2021). The impact of interior design of the educational environment on children's creative skills. Journal of Design Sciences and Applied Arts, 1(5), 18-39)

N	WHAT	HOW
1	Stimulating creativity and critical thinking	<p>The environment should contain elements that stimulate the imagination, such as bright colors, unconventional designs, and open spaces that encourage collaboration and interaction.</p> <p>Variable and reconfigurable spaces can be used to foster creativity, such as multi-use rooms that can be customized for activities.</p>
2	Support focus and reduce distractions	<p>Gifted children need environments that provide them with high concentration, so noise should be minimized and soundproofed, especially in study and deep thinking areas.</p> <p>This can be achieved by using comfortable furniture, natural lighting, and calm colors that help improve concentration.</p>
3	Promote independence and exploration	<p>Gifted children like to explore solutions on their own, so the environment should provide opportunities for exploration and self-learning through interactive educational tools and equipment.</p> <p>Smart screens, interactive whiteboards, and spaces for science experiments can be included to help them develop research and discovery skills.</p>
4	Sensory diversity and motor integration	<p>Interior design should include interactive elements that integrate different senses, such as sensory toys, multi-textured designs, and dynamic lighting that changes according to activity.</p> <p>Encouraging movement and physical activity through wide spaces and corners designed for motor interaction, which contributes to enhancing children's sensory and motor balance.</p>
5	Enhancing feelings of psychological comfort and security	<p>Psychological security plays an important role in enhancing children's self-confidence, so the design should be comfortable and supportive, using calming colors such as green and blue.</p> <p>This can be achieved by designing circular spaces that reduce stress and providing special corners for rest and relaxation, providing children with a safe and psychologically balanced environment.</p>

Figure4, Psychological foundations for designing environments for gifted children

(Hassan, S., & Fikry, D. (2021). The impact of interior design of the educational environment on children's creative skills. Journal of Design Sciences and Applied Arts, 1(5), 18-39)

Architectural foundations for designing environments for gifted children:

D Designing architectural environments for gifted children requires an innovative approach that

combines sustainability, interactivity, and flexibility, while also addressing their intellectual and creative needs. Spatial planning should be versatile, allowing spaces to be adapted to suit a

variety of educational and creative activities, while providing environments that stimulate discovery and experimentation. Natural lighting is essential, as it contributes to improving mood and increasing productivity. Therefore, large windows and skylights are preferred to ensure abundant sunlight, reducing the need for artificial lighting. Designs should also incorporate sustainable environmental elements, such as the use of natural and eco-friendly materials, as well as the application of thermal and sound insulation techniques to provide a more comfortable and healthy environment for children. Furthermore, it is preferable to integrate indoor spaces with outdoor nature through gardens and green spaces that provide opportunities for

learning and interactive exploration, contributing to enhancing children's connection with nature and stimulating their imaginations. The use of modern technology, such as smart screens, interactive equipment, and augmented reality systems, contributes to providing a stimulating environment that aligns with the needs of gifted children, ensuring an integrated and sustainable learning environment that supports their intellectual and creative development and helps them achieve their full potential.(Hassan, S., & Fikry, D. (2021). The impact of interior design of the educational environment on children's creative skills. Journal of Design Sciences and Applied Arts, 1(5), 18-39)

N	WHAT	HOW
1	Flexible and innovative spatial planning	Spaces should be adaptable to accommodate various activities such as individual learning, group work, and hands-on experiences. Open designs with flexible dividers that can be rearranged as needed are preferred.
2	Balanced natural and artificial lighting	Natural light is essential to stimulate mental activity and reduce eye strain, so large windows with controlled light input are essential. Artificial lighting should be comfortable and indirect, with the ability to control its intensity according to activity.
3	Sustainable environmental design	Preferably use natural and eco-friendly materials such as recycled wood, organic fabrics, and non-toxic dyes. Applying green building standards such as natural ventilation, using renewable energy, and increasing green spaces within the educational environment.
4	Using colors in interior design	It is essential to achieve visual balance using a combination of warm and cool colors to ensure a psychologically and behaviorally balanced environment. It is best to allocate colors according to the function of each space within gifted children's environments, as their design varies according to the function.
4	Technology and digital interaction	Using modern technologies such as augmented reality (AR) and 3D printing to develop creative skills. Creating dedicated spaces for robotics, programming, and technological experiments to keep pace with modern developments.

