

# The relationship between Green education and sustainable development in Palestinian educational institutions

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## Abstract

Given the significance of green schools in the Arab world because they are directly linked to environmental, cultural, and educational values, the process of implementing green school initiatives necessitates extensive research into their future prospects in order to disseminate them in various countries, particularly in the Arab world, as they are environmentally friendly and promote the concept of sustainable environmental education in the classroom. On this basis, the current study intended to clarify the relationship between Green education and sustainable development in Palestinian educational institutions, focusing on the descriptive approach to present theoretical literature connected to the research topic. The study discovered that the Palestinian Ministry of Education has made continuous efforts to improve the level of Palestinian curricula and make them equitable with the level of development and change in various fields. The most notable of these efforts was Palestine's ratification of the Sustainable Development Plan 2030 and the inclusion of standards in the Palestinian curriculum framework document, including quality, human justice, dignity, and equality. By ensuring the development of sustainable cities, providing a clean environment, and preserving various resources from contamination, these standards were able to meet a set of goals of the 2030 Agenda for Sustainable Development. According to the study, the Ministry of Education should direct the inclusion of Green School educational lessons in various educational curricula, including mathematics, science, arts, computer science, and others, in order to improve students' positive attitudes toward environmental concepts by developing a methodology that includes the integration of environmental issues (including challenges and problems) in the educational curriculum.

**Keywords:** Environmental Education, Sustainable Development, Green School.

## INTRODUCTION

The school is regarded as an important educational center and an important location for acquiring various knowledge in order to achieve high levels of excellence and scientific creativity, which has given it great significance and has raised awareness to the need to pay attention to it in order for students to achieve appropriate levels of intellectual, physical, and psychological development. Many scientific studies have confirmed that the nature of the educational and educational environment has a

significant impact on the behavior of both teachers and students, as well as their levels of scientific achievement. The school's status has evolved from being a shelter for the provision of educational activities to becoming a place for the provision of services directly related to the educational process and an important center to provide students with social, cultural and psychological needs that directly affect their personalities and behavioral and moral levels (Saada, 2014; Keziz, 2019).

Mohammed (2020) emphasized that linking sustainable development to education is essential for societies to achieve the necessary life elements now and in the future, as education is the most appropriate means of achieving the principles of sustainable development and its various processes, and school curricula are the most appropriate means of achieving the educational goals necessary for individual development and society development. According to Abu Ali (2012), sustainable development aims to improve the quality of life of individuals and ensures the provision of appropriate life for future generations by taking into account future needs while maintaining current needs, as the increasing level of consumption of environmental resources without regard for the needs of future generations requires the development of trends to increase the level of positive thinking during practices that can address future generations' needs, Ghanem (2015) and Ghanem (2020) have also stated that green technology integration into the educational process is one of the current trends in overcoming environmental problems and achieving sustainable development.

Green technology, including green buildings, is critical in the pursuit of a sustainable planet, as it is possible to develop technologies that help prevent pollution in environmentally sound ways by shifting away from non-renewable energy sources and toward the use of renewable energy sources such as wind and solar energy (Ahujia, 2013). (Karpudewan et al., 2015) added that green buildings help students develop their cognitive and intellectual skills as well as their feeling of social and environmental responsibility, achieving the basic goal of sustainable development.

The Palestinian government has committed itself to environmental issues and has been concerned with protecting environmental systems of various components of water, air, and soil, as stated in Article 33 of the amended Palestinian Basic Law, which emphasizes the importance of preserving the environment and keeping it balanced and free of pollutants. As well as the development of Environmental Law No. 7 of 1999, along with its amendments,

which can also be considered as the legal reference for the protection of the environment, this law gave the Environmental Quality Authority—formerly known as the Ministry of Environment—the responsibility of caring for environmental issues, protecting the environment from pollution, reducing natural resource depletion, combating desertification, and developing environmental awareness among individuals in order to realize the concept of sustainable development that takes into account the interests of present and future generations (Environmental Quality Authority, 2017).

The Palestinian government has also attempted to develop numerous plans aimed at the environmental sector, treating it as an independent and separate sector that is an active contributor to the achievement of development concepts and aspects, and the strategic document (2017-2022) was created to move the environmental sector from being a separate sector to being an overlapping sector with the other development sectors (Environmental Quality Authority, 2017). This is in addition to Palestine's commitment to implementing the Sustainable Development Plan 2030, which was adopted by heads of state and government at the United Nations summit on sustainable development in September 2015 and aims to provide a decent and good life for all members of society while eradicating poverty (the first Voluntary National Review on the follow-up and implementation of the Sustainable Development Plan 2030, 2018), which confirms the orientation of the Palestinian government to pay attention to environmental issues to protect its various elements from pollution factors.

Since its establishment in 1994, Palestine's Ministry of Education has been working to improve the nature of school buildings and make them more ecologically friendly by establishing green buildings. Green buildings, particularly green schools, play a significant role in saving the environment and energy resources, as well as having a favorable impact on students' mentality and achievement levels by expanding educational possibilities and

integrating them with their surroundings (Saada, 2014).

The Environmental Quality Authority released the National Sustainable Production and Consumption Plan in October 2016, calling for a shift to green buildings to reduce emissions and pollutants by conserving natural resources such as water and energy and relying on renewable energy sources such as solar cells (Melhem, 2016).

Green buildings are currently in high demand due to the numerous benefits they provide and their contribution to overcoming and reducing educational and economic barriers, particularly in the educational sector. Green School helps students develop their skills and broaden their understanding of their values (Keziz, 2019). The Green School initiative is one of the actions that aims to improve the learning environment and raise learners' and teachers' awareness of issues such as environmental issues, emphasizing their importance in reducing negative environmental impact and achieving financial sustainability, as well as increasing teacher satisfaction with the educational process, which will positively impact students' academic levels and their educational desired direction (Saada, 2014).

