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THE ROLE OF PHYSICAL SPACE IN ACHIEVING THE VISION OF MODERN EDUCATION

دور الفضاء الفيزيقي في تحقيق رؤية التعليم الحديثة

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الملخص:

تقدم هذه الدراسة مراجعة شاملة لدور الفضاء الفيزيقي في تحقيق رؤية التعليم الحديث. حيث تقوم بتجميع الأدبيات الحالية لاستكشاف تأثير البيئات التعليمية على تعلم الطلاب ومشاركتهم وأدائهم الأكاديمي. ومن خلال تحليل نتائج أبحاث متنوعة، تؤكد الدراسة على أهمية تصميم المساحات التعليمية بعناية لتعزيز ممارسات التدريس المبتكرة ونهج التعلم المتمحور حول الطالب. وتبرز النتائج أن البيئات التعليمية المرنة والقابلة للتكيف تلعب دورًا حاسمًا في تحقيق الأهداف التربوية المعاصرة. ومع ذلك، تشير الدراسة أيضًا إلى الحاجة لمزيد من الأبحاث التجريبية للتحقق من فعالية عناصر تصميم محددة تسهم في تحسين نتائج التعلم.

الكلمات المفتاحيّة:

الفضاء، الفضاء الفيزيقي، التعليم الحديث، المؤسسات التعليمية.

Abstract:

This study presents a comprehensive review of the role of physical space in realizing the vision of modern education. It synthesizes existing literature to explore the influence of educational environments on student learning, engagement, and academic performance. Through an analysis of diverse research findings, the study underscores the importance of thoughtfully designed educational spaces in promoting innovative teaching practices and student-centered learning approaches. The findings emphasize that flexible and adaptive learning environments play a critical role in advancing contemporary educational objectives. However, the article also identifies a need for further empirical research to validate specific design elements that optimize learning outcomes.

Keywords:

Space, Physical Space, Modern Education, Educational Institutions.

1. INTRODUCTION

This article examines how to implement green school principles to create environmentally friendly learning environments. It builds on previous studies, such as (Abbas & Jassim, 2012), which found a strong student preference for outdoor learning but highlighted the challenges posed by inadequate outdoor spaces. Similarly, studies by the American Cooperative Organization for High-Performance Schools and the OECD emphasized the need for better-designed school buildings that enhance student and staff well-being while reducing costs. These studies criticized traditional closed designs and advocated for integrating green spaces, modern technology, and flexible layouts that align with global standards. The article explores how educational spaces can be designed to support sustainability and improve the overall learning experience. It calls on stakeholders to prioritize the development of well-equipped, adaptable environments that promote both academic success and the well-being of students and educators.

1.1 Study problem:

This text emphasizes the critical role of the educational environment in achieving learning objectives by providing a flexible, innovative, and interactive space that meets the evolving needs of students. As technology advances, traditional education must adapt by incorporating multi-purpose, interactive spaces that foster engagement, collaboration, and creativity. Flexible designs, ergonomic furniture, and modern technological tools, such as smart boards and digital platforms, enhance communication and intellectual exchange while ensuring students' psychological well-being. Research highlights the significant impact of school architecture on students' quality of life, advocating for resilient and strategically planned buildings that prioritize safety, comfort, and adaptability. Experts like (Smith, 2021) and (Nielsen, 2022) stress the need for learning spaces that facilitate group collaboration and cooperative learning. Furthermore, global organizations, including the Global Facility for Disaster Reduction and Recovery and INEE, support designing schools resilient to environmental hazards. The American Association of School Administrators also links well-designed educational spaces to improved teacher performance and student engagement.

This study proceeds from the following questions:

- How does the design of physical spaces impact the realization of modern educational visions?
- What are the essential components that must be present in physical spaces to create an optimal educational environment?
- What role do technology and modern infrastructure play in enhancing the quality of education?
- How can educational institutions balance traditional teaching methods with technological advancements?