Figure4, Architectural foundations for designing environments for gifted children

(Hassan, S., & Fikry, D. (2021). The impact of interior design of the educational environment on children's creative skills. Journal of Design Sciences and Applied Arts, 1(5), 18-39)

Characteristics of gifted children in Aswan:

Gifted children in Aswan, as in any other region, have unique characteristics that set them apart from their peers. However, these characteristics may be influenced by cultural, social, and environmental factors specific to Aswan society.

They possess a set of unique mental and creative characteristics that enable them to think critically and analytically, enabling them to find innovative solutions to complex problems in unconventional ways. They are characterized by rapid learning and a remarkable ability to absorb complex information easily, along with a vivid imagination that helps them generate new and innovative ideas in various fields, such as art, science, mathematics, and

literature. This creative ability makes them more open to new experiences and more willing to explore unfamiliar cognitive horizons.

Emotionally and socially, they possess high emotional sensitivity and a deep understanding of human emotions, making them more empathetic toward others and more aware of the emotional details surrounding them. Despite this, some may tend to work independently, preferring to focus in quiet environments, while others require an environment that encourages collaboration and interaction with their peers to fuel their minds with ideas and stimulation. Furthermore, they have broad and diverse interests, which makes them constantly seeking intellectual challenges. They

may feel bored in traditional environments that do not provide them with rich content or sufficient stimulation for their abilities.

From a motor and sensory perspective, some gifted children have high energy levels, requiring flexible environments that allow them to express their physical activity in positive ways. They may also be more sensitive to sensory stimuli such as lighting, colors, and sounds, requiring a thoughtful learning environment that provides them with sensory comfort and avoids factors that may cause discomfort or distraction.

Regarding the environmental and cultural impact in Aswan, the rich Nubian culture and ancient Egyptian heritage play an important role in shaping the imagination of gifted children and inspiring them in the fields of arts and crafts, enhancing their creative abilities and giving them a unique cultural identity. However, these children may face challenges in accessing advanced educational environments due to economic constraints or a lack of specialized facilities that meet their intellectual and creative needs. Therefore, it is essential to develop interactive learning spaces that are in line with Aswan's rich heritage, while incorporating modern technologies that help develop their skills and enhance their creativity. This will enable them to tap into their unique potential and contribute effectively to the future of their communities. (Abdel Moneim, Adel Hussein Mohamed. Environmental Problems in Aswan Governorate.

<https://www.academia.edu/43156558/>). (2020).

Environmental requirements of gifted children in Aswan:

To meet the needs of gifted children in Aswan, educational and community environments must be designed that take into account their unique thinking, high intelligence, and special needs, which differ from those of their peers. These children need flexible and innovative spaces that stimulate their intellectual curiosity and encourage exploration and experimentation, while providing a safe and sustainable environment that supports their psychological and emotional development.

The ideal learning environment for gifted children requires a flexible and stimulating one, providing open spaces that allow freedom of movement and exploration, with designated areas for individual work to enhance concentration and group work to support collaborative learning. The integration of modern technology, such as interactive screens, smart labs, and virtual reality programs, is essential for promoting creative learning and expanding horizons of knowledge. To ensure student comfort and a sustainable learning environment, interior

spaces should be designed in a balanced manner, using stimulating colors such as orange and yellow to promote activity, and calming colors such as blue and green to promote concentration and relaxation. Adequate natural lighting should be provided to reduce visual stress, along with adjustable artificial lighting to suit various activities. Comfortable, flexible furniture should be designed to accommodate children's diverse needs.