By mid-2016, the first Green School in Palestine opened in the town of Aqaba in Tubas Governorate, with funding of 1.3 million dollars provided by USAID, where the school was built according to the Palestinian guide for green buildings, which aims to achieve the concept of environmental sustainability in buildings in order to reduce the amount of energy used in buildings and reduce reliance on non-renewable energy resources in the building, and the school has also been equipped with many elements that increase environmental awareness, such as waste separation and the provision of classrooms with lighting technologies that provide electricity (Melhem, 2016).

Based on the aforementioned, and given the importance of green schools in the Arab environment as a result of their direct link to environmental, cultural, and educational values,

the process of implementing green school initiatives necessitates a thorough examination of their future prospects in order to disseminate them in various countries, particularly the Arab ones, as they are considered environmentally friendly structures that promote the concept of sustainable environmental education. The current study aims to clarify the relationship between green education and long-term development in Palestinian educational institutions.

### **Theoretical framework:**

The first axis: the principles of the Green School and its importance in the development of future education

The responsibility of educational institutions to prepare people to be active members of society by improving their cognitive, economic, and cultural levels compelled them to deal with current and future changes by replacing traditional concepts with modern concepts that were commensurate with the nature and scale of the changes (Hanafi, 2016). Climate change is one of the most pressing issues that requires attention and consideration of solutions that can reduce the amount of emissions that contribute to these changes and effectively address various climate phenomena, with the concept of a green school or sustainable school being one of these solutions for dealing with current challenges and anticipating future challenges (Saad, 2014).

The Green School is based on the basic idea of transforming educational institutions into environmental institutions that are similar to environmental reserves, in order to comply with many international agreements, such as the "Kyoto" agreement, which aims to reduce the amount of gases that cause global warming (Keziz, 2019).

The Green School is likewise founded on the notion of increasing students' appreciation for the environment in which they live (Hanafi, 2016), this can be accomplished by creating a comprehensive and integrated plan that includes increasing green spaces in the

educational environment and ensuring that they are filled with herbs and flowers, as well as planting green grass instead of cement and asphalt in playgrounds, reducing parking space, and locating the school in a relatively close proximity to students so that they are encouraged to walk or ride their bikes to school instead of cars and buses by providing safe, convenient and comfortable walking paths for students to make it easier for them to do so. As well as reducing the amount of paper prints used in administrative affairs and attempting to recycle them, especially since an increase in the amount of paper prints consumed had a direct impact on increasing the level of climatic fluctuations because paper requires the felling of trees and the burning of vast amounts of wood to turn it into paper (Nisreen, 2017, Keziz, 2019), which requires providing students with awareness booklets containing measures and actions that students can take in order to protect the environment from pollutants, whether it is inside the educational institution or outside, since the main purpose of the Green School is to increase the level of environmental awareness among students and enable them to deal seriously with various issues related to the surrounding environment (Keziz, 2019).

The Green School has gotten a lot of attention in developed countries, but not so much in developing countries, because it demonstrates a trend toward incorporating environmental aspects into various school areas, such as physical components in classrooms and the entire administrative system of the school (Zaho and Meng, 2015). Green education, according to Hanafi (2016), is a global trend toward developing a global sense of the seriousness of environmental problems and directing efforts toward developing skills and knowledge to find solutions to environmental problems and reduce the probability of the emergence of new problems, as well as a response to global changes and developments that required a response to climate change, which resulted in the development of a new economy called the green economy, giving rise to the concept of Green School as a modern

term capable of dealing with various surrounding developments.

Therefore, the Green School's primary goal is to create a modern educational system based on the idea of environmental preservation in order to provide skills and knowledge that meet the needs of the current and future generations, where the Green School contributes to raising environmental awareness among various groups in the educational sector, such as teachers and students. It increases students' willingness to deal with environmental challenges and respond to them, as well as providing them with skills and knowledge that improve their ability to deal with environmental issues, as well as their sense of belonging to the community in which they live and their sense of responsibility to protect and maintain their community from various risks. The green school can also be viewed as a practical microcosm that represents the family's and society's lifestyles by ensuring that all elements are in balance (Saad, 2014).

Keziz (2019) went on to say that the Green School isn't just interested in improving the educational system now; it also wants to improve it in the future so that it can meet students' future educational needs by improving the nature of the behaviors and habits they practice in order to protect the environment. The student's participation in cleaning up the school, planting trees, and using natural lighting to reduce energy consumption will have an impact on the nature of his behaviors and actions, even at home, where he will be expected to practice the same activities that he does at school, contributing to the establishment of a stable and balanced environment free of environmental challenges and problems; that's why Developed countries strive to spread the culture of the Green School among individuals and in the whole society.

Second axis: the role of the Green School in supporting the achievement of students

The desire to educate students about environmental issues (environmental education) contributes to the growth of students' interest in environmental issues and

increases their desire to solve environmental problems through the acquisition of knowledge about the mechanisms that can be used to address environmental challenges. This will help them accept environmental values and policies and actions that schools can take with the aim of protecting the environment from pollution, which in turn can be applied to their surrounding environment including the neighborhood in which the student lives (Abbas, 2015). Thus, the eagerness to design classrooms that are environmentally friendly and provide a high level of comfort, whether in acoustic or thermal aspects, will motivate students to perform their duties comfortably without negative consequences that may affect their level of achievement or reduce their motivation due to fatigue. This means that green schools can be a key way to improve students' academic standards and develop a positive attitude toward learning (Keziz, 2019). There have been several indications linking the quality of the educational environment to student accomplishment in recent decades, and these indicators include (Douglas et al., 2010):

1. Fresh air minimizes the risk of diseases, including asthma, which is one of the leading causes of missing school.
2. Noise: research has demonstrated that acoustic distraction from aircraft, automobiles, and trains lowers student achievement.
3. Thermal systems: It's challenging to achieve thermal comfort since designs must balance clean air with energy efficiency and minimal background noise.