1.2 Study objectives and importance:

This study explores the role of physical space design in enhancing education quality and achieving modern educational visions by focusing on innovation, interaction, and student support. It examines how well-designed educational environments stimulate creativity, integrate global architectural standards, and incorporate modern infrastructure to foster engagement between students and teachers. The study highlights the importance of adapting school buildings to contemporary architectural technologies, ensuring flexibility and sustainability. Given the rapid technological advancements, upgrading educational spaces is crucial for improving learning outcomes, increasing participation, and creating safe, comfortable environments. The study also provides recommendations for optimizing physical spaces to align with educational policies and goals.

1.3 Study Methodology:

This study adopts a literature review methodology to examine the relationship between physical space and modern educational outcomes. A comprehensive analysis of existing research articles, reports, and case studies was conducted to identify patterns and trends in the field. The sources reviewed include peer-reviewed journal articles, policy reports, and empirical studies that explore the influence of educational space design on student learning. By synthesizing these findings, this article aims to present a coherent understanding of how learning environments impact educational effectiveness.

2. Study Concepts:

2.1 Definition of Physical Space:

The term "space" carries multiple meanings across languages and contexts (Akkarout, 2018, p. 01). In English, it can refer to a vacuum, outer space, or a time span, while in Arabic, it denotes a vast open area or vacant land (Barouq & Yekhlaf, 2012, p. 18). Influenced by Western concepts, space is often associated with spatial emptiness or a constructed entity within dimensions, representing the environment where humans live, work, and interact (Dheimi, 2015, p. 17). It is also seen as a shared domain facilitating collective activities, where individuals exchange ideas and behaviors to achieve common goals (Maalouli, 2010, p. 105). Meanwhile, "physical space" lacks a single, comprehensive definition but is often linked to school architectural space or the school physical environment. It encompasses all physical aspects of educational facilities, including buildings, classrooms, laboratories, and open spaces, as well as environmental conditions like lighting, ventilation, and noise levels (Salah, 2019). In this study, physical space refers to all tangible factors influencing the school community, shaping their interactions and overall educational experience.

2.2 Definition of Modern Education

Education is the verbal noun of *to teach*, meaning "to make someone know (Maalouf, 1976, p. 526)." Technically It is the process of relaying experiences through which the learner acquires knowledge, skills, attitudes, and values. In other words, it refers to the set of methods used to organize elements of the learner's surrounding environment to provide specific educational experiences (Taima, 1989, p. 45). Modern Education refers to an educational system characterized by focusing on the student as the central element of the educational process rather than the traditional focus on the teacher or the subject matter. Modern education involves the use of digital technologies, interactive tools, and flexible teaching methods within the school's physical space, enabling students to learn more effectively and creatively.

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3. Principles and Foundations of the Vision of Modern Education:

Modern education is based on several key principles aimed at improving education quality and fostering a more effective learning process. A student-centered approach prioritizes learners' needs, interests, and learning styles while promoting self-directed discovery (Ali, 2020, p. 35). Technological integration enhances interaction, communication, and access to information, making learning more dynamic. Collaborative learning encourages teamwork and active participation among students, while life skills development focuses on critical thinking, problem-solving, creativity, and communication. Continuous and comprehensive assessment shifts the focus from final exams to ongoing evaluation of student performance. Additionally, lifelong learning is emphasized by cultivating a culture of continuous education beyond formal settings. Lastly, flexibility and inclusivity ensure that learning environments adapt to diverse student needs, creating an equitable and supportive educational experience.

4. The Importance of Physical Space in Modern Education:

Physical space plays a vital role in modern education by providing a stimulating and comfortable learning environment that enhances the learning and creativity process. A well-designed classroom and educational facilities are among the key factors that contribute to improving students' academic performance and developing their skills.