To enhance connection with nature, it's a good idea to incorporate indoor and outdoor gardens into the learning environment. These natural spaces contribute to a calming atmosphere that stimulates creativity and psychological well-being. Natural and eco-friendly materials, such as wood and organic fabrics, can also be used to ensure a sustainable environment. Another important aspect is creating outdoor learning spaces inspired by Aswan's environment, such as outdoor learning spaces inspired by Nubian heritage. This enriches the learning experience, reinforces children's cultural identity, and gives them the opportunity to think deeply and enhance their creativity.

To develop the abilities of gifted children, spaces should be provided for creative activities, such as art, music, robotics, and programming, in addition to equipping them with advanced science laboratories that allow them to explore and experiment. Interactive libraries are also an essential element in supporting learning, as they should contain printed and digital books that cover children's interests and help them expand their horizons, in addition to the presence of interactive robots that interact with children and provide them with useful advice.

Regarding psychological support, it is essential to provide a supportive learning environment, including qualified counselors and teachers who work with gifted children, to provide them with the necessary psychological and educational support. It is also preferable to design quiet spaces that help children meditate and relax, away from noise and distractions. This ensures a balanced environment that stimulates creativity and critical thinking. Finally, creating a positive environment that encourages children to express themselves freely contributes to the development of their social skills and helps them achieve their full potential in a healthy and advanced learning environment. It also works to promote self-learning and self-reliance in solving their problems in a calm. (Abdel Moneim, Adel Hussein Mohamed. Environmental Problems in Aswan Governorate.

<https://www.academia.edu/43156558/>). (2020).

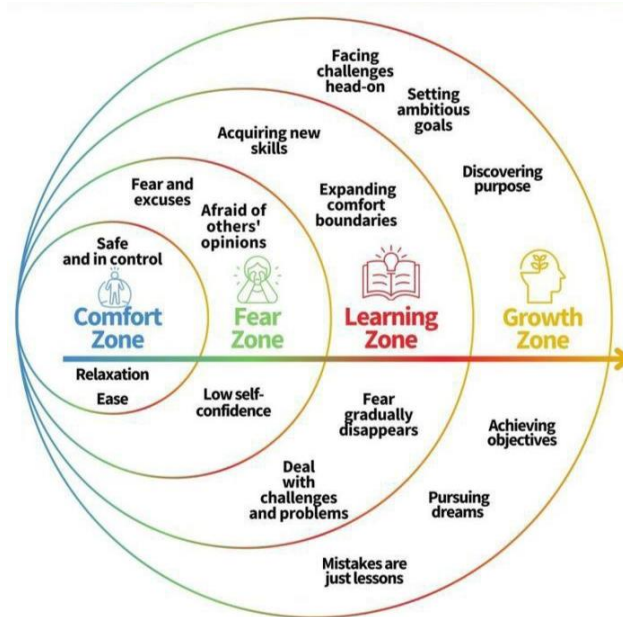


Figure 6, The stages of development that children go through until they discover their talent

The growth journey credit to igor,Linkedin,<https://images.app.goo.gl/qnHuMksyyZLStpyJ6>,(2025).

A child goes through several integrated developmental stages that influence the discovery and development of their talents until they achieve their goals. The first stage begins from birth to early childhood, where the child is in the sensory and motor discovery stage, beginning to explore their environment and interact with the world through their senses and direct experience, which helps shape their natural curiosity and ability to learn. As they enter middle childhood, which extends from the ages of 3 to 6, the features of talent gradually begin to emerge, as the child demonstrates their special interests in specific areas such as drawing, music, mathematics, or science, and begins to express themselves more clearly. In late childhood (from 6 to 12 years), their cognitive and creative skills develop rapidly, and they become more capable of concentration and critical thinking, making it easier to identify their unique talents and work to develop them through educational programs and specialized activities. As for adolescence, which extends from the ages of 12 to 18, the child begins to refine their talents through continuous training, develops the ability to plan and set goals, and becomes more aware of their abilities and personal ambitions. During this stage, family and educational support play a pivotal role in guiding the child toward achieving their goals, by boosting their self-confidence and providing an encouraging environment that allows them to develop. By the time the young person reaches maturity, they will have acquired the skills and experiences that qualify them to utilize their talents professionally and achieve their future goals, whether in academic, artistic, or professional fields.