But when it comes to providing enhanced learning opportunities, data on Green Schools suggests that they contribute to better learning opportunities for students, with US Environmental Protection Agency research finding that students who attend schools in poor condition score 11 percent lower on standardized tests than students who attend schools that are in good condition and built to environmental standards (U.S. Environmental Protection Agency (EPA), 2010).

(Ozmehmet, 2005) stated that designing school buildings based on data from the surrounding environment aids in achieving the best function of the building by considering the impact of the climate on the building in terms of location and the nature of the building materials used, as well as dealing with the ventilation openings in the building so that they face the movement of wind and sunlight. The ability to offer students with adequate lighting and natural ventilation within the school building would improve their comfort and, as a result, their academic performance.

(Saada, 2014) added that educational institutions' enthusiasm to establish classrooms that meet the requirements of comfort in terms of sound, heat, and light contributes to giving students and teachers a sense of comfort and stability, as well as reducing feelings of stress, fatigue, and discomfort, thereby positively affecting students' desire to learn and enhancing their motivation toward achievement without feeling tired and fatigued.

According to Ontario's Ministry of Education (2010), using environmentally friendly heating, ventilation, and lighting systems improves the classroom environment and increases students' willingness to learn and gain educational experience. However, teaching students in classrooms that are opaque and unsuitable in terms of sound, resulting in higher noise levels, reduces the teacher's ability to communicate with students easily and quickly; thus lowering the student's desire to learn and limiting the teacher's ability to provide scientific material easily and efficiently.

When associating environmental education with students' level of accomplishment, the theoretical literature also includes various empirical data from examined study findings that indicate to sustainable outcomes in the efficiency and sustainability of students' ideas, attitudes, and behaviors, where (National Environmental Education & Training Foundation (NEETF), 2000) discovered significant improvements in students' reading, math, science, and social studies scores, as well as an increase in their capacity to transfer knowledge to new contexts and apply scientific

skills and knowledge. (Bartosh et al., 2005) and (Bartosh et al., 2006) found that students in environmental education programs obtained considerably higher standardized exam scores than students who were not proficient in energy efficiency. (Wheeler et al., 2007) confirmed that there is substantial evidence that energy efficiency can lead to considerable improvements in math and science educational attainment.

Third axis: standards and requirements for building a Green School

To establish the Green school requirements, the (U.S. Green Council, 2007), (Saada, 2014), and (Ministry of Education- Ontario, 2010) revealed a collection of standards that must be followed in the educational environment to establish a clean learning environment in which various factors are comfortable in terms of visual, thermal, and acoustic comfort, these requirements can be divided into the following:

1. Site preparation and sustainability requirements

a) Ensure that soil loss is prevented during the construction of the school, and ensure that the soil is stored for use on site.

b) Protect the air from pollution during the construction process.

c) Ensure that the work site is free of unsafe contaminants.

d) Ensure the sustainability of the work site by taking into account a set of elements, including:

□ **Worksite:** It must be verified that the school site on which it will be built is not agricultural land, an environmental reserve, prone to water runoff, or historically significant.

□ **Environment and surroundings:** It is necessary to ensure that the chosen site supports biodiversity and contributes to the improvement of the affected environmental areas by expanding green spaces, controlling erosion in local soil, ensuring the cultivation of plants that are more adapted to the environment

and require less follow-up, and using approximately 10% of the site area for tree planting with a focus on native species.

□ **Transportation:** by choosing a school site that is close to a public transportation line so that students can walk there, ensuring the provision of a safe line for cars and bicycles, lines for walking pedestrians without endangering them, and ensuring that approximately 80% of students attending the school are within a radius of 1.2 from first to eighth grade. Students in higher grades must be within a 2.4-kilometer radius.

□ **The climate surrounding the site:** it is necessary to be careful to orient the building to create a balanced environment by directing the building to exploit the slope of hills or trees to provide appropriate shade to the south or north, and to use white color in painting the surfaces to reduce the level of its impact on heat.

□ **Ensure that rainwater is collected for reuse or transfer to the municipality.**

□ **Reduce the amount of external illumination and ensure that the lights are turned off when the school day ends.**

2. **Efficiency in the exploitation of Water Resources:** Through the employment of modern technologies to deal with rainfall and wastewater, drinking water usage could be reduced by 20% of the average value in the summer.

3. **Efficiency in the use of energy resources:** By providing the building with an insulation system to deal with hot and cold weather, where the building is oriented to the south side and the ratio of openings to wall is 40/60 in case of cold climate, as well as relying on the use of electrical systems that are highly efficient and at the same time do not consume a large level of energy, and make sure not to use devices that contain chlorofluorocarbons (CFC), and ensure that the building is tightly closed so that the air leakage from the building or the inside of the building should not exceed 10 m<sup>3</sup>/h of the building envelope, in addition to the ideal exploitation of renewable energy resources.