Among the most important aspects that highlight the significance of physical space in modern education are:

- Stimulating Creativity and Critical Thinking: A well-designed physical space provides a comfortable environment that encourages students to think in creative and critical ways. Classrooms equipped with flexible furniture and modern technology enable students to collaborate and freely discuss ideas.
- Improving Focus and Attention: An organized, clean, and well-lit physical space can contribute to improving students' focus and attention, leading to better comprehension of the information presented during lessons.
- Enhancing Social Interaction: Designing educational spaces in a way that allows for social interaction between students helps build positive relationships and fosters collaborative learning. Designing open outdoor spaces such as areas and halls for lectures and group lessons can encourage students to exchange ideas and learn from each other.

5. Physical Elements of the School Space:

5.1 School Building Location:

The location and architectural design of school buildings play a critical role in shaping the educational environment. Factors such as geographic placement, surrounding environment, and the aesthetic and functional aspects of interior and exterior spaces must be carefully considered during the design phase, as they are difficult to modify later (Archi Classe , 2020, p. 07). Sustainable school principles, as outlined in a 2008 UK Department for Education study, emphasize the importance of applying the LEED system, which focuses on sustainability, energy efficiency, water conservation, and indoor environmental quality. Additionally, reducing operational costs, utilizing renewable energy, integrating waste recycling, and ensuring thermal and visual comfort contribute to a healthier learning atmosphere. The concept of green schools further reinforces the need for environmentally friendly designs that enhance educational quality while maintaining cost efficiency. These elements collectively ensure that school buildings provide an optimal and sustainable environment for both students and educators (Osman, 2019, p. 23).

5.2 Lighting:

The human eye perceives objects as a result of light rays reflecting off them. Light is a natural or artificial energy that spreads in all directions in straight lines as waves. It has been shown that the human eye is sensitive to light waves that range from 380 to 760 nanometers (1 nanometer = 10^{-9} meters). Therefore, it should be noted that the eye is not sensitive to infrared rays, which have a wavelength greater than 760 nanometers (Belkars & Hezabra, 2021, p. 63).

Lighting is divided into two types based on its source: natural lighting and artificial lighting:

- Natural Lighting: Its source is the sun and stars. It is defined as the use of daylight to illuminate tasks that need to be performed. It is also defined by (P. Chauvel) as the lighting produced by the celestial vault or light coming directly from the sun or reflected by sunlit surfaces. It is considered one of the best types of lighting because it contains all the colors of the solar spectrum (Kallab Dbbih Zahira & Ben Nacib, 2016, p. 10).

- Artificial Lighting: This is obtained through various methods, each differing in the way it produces light. Light is emitted from certain objects due to their high temperature from heating, the passage of an electric current, or as a result of a chemical reaction (Belkars & Hezabra, 2021, p. 64).

5.2.1 Lighting Standards in the School Environment:

Creating a stimulating learning environment can help students feel comfortable, develop their ability to concentrate, and make the most of each day spent at school. Therefore, the European standard (NE-1 12464) for lighting within classrooms specifies a lighting level of 300 lux for children during the day. For adults, the level is set at 500 lux during the evening. The lighting for classroom blackboards is specified at 500 lux, and the color rendering index should be higher than 80. The French Lighting Association (E.F.A) has proposed standards that set the color temperature at 3000 K, with classroom lighting set at 670 lux. For the color rendering effect, it should be 85. The Illuminating Engineering Society of North America has specified that the lighting intensity should not be less than 1076 lux when teaching using a blackboard, and no less than 538 lux for any other regular activity within the classroom (Wanis, 2018, p. 59).

5.2.2 The Importance of Lighting in the School Environment:

Lighting has a significant impact on physical and intellectual development, as 70% of information is processed through vision. Naturally, the quality of lighting influences students' academic performance, growth, development, and behavior during lessons (Azoulay, 2016, p. 03). The importance of lighting in the school environment can be highlighted through the following points (Chevassue, 2020, p. 02):

- Lighting quality should incorporate reliable and high-performance technology, such as using LED technology for entrances, hallways, classrooms, and school sports fields. This enhances the educational and pedagogical process, keeping students alert and encouraging their active participation both inside and outside the classroom.
- Prioritizing the use of natural lighting is an essential architectural criterion for schools, as it provides visual comfort and adapts the eyes for distant viewing.
- Proper lighting (whether natural or artificial) is a critical factor for the sender and receiver of messages. It facilitates the recognition of shapes, signs, and colors in an easily perceivable manner.