This will enable them to fulfill their potential and contribute effectively to society.(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. *Journal of Design Sciences and Applied Arts*, 3(1), 275-283.)

The impact of the physical environment on creativity and learning:

The physical environment plays a crucial role in the development of gifted children in Aswan, influencing their ability to create and learn by providing spaces that stimulate exploration and critical thinking. Aswan's urban design features elements inspired by Nubian heritage, such as warm colors, unique geometric shapes, and open spaces, creating a rich environment for visual and creative inspiration. However, the quality of infrastructure, the availability of interactive spaces, and the use of modern technology in the educational environment play a pivotal role in supporting or hindering the development of gifted children. Factors such as natural lighting, good ventilation, and the use of sustainable materials improve mental and physical comfort, enhancing children's ability to focus and innovate. Therefore, designing integrated educational environments that take into account Aswan's cultural specificity.(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. *Journal of Design Sciences and Applied Arts*, 3(1), 275-283)

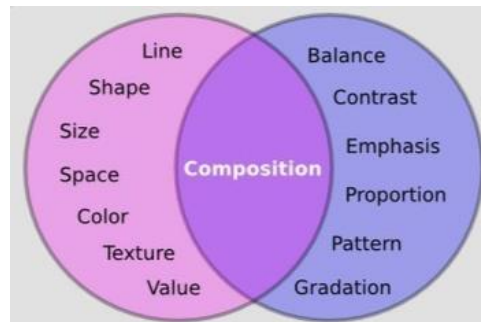


Figure7,Environmental factors affecting creativity and learning
Inkscape,Tech valley, [https://images.app.goo.gl/BbX9vw2Lxv43p1ZW8\(2022\)](https://images.app.goo.gl/BbX9vw2Lxv43p1ZW8(2022)),

N	WHAT	HOW
1	Spatial Planning	Spatial planning: Designing open, flexible spaces helps promote freedom of movement and interaction, supporting creativity, independent thinking, and the possibility of architectural modifications.
2	Lighting	Natural lighting provides a relaxing environment and enhances attention, while adjustable artificial lighting improves mood and stimulates creativity.
3	Colors	Using the right colors creates a stimulating environment. Warm colors like orange promote activity and creativity, while cool colors like blue help with concentration.
4	Materials and textures:	The variety of materials, including wood, glass, and different fabrics, provides a rich sensory experience that supports learning through physical interaction.

Figure 7, Environmental factors affecting creativity and learning

.(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. Journal of Design Sciences and Applied Arts, 3(1), 275-283)

The impact of the technological environment on creativity and learning:

Smart technology plays a vital role in developing the skills of gifted children in Aswan, contributing to an interactive learning environment that stimulates creativity and enhances their intellectual abilities. Through advanced tools such as smart screens, augmented and virtual reality technologies, and artificial intelligence-based learning, children are able to explore concepts in new and more interactive ways, enhancing deep understanding

and encouraging critical thinking and innovative problem-solving. Technology also enables self-learning capabilities, enabling children to develop their skills according to their abilities and at their own pace. In Aswan, where a rich cultural heritage intersects with modern challenges.(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. Journal of Design Sciences and Applied Arts, 3(1), 275-283.)