4. Resources used in green design: which includes the following:

- a) Designate a storage area for non-hazardous products that can be recycled that is easily accessible.
- b) Establish a particular waste management program for the whole construction phase that includes the recycling of 30% of construction waste and demolition by weight or volume, excluding hazardous trash.
- c) Avoid using hazardous materials in construction, such as asbestos.
- d) The use of environmentally friendly materials that regenerate quickly and are non-polluting.
- e) The use of high-quality lighting.

Fourth axis: the role of the Green School in achieving sustainable development

To reach the concept of sustainable development, members of the community must commit to environmental, social, and cultural ethics and seek to develop them by increasing their positive awareness of the importance of preserving the environment, moving away from negative practices that increase the likelihood of pollution, and reducing the use of non-renewable resources and moving toward the use of renewable resources (Saroji, 2009). The concept of sustainable development consists of three basic elements that are related to each other, affect each other, and interact with each other in order to provide a comprehensive system capable of achieving environmental balance; these elements are human, economic (depends on the orientation toward the use of modern technology), and ecological, any flaw in one of these elements results in a lack of understanding of development due to resource depletion (Jamil, 2008).

Development in general pursues a set of objectives, including; improving individual quality of life by increasing their awareness of the proper way to deal with the environment, increasing economic growth, and expanding opportunities for government-private sector

collaboration, particularly in terms of training, education, and guidance to improve reproductive environmental trends, as well as contributing to the development of natural resources and their logical and proper use without depletion, which adds to the effect of suitable change in society by addressing people's demands in a way that is compatible with the environment (Tawil, 2013).

There must be a set of requirements to achieve the concept of sustainable development, one of which is the application of strategies that are consistent with the concept of development and contribute to resource sustainability, and these strategies include the application of green schools, which is one of the most prominent initiatives to create sustainable communities with the help of schools in achieving the following (Keziz, 2019):

1. Developing a green economy.
2. Increase the rate of economic expansion.
3. Balance the economic and environmental domains.
4. Encourage energy resource utilization to be more sensible.
5. Reduce the negative impact on the environment by relying on environmentally friendly resources

Green school programs are a recent trend in environmental education and minimizing environmental damage, with green buildings being one of the essential features of a green school that is supposed to prevent environmental damage and preserve a healthy environment (Ragheb et al., 2016; Iwan and Rao, 2017). The green school building process is based on enough natural light, good ventilation, indoor air quality, efficient renewable energy, and the use of safe building materials (Suryani et al., 2019).

Keziz(2019) stated that the Green School has been successful in reaching the Sustainable Development Goals since it is a building that has low operating expenses, low negative environmental impact, and efficient energy

consumption. The green school, according to Saada (2014), can be described as an environmentally and financially sustainable school that contributes to the psychological comfort of the various groups that use it, and is characterized by:

1. Energy consumption is reduced.
2. Minimize environmental effect to preserve the environment.
3. It improves the quality and effectiveness of the educational process by providing comfortable conditions for both teachers and students, resulting in a more positive attitude toward school.
4. According to the results of a study conducted by school boards in Ontario, Canada, standard school buildings are typically constructed to last 50 years. During this time, the school may require more operational and maintenance costs than design and construction costs, but this does not apply to green schools, as they contribute to offset the additional costs of construction and design more than once over the life of the operational building, thereby actively contributing to the educational institution's material profit. These structures typically cost 5-10% more than typical schools in order to be designed and constructed; however, this cost is recovered during the life of the building due to the lower running expenses of these buildings when compared to normal schools (not green) (Ministry of Education- Ontario, 2010)
5. Limit the amount of consumption of Water Resources and energy resources because of their reliance on renewable resources.
6. It provides financial economic returns to the school, which can be utilized to offset the additional cash needed.
7. Assist in meeting the educational demands of various populations.
8. Improve the water quality used.
9. Recycle and utilize used materials instead of disposing of them as waste.

10. Promote the principle of sensible green land use by eliminating unjust land use.

When considering the operating and maintenance expenses of electricity, water, sewage, and other Green School components, the green school project can be regarded an investment project over the life of the facility.

Fifth axis: Comparing the use of green schools in worldwide and Arab models, as well as locally

Most developed countries, like the United States and the European Union, have been able to successfully implement the Green School Initiative in part of their schools and are working to do so in the rest of schools. The international movement for a green school began following the 1992 global summit in Rio de Janeiro, Brazil, which emphasized the need to balance the globe's capacity with the requirements of the global population; i.e., sustainable development (Keziz, 2019). However, due to schools' failure to adhere to the standards and conditions essential to assure the initiative's success, its implementation in developing countries is still restricted and filled with obstacles. The following is a list of the most popular green school models used globally and in the Arab world (Keziz, 2019):

1. Green School in Bali, Indonesia: Founded in 2008 by Canadian entrepreneur John Hardy, who wanted to create a modern educational model capable of positively influencing students and enabling them to be active and productive by providing them with the necessary knowledge, the American Green Schools charity center and the American Green Building Council awarded it "the greenest school in the world" award in 2012 (Hamdi, 2013).

The school is a non-profit educational organization dedicated to enhancing young people's skill and willingness to attain their goals and make a positive contribution in society. To achieve the green school, the school has used a variety of strategies, including (Keziz, 2019):



a) Remove the building's reliance on the electric power grid and increase its energy self-sufficiency by producing 72 kWh of the energy it consumes.

b) Create laboratories in which students can work on educational projects.

c) Mobile phones and computers are replaced, discarded batteries are collected, and a battery bank is established.

d) Carbon dioxide emissions are being cut by almost a third.