- Tree growth near windows reduces the availability of natural light. Therefore, classroom windows should occupy between one-fourth and one-sixth of the classroom wall area to ensure sufficient natural lighting. Additionally, windows should not be placed in front of or behind students, and their glass should be transparent and white to enhance visual comfort.
- Lighting on the blackboard should be positioned to prevent students from directly seeing the light source, thereby avoiding discomfort caused by light reflections (glare).
- The more sufficient and consistent the lighting, the easier it becomes to perceive details, increasing engagement with presentations.

5.3 Noise:

Noise is a form of physical environmental pollution with detrimental effects on human physiology and psychological health, leading to conditions such as nervous system disorders, cardiovascular diseases, auditory fatigue, pathological deafness, and attention distraction (Belkars & Hezabra, 2021, p. 67).

There are various definitions of noise, including:

- Shukri Ibrahim Hassan's Definition (2011): Noise is a collection of disturbing sounds that cause annoyance and nervous irritation. It is a discordant mixture of sounds prevalent in the work environment, affecting workers' activities (Hassan, 2013).
- World Health Organization (WHO) Definition: Noise is defined as an undesirable sound, representing an unjustified disturbance within a useful frequency range, akin to unwanted electrical waves in a channel or transmitter (Fink, 2019, p. 03).

According to the WHO, the permissible noise level in school environments should not exceed 35 decibels inside classrooms during teaching sessions, and 55 decibels during break times. Noise exposure above 85 decibels for more than six hours a day poses potential health risks.

Achieving optimal acoustics for verbal communication is crucial for supporting all aspects of educational and school-related communication, including speaking, listening, and interacting with colleagues, workers, and teachers. A study conducted by (Shield, 2019) revealed that lower noise levels enable students to process information more quickly and respond with greater accuracy and performance. This

study suggests that noise negatively affects students' academic achievement and teachers' performance. Many studies in the field of teaching indicate that a significant percentage of teachers, around **65%**, suffer from stress and voice health problems due to raising their voices during lessons. This leads to increased heart rate, tension, and potentially life-threatening health conditions (Shield, 2019, p. 10).

Three primary factors dominate noise in schools (Shield, 2019, p. 10):

- External environmental noise: Including traffic movement from vehicles, trains, airplanes, public markets, factories, and building services.
- Noise from students' learning activities.
- Mechanical noise sources inside classrooms: Such as ventilation systems, presentation devices, or computers.

5.4 Hygiene and School Health:

The French Ministry of Education defines hygiene as a set of principles and individual or collective practices aimed at preserving human health and protecting it to prevent infectious diseases and environmental pollution in the school setting (Edu-Scol, 2008, p. 04).

School health encompasses all aspects related to the health of students, including health services, therapeutic programs, educational efforts, and the focus on protecting them from various diseases and epidemics. This attention is not limited to students but extends to all individuals present at the school, including teaching staff and workers (Bakar & Sirat, 2019, p. 175).

School health aims to achieve the following objectives (Al-Maayta, 2007, p. 213):

- Creating an appropriate environment and the necessary healthy conditions for physical, mental, and emotional development.
- Providing special care for students with special needs.
- Obtaining a realistic picture of students' health conditions at school age through medical examinations at the beginning of the educational phase and periodic medical check-ups as required.
- Detecting health deviations, whether physical or psychological, and working on their treatment.

- Instilling healthy habits in students and raising their level of health awareness.
- Ensuring the school has a cafeteria that provides clean, hygienic, and balanced meals for students and school staff.