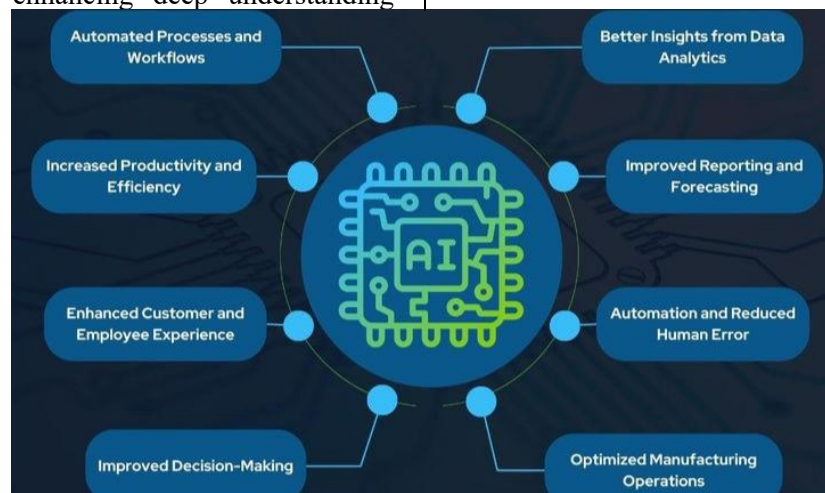


Figure8,Technological factors affecting creativity and learning
Cesare Cantieri - Senior Software Developer - CCH® Tagetik
,LinkedIn,[https://images.app.goo.gl/veXKnHJqFMMparHb7\(2024\)](https://images.app.goo.gl/veXKnHJqFMMparHb7(2024))

N	WHAT	HOW
1	Interactive learning	The use of smart screens, virtual reality (VR), and augmented reality (AR) devices makes learning environments more engaging and stimulating for creativity through visual and interactive experiences.
2	Hands-on experience	Labs equipped with 3D printers, programming and design tools help transform ideas into tangible models, enhancing gifted children's applied skills and developing their thinking.
3	Communication and Collaboration	Technology provides interactive digital learning spaces that facilitate the exchange of ideas and teamwork, encouraging shared creativity and enhancing communication skills among children.
4	Personalization and Adaptability	Personalization and Adaptation: Smart systems enable the learning environment to be tailored to individual children's needs, through adjustable lighting and personalized interactive content.

Figure 8, Technological factors affecting creativity and learning
 .(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. Journal of Design Sciences and Applied Arts, 3(1), 275-283)

The impact of colours on the creative environment:

N	Type	Importance
1	Warm colors	stimulate activity and innovation, and encourage and creative expression.
2	Cool colors	promote relaxation and focus, helping children think deeply
3	color contrast	Creates a balanced environment that combines visual stimulation.
4	Changeable colors	gives children the opportunity to interact with their environment

The impact of materials on the creative environment:

N	Type	Importance
1	natural materials	Provides a warm sensation that helps relax and enhances creativity.
2	Multi-textured materials	Encourages sensory interaction and develops motor perception.
3	Adjustable materials	Children are able to draw and express their ideas freely.
4	Sustainable materials	Encourage children to adopt ideas about conserving natural resources.

The impact lighting on the creative environment:

N	Type	Importance
1	natural lighting	It helps improve mood and enhances brain activity in children.
2	Adjustable lighting	Allows children to control the lighting level as needed.
3	colored lighting	Stimulates creativity by providing a dynamic atmosphere.
4	Focused lighting	Helps children focus and achieve maximum productivity.

Figure 8, Technological factors affecting creativity and learning
 .(Abu Zaid, M., & Abdel Rahman, S. (2021). Interior Design of Gifted Children's Skills Development Centers Using the Concept of Biophilic Design. Journal of Design Sciences and Applied Arts, 3(1), 275-283)

Challenges facing gifted children in Aswan:

Gifted children in Aswan face a range of challenges that impact their creative and academic development. The lack of specialized educational institutions is one of the most significant obstacles they face. The paucity of programs specifically designed to nurture gifted children in various fields, both artistic and scientific, limits their ability to develop their talents and hone their skills. Furthermore, the limited availability of modern technological resources in traditional educational settings hinders their access to interactive learning tools and smart technologies, potentially negatively impacting their innovative potential.