2. Green School in Tanzania: a network of three green schools aimed at increasing students' and parents' understanding of the importance of renewable energy and the importance of relying on it, as well as reducing logging and deforestation practices in order to establish the concept of environmental sustainability. The school was awarded the "Zayed Future Energy Prize" in the area of the worldwide prize for secondary schools in Africa in 2013, and it contained a number of characteristics that support sustainable development, including:

a) Install an 8kW solar PV system to supplement energy needs.

b) Lower energy bills

c) The involvement of over one thousand students in attaining these goals in order to promote the notion of sustainable development and raise awareness of the importance of the trend toward alternative green solutions.

3. Green schools in China: Since 2000, China has embraced the notion of a green school, which now accounts for around 5.2 percent of all schools in the country, with plans to grow the number of green schools. Green schools in China served as a model for many developing and Arab countries seeking to promote the concept of green schools and encourage schools to use them to achieve sustainable development, with countries holding competitions between schools to

encourage students to pay attention to environmental issues and aspects.

4. Green schools in the United States of America: In 2010, green schools accounted for about one-third of all educational institutions in the United States, and between 2009 and 2012, nearly 90% of schools were renovated to become green following green building standards (Hanafi, 2016).

5. Green School in Dubai: The "New Riyadh" school is the first Green School in Dubai, developed by the Dubai government in an effort to increase the standard of the educational process to international levels and as a step toward achieving the notion of sustainable development, and it has been accepting students since 2016.

By lowering energy and water usage, the Ministry of Public Works, in partnership with the Ministry of Education, has attempted to transform most schools in Dubai into green and ecologically friendly schools. Such schools strive to improve educational outcomes, implement sustainability standards in various state buildings, and pay attention to and preserve green spaces, all of which contribute to increased environmental awareness and appropriate utilization of resources.

6. Green schools in Abu Dhabi: these schools use the "Green Schools" Guide to improve their environmental orientation, promote student participation in the educational process, and ensure the integration of environmental standards and concepts in the educational curricula in a way that enhances the level of environmental awareness among students and encourages them to engage in positive community behaviors to protect them from pollution.

It is clear from the above examples of the application of the green school that the Green School is of great importance in the world, where this importance of the Green School may be shown in the awards given to these schools in order to encourage and expand the concept of the Green School on a global and Arab level, such as the "Zayed Future Energy Prize" and "the greenest school in the world". The Green

School in China is one of the most prominent schools concerned with environmental issues, and the Green School in Tanzania is an important model for providing an appropriate educational environment in the implementation of activities. As well as the importance of green schools in Abu Dhabi, which aimed to develop the level of awareness of students and parents of environmental aspects to achieve sustainable development, and the Dubai Green School, which contributed to enhancing the quality of education and reliance on renewable energy sources. When looking at the international experiences of implementing the green school, it should be noted that these countries have a greater tendency to apply the concept and their constant and continuous pursuit of expanding the scope of application, as opposed to developing countries, where the scope of application of the Green School is still limited and requires more awareness to overcome the economic, environmental and cultural challenges that exist in the Arab environment and through the use of distinguished international countries as a model for the construction and design of green schools in developing countries. Arab countries could also consider awarding prizes and incentives to schools that undertake green school projects, as well as schools that remodel traditional schools and turn them green, like the United States has done.

Sixth axis: linking the Palestinian curriculum to the values of the Green School to achieve sustainable development

The political movement in Palestine that began in 1993 and resulted with the foundation of the National Authority in 1994 influenced the Palestinian curriculum, and these sympathies constituted influences that contributed to the changes in the Palestinian curriculum (Ministry of Education, 1998).

The Palestinian Ministry of Education has worked to realize the Palestinian people's ambitions and improve the Palestinian character through the Palestinian curriculum, especially given the Palestinian people's challenging conditions. In 2000/2001, the Ministry of education developed a national

strategy for the form of the Palestinian curriculum, which was completed in 2006/2007 through the completion of the twelfth grade curriculum (Ministry of Education, 2008). In 2015, based on a set of evaluation studies conducted on educational curricula, which confirmed the weak level of inclusion of life skills in educational curricula, and in response to changes and technical developments that affected various fields, the Ministry of Education quickly began to develop educational curricula to take modern curves proportionate to the requirements and trends of the Twenty-First century, and it aims to connect the concepts contained in the curricula with the courses of life skills and its thoughts (Ministry of higher education, 2016).

Given the importance of educational curricula in achieving educational goals, it is necessary to constantly strive to develop educational curricula in order to keep up with changes and continuous developments to keep students informed of the level of development and progress in various fields due to the human being as the primary driver of change and an effective contributor to achieving the concepts of Sustainable Development (Mohammed, 2020). UNESCO (2013) emphasized the importance of designing educational curricula with the goal of achieving the Sustainable Development Goals, in which sustainable development contributes to improving the quality and quality of life of individuals while also ensuring that their current and future needs are met, it also ensures economic balance in society. In this area, Abu Ali (2012) explained the importance of linking environmental learning with learning to achieve the goals of Sustainable Development; Environmental learning is a branch of sustainable development that includes care to prevent the depletion of resources and reduce the amount of consumption, as the involvement of the current generation in environmental issues and raising their awareness of the importance of conservation and pollution protection is an educational source that will enhance the culture of the current generation and their level of awareness of the need to conserve resources, reduce consumption, rationalize

energy use, and shift to renewable energy sources utilizing cutting-edge technology to achieve the concept of a sustainable environment capable of serving the demands of the current generation and future generations.

Saada (2014) emphasized the importance of linking the educational institution's design to the school curriculum in terms of environmental education, where the green school can improve students' desire to learn by transferring the educational process from a theoretical framework included in the curriculum to a realistic framework and realistic picture that students live in the Green School and deal with on a daily basis when they go to school.