5.4.1 The Relationship Between Health and the School Environment and Its Physical Space:

The work of school health services primarily focuses on promoting health within the school environment. This is achieved through medical follow-ups for students by the school's medical team, which involves creating a medical file for each student. These files document medical examinations, track periodic vaccinations, and ensure the implementation of preventive and therapeutic measures within educational institutions (Khalfouni, 2014, p. 02).

Proper management of hygiene and health in the school environment is a central issue for combating diseases, epidemics, and germs that threaten the health of students and school staff. Cleaning and disinfection processes are complementary efforts aimed at maintaining the cleanliness of school buildings and equipment by removing unwanted germs and microbes. Furthermore, removing accumulated dirt from surfaces and floors across all facilities in the school building is considered a fundamental requirement for school health. This task must be carried out daily by cleaning and maintenance staff in educational institutions. These efforts can only be achieved through the consistent implementation of hygiene measures and the promotion of health education, focusing on hygiene and health safety standards. It is also essential to inform and educate all school building users about these standards while ensuring cleaning products are stored safely out of reach of children and students to prevent potential health risks (Edu-Scol, 2008, pp. 06-07).

Attention to hygiene, maintenance, and health safety must be prioritized both nationally and globally in the design and architectural planning of educational buildings. The Official Gazette of the Algerian Ministry of Education (2021) emphasized this in Article 24, which states that every school or educational institution must have a unit for health screening and follow-ups. Article 23 also mandates the presence of a cafeteria large enough to accommodate all students and dormitories with individual rooms for accommodation.

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Health education in schools can only be meaningful if the physical and organizational reality of the school aligns with its recommendations for hygiene and school health standards. This includes achieving 100% immunization coverage by establishing medical clinics in schools and providing the necessary human and logistical resources for school health activities, such as vaccinations and prevention of infectious diseases and epidemics like tuberculosis, malaria, and lice (Khalfouni, 2014, p. 02).

Additionally, constant efforts should be made to maintain the cleanliness of all school facilities, including:

- Regular cleaning and disinfection of toilets, bathrooms, and water facilities.
- Dusting and disinfecting classrooms, offices, and libraries to eliminate ground and air pollutants.
- Ensuring the cleanliness and quality of dormitories, cafeterias, and the meals served.
- Maintaining and disinfecting schoolyards and gardens by designating proper areas and containers for waste disposal. (Ibid., p. 2).

5.5 Ventilation, Temperature, Heating, Color, and Furniture in the School Environment:

5.5.1 Ventilation:

Ventilation involves introducing fresh air and expelling stale air and undesirable odors from within the organization. The goal is to create suitable conditions and an appropriate atmosphere for work efficiency while ensuring safety for students and staff in the workplace. Proper ventilation enhances their attention and concentration levels while reducing absenteeism rates (Mohamed, 2001, p. 374).

5.5.2 Temperature and Heating:

Human engineering experts recommend maintaining classroom temperatures at no more than **24°C**. Bathrooms should have a minimum temperature of **16°C**. During summer, classroom temperatures should not exceed **27°C**, or they should remain at least **5°C** cooler than the outside temperature when the external climate exceeds **32°C**, to prevent significant temperature differences that could negatively affect students' health (Slimani, 2011, pp. 176–179).

5.5.3 Color:

Colors have a profound impact on human psychology. Thus, it is advisable for school administrations to paint workplaces with colors that align with the nature of the work. Uniforms for staff and students should also feature appropriate colors that inspire joy, calmness, and focus. Colors should avoid causing agitation, conflict, or dullness, which could lead to fatigue or drowsiness. Instead, they should encourage motivation and enthusiasm (Arvis, 2020, p. 63).

5.5.4 School Furniture:

The importance of school furniture lies in two key aspects:

- Ensuring Physical Comfort: Comfortable furniture that matches students' body sizes enhances their physical ease, reducing muscle strain and improving their concentration and learning ability.
- Flexibility: Adjustable, multifunctional furniture supports various learning styles, such as individual or group work, promoting effective interaction and active participation in the classroom (Barrett, Davies, Zhang, & Barrett, 2015).