In addition, these children face social and psychological challenges, represented by a lack of societal awareness of the importance of developing gifted children and the need to provide supportive environments for them. Gifted children may find themselves surrounded by a community that doesn't

recognize their unique needs, which can lead to feelings of isolation or lack of motivation. Furthermore, the lack of specialized teacher training makes it difficult to meet the needs of these children in a way that helps them reach their full potential.

To overcome these challenges, it is essential to provide integrated and sustainable educational environments that utilize the latest educational technologies, in addition to raising community awareness of the importance of supporting gifted students. Establishing specialized centers within Aswan could be an important step toward providing a supportive environment that contributes to discovering and nurturing talent, helping gifted children realize their potential and contribute to the cultural and scientific development of society. (Abdel Moneim, Adel Hussein Mohamed. (2020). Environmental Problems in Aswan Governorate.

<https://www.academia.edu/43156558/>



Figure9, Design challenges fa

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The design challenges faced by gifted children are a significant factor influencing their creative development. Obstacles such as a lack of resources, specialized guidance, and the limitations of traditional curricula can hinder their skill development. However, facing these

challenges can also serve as a catalyst for enhancing their innovative abilities, as they learn to think outside the box and seek innovative solutions to problems. Providing a supportive environment, including appropriate tools and effective guidance, helps transform

these challenges into opportunities, helping to hone their creativity and develop their design skills, enabling them to make a positive impact in the future. (Abdel Moneim, Adel Hussein Mohamed. (2020). Environmental Problems in Aswan Governorate. <https://www.academia.edu/43156558/>

Case study of some centers for gifted children in Egypt:

Talent Development Center at the Egyptian Opera House

A) About the Center

The Talent Development Center at the Egyptian Opera House is one of the most important educational institutions specializing in discovering and refining artistic talents among children and youth. It aims to provide an integrated creative environment that helps develop artistic skills in various fields, such as music, singing, ballet, and drawing. The center seeks to train a new generation of artists through advanced educational curricula supervised by a group of specialized professors, providing students with the opportunity to learn according to high-level academic methods. Additionally, the center plays a prominent role in supporting the cultural and artistic scene in Egypt by organizing regular concerts and performances that provide young talents with the opportunity to stand on stage and interact with the audience, enhancing their self-confidence and contributing to the enrichment of the artistic movement. Thanks to its diverse programs and professional training, the Talent Development Center represents a vital platform for shaping a bright artistic future in Egypt.

B) Educational programs and classes offered at this center

The Talent Development Center offers a variety of educational programs aimed at developing the artistic abilities of children and youth in various creative fields. Music classes include instruction on a wide range of instruments, such as the oud, qanun, flute, violin, piano, guitar, cello, and harp, enabling students to acquire advanced musical skills under the supervision of specialized teachers. The center also offers specialized singing and choral classes, where children are trained in authentic Arabic and operatic singing, contributing to the development of their vocal

and performance abilities and boosting their self-confidence.

In addition, the center offers movement classes such as ballet and claquette, which help develop physical expression, flexibility, and the ability to perform harmoniously. In the field of fine arts, the center offers specialized classes in drawing and design, where children are trained in various techniques that help them develop their creative sense and enhance their visual skills. The center pays special attention to children with special needs, offering art classes specifically designed to integrate them into artistic and social activities. This helps boost their self-confidence and provides them with the opportunity to creatively express their talents. With this diverse array of classes, the center provides an integrated educational environment that helps children discover their potential and develop their artistic skills in various disciplines.

C) Interior design of the center

The Talent Development Center's interior design features an inspiring learning environment that aims to foster creativity and focus in children. It blends aesthetics with functionality to provide an ideal environment for learning and artistic training. The halls are designed to suit the nature of each activity. There are dedicated music rehearsal halls equipped with advanced sound insulation to ensure an optimal listening and training experience. Other halls are equipped with special floors for ballet and claquette classes, providing comfort and safety for movement and performance.