Keziz, 2019 added that the ability to link environmental activities to educational curricula is a critical step in raising student awareness of the importance of protecting the environment from pollution by providing them with positive practices that foster these attitudes and emphasize the need to invest in renewable environmental resources and rely on them in educational facilities.

As a response to what the studies pointed to the importance of designing educational curricula so as to ensure the achievement of the axes of sustainable development as education is the main pillar to develop the concepts of sustainable development and achieve its goals (Chakraborty et al., 2018; MacKellar et al., 2020), In response to official UN studies emphasizing the need for nations that have adopted the 2030 Agenda for Sustainable Development to commit to designing education frameworks and developing curriculum that take sustainable development standards into account, including their activities and content; The Palestinian curricula attempted to incorporate aspects of sustainable development into their design, as evidenced by the criteria contained in the document of reference for the Palestinian curricula. It was ensured that these standards, including the standard of quality, justice, human dignity, and equality, were included in the Palestinian educational curricula, and that they were able to meet the fourth and fifth goals of the 2030 Agenda for

Sustainable Development, such as improving education and achieving economic growth by providing a clean environment and creating sustainable cities and green schools through which the natural environment is protected from various sources of pollution (United Nations, 2015; Ministry of higher education, 2016).

(Chakraborty et al., 2018) emphasized that with the advancement of education for sustainable development, there has been a common development in pedagogy where sustainable development has been integrated into all levels of education through the curriculum becoming green, where the green curriculum associated with the Green School is a real investment course of study because it encourages environmental awareness as well as participation in reducing adverse environmental impacts.

The seventh axis: environmental education and the characteristics of the attractive school (outdoor education)

Environmental education is a relatively new concept that arises primarily from the interaction between the environment and education, and due to the diversity of concepts associated with education, many concepts have been assigned to environmental education. Some have stated that environmental education includes the development of economic, social, and cultural concepts among individuals, while pointed out that environmental education takes into account the foundations that can be relied upon to protect environmental resources including plant and animal ones (Wahibi and Ibtisam, 2003). Mutawa (2005) also showed that environmental education contributes to the involvement of the individual in addressing environmental problems and developing appropriate solutions based on available resources. Environmental education, according to BaniFaris (2009), contributes to the development of an individual's abilities and skills to deal with and address environmental problems because it represents formal and informal bodies' efforts to provide individuals with an appropriate level of environmental awareness.

When linking the concept of environmental education to the green school, it is clear that three objectives of Environmental Education seek to achieve through the green school, which are (Keziz, 2019):

1. It enhances the student's awareness of the interconnections between the various parts of the environment and the extent to which they impact one another, allowing the student to comprehend the nature of the complex environment and effectively cope with it.
2. Improve students' understanding of the importance of environmental preservation and its impact on achieving sustainable development in all aspects (economic, social, and cultural), thereby contributing effectively to society's prosperity and safety.
3. Instill in students a greater appreciation for the significance of stepping up efforts at the state level to ensure a healthy, non-polluting ecosystem.

As a result, the Green School's primary philosophy is based on the need to conserve the environment and protect its natural resources from threats by increasing students' understanding of environmental issues in a way that contributes to the implementation of economic development ideals. This means that the Green School is dynamic as a result of the growth of classroom and extracurricular activities inspired by the natural surroundings (Hanafi, 2016). (Ramli et al., 2012) also stated that the establishment of green schools will ensure that students are provided with distinctive and unique ways to learn in a healthy environment capable of saving costs resulting from operations and maintenance.

Environmental education is linked to outdoor education, which is an essential part of Curriculum Development that benefits both children and young people alike, including achieving the physical benefits of being outdoors by improving balance, strengthening bones and muscles (Dietze, 2016), and boosting immunity and energy levels (Suzuki, 2017). Outdoor environmental education also includes the study of natural settings, as well as their historical context, social challenges, and

aesthetics of civilization and its surroundings. As a result, one of the primary goals of environmental education is to examine how landscapes, social infrastructure, and cultural traditions interact and shape one another (Sobel, 2005).

(Sutherland & Legge, 2016) emphasized that one common trend in outdoor education is to encourage students to feel environmentally responsible in order to graduate students who care about the environment and are motivated to develop solutions that contribute to mitigating global problems such as climate change and biodiversity loss.

This means that the negative factors that students may be exposed to in the classroom can be addressed by creating a unique learning environment with features that aid the learning process and increase students' willingness to learn. This necessarily falls within the concept of an attractive school, which is defined as a school with a set of features that increase a student's desire to learn and increase their level of enjoyment in it, as well as encouraging active participation in dialogue and the use of democratic practices to create an effective educational system (Abdel Fattah, 2015). This means that the student's role will no longer be that of a passive receiver, but rather that of an active participant in the educational process, with the environment taking into account educational differences among students and encouraging the use of various educational strategies based on modern technology (Hanna, 2016).

Briefly, the characteristics of an attractive school can be summarized as follows:

1. Efficiency of the psychosocial environment
2. The physical financial environment's efficiency.
3. The quality of the standards used to assess the educational level's quality.
4. Provide equal educational opportunities to all students.

5. Make sure students have access to safe drinking water.
6. Create an environment that encourages students to talk.
7. Provide students with sanitary facilities that are clean and acceptable.
8. Taking into account individual differences between students
9. Provide safety for students both inside and outside the classroom.
10. Provide spacious, green playgrounds for students to improve their physical health.
11. Provide several teaching approaches based on the curriculum's nature.

This means that the attractive school has a set of characteristics that set it apart from traditional schools, such as encouraging students to participate actively in the educational process, increasing their awareness of problems and challenges in their environment, and motivating them to develop the best solutions to those problems.