5.5.5 The Importance of Temperature, Ventilation, Heating, and Color in the School Environment

Temperature, ventilation, and heating in the school environment are essential for reducing bacterial contamination risks and ensuring the quality of the air students breathe. Teachers must ensure adequate ventilation and heating in classrooms, especially for students with respiratory conditions, by maintaining appropriate temperatures and using measures such as curtains, opening doors and windows to allow fresh air, and providing air conditioning systems with regular maintenance.

Proper air renewal is critical, particularly in small classrooms with large numbers of students, where education quality is negatively affected. Air in classrooms should be changed at least three times an hour to ensure a healthy environment. The placement and size of ventilation openings must be carefully measured to achieve an airflow speed of **1 meter per second**, not exceeding **2 meters per second**, within the classroom. Ideally, windows should be on opposite sides to provide continuous ventilation and sufficient lighting.

Poor ventilation can lead to drowsiness, fatigue, and discomfort caused by oxygen depletion and increased carbon dioxide levels. This can disrupt the body's ability to regulate temperature and eliminate excess sweat (Oweida, 1996, p. 146).

Additionally, classroom and school wall colors play a vital role. The walls should be painted in light colors as much as possible, with white ceilings to reflect light. Preferred wall colors include very light shades of yellow, gray, or pistachio, which harmonize with the school furniture and doors. These choices help minimize stress on students' nervous systems, reduce distractions, and enhance focus (Edu-Scol, 2008, p. 09).

6. The Importance of Architecture in Achieving Modern Educational Vision

The significance of school architecture is a relatively modern field with a pedagogical function. It is an essential component of education, as it has been defined by **Auxent** as an expression of the culture, lifestyles, and societal values of a specific era, allowing the development of artistic sensibility influenced by pedagogy and fine arts. Through architecture, a specific historical period is reflected. School architecture is complex, transcending the mere placement of structures on a construction site. It results from programming and design that consider numerous elements beyond the site, including cultural references, function, resources, legislation, budget, and individual needs. It is not a replicable model but also a subject of innovation (Wanis, 2018, p. 57).

The need for designing schools that enhance cognitive abilities and stimulate motivation for education through open spaces has become a fundamental requirement of our time. The book **Sustainable Schools** described school buildings over the past decade in the United States, Britain, and other countries as resembling "prisons." Students and teachers spend most of their day in poorly ventilated, dimly lit school buildings lacking visual and auditory environments, thermal comfort, adequate outdoor spaces, and proper maintenance systems. These conditions create an unhealthy environment for both students and teachers.

As a result, calls have grown to focus on designing and constructing advanced schools, despite the significant share of state budgets allocated to their development. In 1999, efforts to review and compare school designs in the United States began, revealing that significant and positive changes in the educational process occurred

with better architectural designs. This prompted a reassessment of school building designs to make them sustainable.

From this emerged the concept of the **sustainable school**, representing a new generation of school buildings with physical attributes and design treatments grounded in the core principles of sustainable architecture, such as energy and natural resource conservation. These schools create healthy educational spaces aimed at improving student performance, enhancing learning experiences, and transforming education into an enjoyable process in both the internal and external spaces of schools.

This concept embodies a unified approach: providing a healthy, environmentally friendly, and pedagogically sound environment to ensure better education and high-quality outcomes (Abbas & Jassim, 2012, p. 38).

7. The Physical Space and Its Relation to Advanced and Sustainable Schools and Their Role in Achieving the Modern Educational Vision

The relationship between the physical school space and the concept of sustainable schools can be understood through several interrelated terms and concepts that contribute to its meaning:

7.1 Green Schools:

This term refers to school buildings that are environmentally sensitive and energy-efficient. A school building that requires excessive lighting, is difficult to heat or cool, does not use eco-friendly materials, and fails to provide a comfortable and cheerful environment for its users—teachers, students, and staff—cannot be classified as a "green school."