In terms of lighting, a diverse lighting system has been adopted that balances natural light with adjustable lighting. Soft lighting helps enhance concentration during theoretical lessons, while directional lighting is used in performance classes and live performances to improve visibility and highlight artistic details. Acoustic design pays special attention, with soundproofing materials distributed to ensure clear sound in the music halls, enhancing the quality of performance and training. These factors combined create an integrated learning environment that helps children develop their talents in a professional environment that supports their creativity and artistic development.

D) Modern technology and techniques at the center

The Talent Development Center at the Egyptian Opera House relies on the latest technologies and modern equipment to provide a comprehensive and distinguished educational experience. The rehearsal halls are equipped with advanced audio systems that ensure clear sound quality, helping students hear the subtle details during musical rehearsals. Soundproofing systems are also designed to ensure an ideal training environment, free from external noise.

In addition, interactive screens and smart learning tools are used in theoretical classes. These tools enhance interaction between students and teachers by presenting educational materials in an attractive visual manner, facilitating the understanding of musical and artistic concepts. These technologies also enable the analysis of vocal and movement performances, helping students improve their skills more accurately.

Modern technologies also contribute to the development of training and teaching methods by integrating specialized applications and programs for music and the arts, enabling students to learn in an interactive and advanced manner. These innovations enhance the quality of education within the center and provide a professional training environment that helps children develop their talents using the best modern methods.

E) Events and artistic performances at the center

The Talent Development Center at the Egyptian Opera House places great emphasis on artistic events and performances. It organizes regular concerts where students perform before an audience, giving them the opportunity to showcase their musical and performance skills in a professional setting. These performances are an important milestone in their educational journey, boosting their self-confidence and providing them with experience on stage and interacting with audiences.

In addition to regular concerts, students at the Center participate in cultural and artistic events held at the Egyptian Opera House, providing them with the opportunity to interact with the Egyptian art scene and engage in an

environment that stimulates creative growth. This also contributes to developing their artistic sense and broadening their horizons through watching musical and operatic performances by professional artists.

The role of artistic performances is not limited to entertainment alone; they also serve as a powerful tool for building self-confidence in children, as they learn how to interact with an audience, overcome stage fright, and perform at their best. These performances are an essential step in honing their artistic talents and enhancing their future readiness, whether in the artistic field or in other fields that require presentation skills and effective communication.

F) Registration and admission to the center

The Talent Development Center at the Egyptian Opera House welcomes talented children who wish to develop their artistic abilities through specialized educational programs. The application and admission process is based on a set of criteria that ensure the selection of the most qualified students to benefit from the courses. Enrollment requires passing placement tests according to each artistic field, such as playing musical instruments, singing, or performing arts.

The center targets various age groups. Specific programs are designed for early-age children to develop their skills from an early age, while more specialized programs are available for older age groups to enhance their artistic abilities and hone their professional skills. Application deadlines and admission requirements are announced on the center's official platforms. Interested parties can follow the center's news and events through the official social media page or the Egyptian Opera House website, allowing them to stay up-to-date on all new activities and courses.

G) The Center's role in supporting future talents

The Talent Development Center at the Egyptian Opera House is a key pillar in discovering and cultivating emerging artistic talent. It prepares children to participate in musical ensembles and national artistic activities through intensive training programs that develop their skills and prepare them for a promising creative future. The center

contributes to the development of children's artistic performance by enrolling them in specialized workshops that enhance their playing, singing, and movement skills, enabling them to join orchestras, choirs, and professional artistic groups.

It also contributes to building a new generation of creatives by providing them with a strong

artistic foundation and preparing them to participate in major cultural and artistic events inside and outside Egypt. Through regular performances and diverse artistic experiences, children gain self-confidence and practical experience, helping them develop their artistic careers and contribute to enriching the Egyptian artistic scene in the future.