### Previous studies

First: previous studies related to the Green School and its importance in the development of future education

A number of studies were conducted to clarify the role of the Green School in the development of future education, including Hanafi's Study (2016), for example, looked into the aspects of the Green School as a means of reforming technical education as a result of changes and advances. The study used a descriptive technique to get to the conclusion that the Green School is a model for equipping students with a set of technical and environmental skills that are eager to protect the environment from pollution in order to achieve aspects of social evolution. This requires raising students' awareness and knowledge of environmental issues, as well as their ability to devise acceptable solutions.

(Kerlin et al., 2015) conducted a study aimed at analyzing the structure of the Green School as suitable laboratories for learning by identifying teachers' perceptions of the direction of the design of green schools. The study used an anthropography approach with interviews and group discussions to assess the structure of the Green School as appropriate learning laboratories by determining teachers' impressions of the direction of the design of green schools. The findings revealed that teachers' perspectives differed, with some having a positive attitude toward green schools and others having a negative attitude, with other teachers refraining from expressing their thoughts in the field.

On the other hand, (Ramli et al., 2012) conducted a study to present a collection of data connected to the subject of Green School Employment and to clarify the influence of the design of these schools in Malaysia, finding that the design of these schools has a number of positive effects on the level of education. These impacts are a result of the characteristics offered by these schools, which include improving air quality, minimizing high or low light levels, reducing noise, maintaining a proper temperature in the building, and assuring efficient management of the facility's various energy resources.

Second: previous studies related to Green Schools supporting student achievement

By relying on the findings and assessments of prior studies and research, (Douglas et al., 2010) established a set of effects that result from students learning in a green school environment. One of these impacts is the Green School's contribution to raising student scores by 3 to 4 percentage points on standardized tests, as well as the Green School's contribution to a 15% decrease in absenteeism and a 5% rise in student test results. The findings also revealed that transferring students to green schools lowered their absenteeism rates by 15% compared to their former schools. Students who switched from a traditional school to a green classroom saw significant improvements in their health, as well as a 19 percent

improvement in average oral reading fluency scores.

(Ghent et al., 2014) did a study to see how much of an influence a green school has on students' standardized test scores. The study used an analytical descriptive approach, collecting data on student rates grades for three years prior to the Green School's establishment, and for three years after, in reading and math tests for fifth and eighth grade students, as well as mathematics, English language arts, and biology grades for high school students. The study discovered that in many schools and across subjects, the Green School ranking was favorably connected with standardized test success rates.

Based on a review of research and the findings of relevant studies in the field, Browning and Rigolon (2019) investigated the influence of a Green School on student accomplishment. The nature of the correlations between academic results, types of green spaces, and distances at which green spaces were assessed near schools were studied in 13 articles. Many studies have identified connections between green space and academic achievement, and the researchers hypothesized that green space can help eliminate these differences in the long run. End-of-term scores and college entrance examinations also revealed a higher proportion of favorable associations between student accomplishment and learning at a green school than math or reading test results.

Third: Previous studies on the role of the Green School in achieving sustainable development

The Green School Initiative, which began in October 2013 and is financed by the Suriname Conservation Foundation and the State Oil Corporation for Community Development, was reviewed by the Somwaru (2016) study at a national level at every primary school in Suriname. The study concluded that the Green School's main goal is to create a diverse society in a sustainable and safe manner by creating conditions that promote the realization of the concept of sustainable development, such as biodiversity, waste management practices such as reduction, reuse, and recycling, and water

and energy conservation practices. According to the results, all primary schools will be recognized as "green schools" by August 2016, with the green theme becoming an official element of the primary school curriculum.

Keziz (2019) examined the importance of employing a Green School in achieving the concept of a sustainable society, as the study relied on a descriptive approach to data collection, and concluded that the Green School is currently regarded as one of the development requirements due to the promotion of environmental education practices, which is a new style of education that affects students' awareness of the importance of preserving the environment and protecting it from various pollutants. The study highlighted the potential for the Green School to be implemented in Arab countries, as it is in developed countries such as China, to strengthen Arab societies' capacity to achieve sustainable development principles.

(Gough et al., 2020) also did a study to determine the level of influence of the Green School Initiative on Sustainable Development, which was based on a review of a set of experiences from nations that have implemented the Green School initiative. Green Schools, according to the study, aim to improve all aspects of the school and its categories, ensuring the improvement and efficiency of the educational process through the improvement of school surroundings. It also included encouraging students to address environmental issues and explore local solutions, as well as thinking globally and changing student attitudes and behaviors as part of the development of a sustainability mentality.

Abdel Aal (2021) conducted a study aimed at identifying the role of green universities in addressing the challenges that scientific research faces in order to address environmental issues, based on the work of Wageningen University and studies in the Netherlands, as well as Sherbrooke University in Canada. Green universities, according to the study, play a clear and essential role in accomplishing the ideals of sustainable development, since the term "green university"

refers to the practices that universities attempt to implement in order to be environmentally friendly and conserve energy resources.

In addition to the Al-Qudra study (2022), which aimed to present a proposed vision for transforming Palestinian schools into green schools in light of global models based on an analysis of the reality of green schools in Palestine, the study used a descriptive analytical approach and an environmental analysis method (SWOT). The study discovered that the concept of Green School takes into account a variety of factors, including corporate culture, educational process features, and student consumption patterns. The results also revealed that green schools can be an important tool for achieving sustainable development principles by addressing global environmental challenges, with the Ministry of Education in the Twenty-First Century eager to incorporate Green School concepts into educational curricula and to implement green energy generation projects in educational institutions.