7.2 High-Performance Schools:

These are buildings that integrate the best contemporary design strategies, construction techniques, and building technologies. They provide an optimal learning environment for students while minimizing operating costs and protecting the environment.

7.3 Eco-Schools:

Eco-Schools are designed to foster environmental awareness within the community by integrating sustainability into curricula, student activities, and school infrastructure. Their primary objective is to support sustainable development by improving both the educational environment and teaching methods. Key initiatives include enhancing curricula, managing resources efficiently, reducing waste, encouraging eco-friendly transportation, strengthening community engagement,

establishing electronic connections between schools, and promoting shared environmental practices. These efforts align with the vision of 21st-century education, emphasizing sustainability and environmental responsibility.

In Algeria, a study conducted by **Zegadi and Djemilli (2016)** in schools in the Sétif province revealed that most schools lack development, quality in their buildings and facilities, and appropriate equipment. Generally, these schools are surrounded by large fences, with cement or concrete grounds, and there is an almost total absence—if not complete absence—of greenery and plants. When greenery does exist, it is often neglected, disorganized, and lacking aesthetic or coordinated designs in the school gardens (Zegadi & Abderezak, 2016, p. 49).

According to **Robin Moore**, a researcher interested in school spaces, the best way to enhance outdoor play settings is to transform school playgrounds by replacing hard surfaces like cement and concrete with soft, grassy ones. This reduces the severity of injuries from falls. Additionally, planting shrubs to provide necessary shade, calmness, and comfort within the school space creates a healthy and enjoyable environment for play and various physical activities. Planting climbing vines and evergreen flowering plants can foster a sense of joy and aesthetic appreciation among students. Planting trees with broad or oval canopies increases shade as their crowns expand (Zegadi & Abderezak, 2016, p. 53).

There is no doubt that beautifying school spaces contributes to cultivating aesthetic taste among students. Children learn more through imitation than through direct advice or instruction. Using colorful curtains, decorating walls with expressive and educational pictures, and creating a vibrant environment enhances students' interaction with their surroundings. It also fosters imagination, creativity, and a deeper connection to their educational environment. Today, schools are no longer places where knowledge is transferred passively in ways that stifle talent and potential. Instead, they have become venues for diverse theoretical and practical activities aimed at developing skills, attitudes, and behaviors essential for life (Maalouli, 2010, pp. 109-110).

Therefore, schools must include diverse spaces, rooms, and areas that differ in size, architectural style, and equipment from traditional classrooms. What is needed are new buildings that align with the programs and teaching methods necessitated by the technological revolution. These buildings must be capable of accommodating advancements in the field of education, as they have direct and effective impacts on

shaping students' personalities. This is achieved through their openness and connection to local, national, and global communities via open spaces.

8. Models of Schools and Universities Implementing Modern Visions in Designing Physical Spaces:

8.1 Gandhi Studio Elementary School in France:

This school applies modern visions in designing physical spaces to provide a vibrant educational environment. The design features open spaces allowing children to move freely, with designated areas for group and individual interactions. The classrooms are equipped with flexible furniture that can be arranged in various ways to support diverse educational activities. Additionally, bright colors and natural materials are used to stimulate creativity and provide psychological comfort for students (Lombard, 2023, p. 45).

8.2 Thorsberg Elementary School in Denmark:

Considered a pioneering model in designing physical spaces that enhance the learning experience, this school integrates indoor and outdoor spaces, enabling students to learn in an open and natural environment. The classrooms feature movable walls that allow room sizes to be adjusted based on educational needs. The design focuses on providing a flexible and multifunctional educational environment that supports various learning methods (Nielsen, 2022, p. 78).

8.3 Innovative Insights by Dr. John Smith:

In his book *"Education in the 21st Century: Designing Physical Spaces for an Innovative Learning Environment"*, Dr. John Smith presents innovative and modern approaches to designing educational spaces that meet the needs of the 21st century. The book emphasizes creating interactive learning environments that foster creativity and collaborative learning, significantly enhancing the students' educational experience.