Figure 10, Talent Development Children at the Egyptian Opera House Development Children at the Egyptian Opera House

The official page of the Talent Development Center at the Egyptian Opera House 2022

<https://www.facebook.com/share/12Kw4PJxpbm/>

Proposed designs of an interior space for implementing the standard:



Figure 11, Proposed design of an interior space for implementing the standard:

Prepared by the authors in addition to the use of artificial intelligence technology

Based on the proposed images, the interior design of the Skills Development Center for Gifted Children can be analyzed through a scientifically grounded perspective, aligned

with the principles of environmental, social, psychological, cognitive, and technological sustainability. The design demonstrates an intelligent use of natural lighting through

expansive floor-to-ceiling windows and overhead skylights, significantly minimizing dependence on artificial illumination and thereby enhancing energy efficiency—a fundamental component of environmental sustainability. Additionally, the use of eco-conscious materials such as light-toned wood contributes to reducing the building's carbon footprint.

Functionally, the design adopts an open-plan and modular spatial layout, enabling multifunctional usage that accommodates a wide spectrum of activities including collaborative workshops, interactive experiments, and creative play. This spatial flexibility is particularly suited to the developmental needs of gifted children, who thrive in dynamic environments that encourage exploration and autonomous learning.

From a psychological and cognitive standpoint, the palette of natural greens, soft yellows, and wood textures is carefully curated to promote mental clarity, reduce anxiety, and stimulate concentration. These colors are known for their calming and cognitively supportive effects—especially crucial for children with heightened sensory perception. The integration of child-scaled, ergonomic furniture further reinforces feelings of security, independence, and self-confidence.

A critical aspect of the design is the integration of smart technology to enhance both environmental control and educational outcomes. This includes automated lighting and HVAC systems that respond to occupancy and daylight levels, contributing to energy conservation and indoor comfort. Interactive digital panels, learning stations, and sensor-based tools create an engaging, responsive learning ecosystem tailored to the advanced cognitive abilities of gifted children. These technologies not only streamline building performance but also foster digital literacy and adaptive learning—key competencies for future-ready education.

Lastly, the architectural and material language of the design pays homage to the environmental and cultural identity of Aswan, utilizing textures and tones that resonate with the region's natural landscape and heritage. This connection reinforces a sense of place and

belonging, anchoring the child emotionally within their learning environment. Collectively, the proposed design models present a holistic vision of sustainability—where ecological responsibility, human-centered pedagogy, and smart innovation converge to shape an inclusive, nurturing, and forward-thinking educational space. Such an approach ensures that the built environment becomes an active agent in the educational process, rather than a passive backdrop, fostering lifelong curiosity, wellbeing, and innovation.

It further positions the center as a model of 21st-century educational architecture—where sustainable values, cultural sensitivity, and technological advancement coalesce to support the full potential of gifted learners.

Results:

- The design of large windows and skylights reduces energy consumption, especially during the daytime, enhances children's concentration and visual comfort while learning, and improves their ability to utilize light more effectively.
- The integration of green spaces and open gardens into the design improves children's comfort and stimulates their creative thinking, as these spaces provide opportunities for exploration and interactive learning, opening up new horizons for learning.
- The use of modern technologies, such as interactive screens and smart lighting and ventilation control systems, enhances energy efficiency, provides a sophisticated learning experience for gifted children, and develops their technological skills.
- The application of thoughtful colors in interior design increases the development of skills, motivates performance, and increases creativity among gifted students, as colors stimulate the nervous system for outstanding performance.

Recommendations:

Based on the findings, the study recommends that researchers and academics in science colleges apply sustainability standards to all stages of design and implementation of

educational centers, with a focus on design flexibility, utilizing natural resources, and employing modern technologies to enhance the learning experience for gifted children. The study also calls for increased awareness of the importance of sustainable design among relevant stakeholders, ensuring the provision of educational environments that support innovation and creativity for future generations.

Conclusion:

The research highlights the importance of sustainability in the interior design of gifted children's development centers, as it contributes to creating a healthy and advanced educational environment that stimulates creativity and supports interactive learning, while ensuring the preservation of environmental resources. This makes it a model that can be applied more widely across various educational institutions.

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