- **Al Noor International School in Finland:** Highlighted as a model, this school relies on open educational spaces without traditional walls, enabling the integration of classroom activities with public areas. This design encourages collaboration among students and promotes free interaction across different age groups, creating a comprehensive and multifunctional educational environment.
- **Modern Technology University in Japan:** This university redesigned its classrooms to be flexible and adaptable to various learning styles. The classrooms

are equipped with easily movable and adjustable furniture, as well as virtual reality technology to enhance the learning experience. The university has successfully created an interactive educational environment that effectively integrates modern technology into the teaching process, making learning more engaging and efficient (Smith, 2021, p. 45).

- **Singapore's Innovative Schools:** These schools are built on the concept of "active learning," with learning spaces designed to be multifunctional. They enable students to participate in group projects and practical activities, promoting hands-on learning and critical thinking. The environment nurtures practical skills alongside theoretical knowledge, encouraging initiatives and enhancing students' analytical and problem-solving abilities, better preparing them to face future challenges (Smith, 2021, p. 45).
- **Shorouq School in Canada:** Focused on the role of physical spaces in supporting students' physical and mental health, this school incorporates green spaces within its premises to create a comfortable and stimulating environment for students. The design includes areas for relaxation and reflection, helping students achieve a balance between study and rest. This approach improves student comfort levels and enhances academic performance (Smith, 2021, p. 45).

9. The Role of Physical Space in Achieving the Vision of Modern Education:

The following key points highlight the prominent role of physical space in achieving the vision of modern education:

9.1 Innovation in Physical Space:

Innovation in education requires an environment that facilitates creative thinking and encourages exploration and experimentation. This can be achieved through the design of educational spaces equipped with advanced technologies and interactive educational tools, such as open science labs, collaborative workspaces, and innovation corners. These designs provide students with broader opportunities to engage with the educational content in new and innovative ways. Designing educational spaces that stimulate creativity, using modern technologies, and providing flexible environments that can adapt to various learning methods are essential components in fostering innovation.

9.2 Enhancing Interaction:

Effective interaction between students and teachers is one of the foundations of the modern educational vision. Therefore, the design of physical educational spaces needs to include areas that allow for the formation of small work groups and provide technology that supports collaborative learning. These technologies may include smart boards, interactive display screens, and digital learning platforms that encourage participation and direct interaction.

9.3 Comprehensive Support:

Providing comprehensive support to students requires an educational environment that meets their academic, psychological, and social needs. This includes quiet spaces designed for individual study, group study areas, and support facilities such as counseling centers and specialized libraries. These environments must be flexible and responsive to the diverse needs of students to ensure an inclusive educational space that supports each student's personal and academic growth.

10. Discussion:

The analysis of the reviewed literature reveals several key findings regarding the role of physical space in modern education. First, flexible learning environments that allow for collaborative and individual learning have been found to enhance student engagement and academic performance. Additionally, studies suggest that natural lighting, ergonomic furniture, and technological integration contribute positively to the learning experience.

Moreover, the review highlights the importance of designing inclusive spaces that accommodate diverse learning needs. For instance, adaptable classroom layouts enable teachers to implement various instructional strategies that cater to different learning styles. Furthermore, the integration of outdoor learning spaces has been associated with increased creativity and cognitive development in students.

The findings suggest that while there is strong theoretical support for the importance of physical space in education, more empirical research is needed to determine the specific design elements that maximize learning outcomes. Future research should focus on longitudinal studies that assess the long-term impact of educational space design on student performance and well-being.

11. ***Conclusion*:**

This review article underscores the critical role of physical space in shaping modern education. By synthesizing existing research, it highlights how well-designed learning environments support innovative teaching methodologies and student engagement. The findings suggest that flexible, inclusive, and technology-enhanced educational spaces contribute significantly to achieving contemporary educational goals. However, further empirical research is required to establish best practices for optimizing learning environments.

12. ***Bibliography***

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