Fourth: previous studies on the curriculum's connection to green school principles for sustainable development

The researcher had trouble identifying studies that discussed the level of inclusion of green school concepts in the educational curriculum, since only a few were found that addressed this topic, the most important of which are (Chakraborty et al., 2018) which stated that technological and industrial growth is poisonous in causing negative repercussions of unsustainable production and consumption practices in India, where it is commonly acknowledged that education for sustainable development minimizes the danger of environmental degradation and resource depletion. As a result, the study used content analysis to determine how well Green curricula are integrated into engineering education. According to the green curriculum index, Indian technology education emphasizes vertical integration over horizontal integration of green curricula, resulting in the development of an unsustainable green culture and environmental behavior among students. It was

emphasized that rather than responding to official initiatives to establish a low-carbon green economy, higher education institutions must comprehend and appreciate the necessity of sustainable development.

Al-Amayra (2019) study aimed to determine the degree of inclusion of green economy requirements in the curricula of the College of engineering and their relationship to the degree of environmental awareness among its students, where the study relied on the descriptive method of correlation and used questionnaires to collect data from 18 faculty members and 208 students. According to the study, the field of capacity building and skills development has the greatest requirements in the College of Engineering's curricula, followed by the field of Environmental Strategies in second place, and scientific research and innovation in third place. The findings also revealed that there were no statistically significant differences in the level of inclusion of green economy requirements in the College of Engineering's curricula between the responses of the study sample members (students and faculty members).

Mohammed (2020) also conducted research with the objective of building an environmental sustainability and positive thinking curriculum for middle school students based on the principles of green chemistry and its applications. To reach the study objective, the researchers used a descriptive analytical approach, it relied on establishing a list of green chemistry principles and applications, preparing a list of criteria to be considered in the content and objectives of the middle school science curriculum, and preparing a scale of positive thinking to collect data. The research found that the indicators for the standards of green chemistry principles and applications were only mentioned briefly in the first preparatory science textbook, which only included three indicators: energy transitions, security archives, and determining real-time pollution prevention. It was also discovered that teaching the proposed module based on green chemistry principles helped third-grade preparatory students build environmental sustainability awareness.

Al-Sayyed& Al-Sayyed (2022) conducted research to develop a future home economics curriculum based on the Green School's standards in order to implant sustainability concepts and green product creation skills in female vocational middle school students. To achieve the goals, the study used an experimental strategy and two data gathering instruments: creating a list of requirements for becoming a Green School, identifying a list of sustainability concepts, and developing a list of sustainability concepts. A cognitive test of sustainability concepts, product innovation skills and an academic buoyancy scale were also relied upon. The instruments were applied to a sample of 56 first-graders.

The study found a positive correlation between the growth of sustainability concepts and academic buoyancy.

Comments on previous studies and the state of the current study:

1. Previous studies in the adopted curriculum agreed with the current study in achieving the goals, including the studies of: Hanafi, (2016), Gough et al., (2020), and Douglas et al., (2010); they all depended on the Descriptive approach. On the other hand, there are other studies that used different methods, such as the study of Kerlin et al., (2015) that used the Anthographic method; the studies of Ghent et al., (2014) and Mohammed (2020) that used the Descriptive-analytical approach; the study of Al-Amayra (2019) that used the Associative descriptive approach; and finally, the study of Al-Sayyed& Al-Sayyed that depended on the Experimental approach.

2. Previous research has found that the need to think about strategies to improve the educational system's efficiency and thus meet the needs of current and future generations stems from the magnitude of challenges and changes in countries and societies. These changes necessitate the need to think about strategies to improve the educational system's efficiency and thus meet the needs of current and future generations. The importance of the Green School and its active role in achieving sustainable development and dealing with

global developments, such as climate change and global warming, has been recognized in past research.

3. Despite the importance of studying the Green School as an initiative to achieve sustainable development and improve student levels, there is a severe lack of Arab studies that have been researched in the field, unlike Foreign Studies, which are considered rich and broad in this field, where they looked at many aspects related to the green school subject, including students' achievement and achievement levels, their impact on health, their impact on the environment, and their impact on Sustainable Development and other aspects. This confirms the existence of a gap in the Arab theoretical literature, necessitating the need for additional research in this area, as this gap reflects the low level of interest in this field among Arab countries, despite its enormous importance and impact on achieving sustainable development in the current era.

4. There was no study that addressed the connection between Palestinian curricula and Green School values, as what was found in this area were merely paragraphs from previously published studies and research. The current study aimed to examine and highlight this aspect, which makes it particularly important because it focused on this topic.

5. The current study differs from others in that it incorporates a variety of topics that have previously been discussed separately and separately in other studies, such as the Green School, Environmental Education, sustainable education, and outdoor education. As well as the attractive school concept, this is one of the few studies that has focused on it and tied it to the Green School Initiative and sustainable development.

### **Discussion, findings and recommendations**

1. The Green School is a broad concept that expresses the requirements of sustainable development as well as the success of educational institutions and their ability to



achieve set goals as it contributes to the development of the complementary fields of social, cultural, environmental, economic, and educational development.

2. Environmental issues must be integrated into the content of the curricula at all levels of education in order to raise awareness of the seriousness of environmental problems in the school environment and to assist students in comprehending the various aspects associated with social, natural, and economic factors that ultimately lead to the concept of sustainable development.

3. Most European countries, particularly Canada and the European Union, have been able to effectively and successfully implement the green school experience, but this level has not yet been reached in developing countries, which, while they have made significant progress in meeting international environmental requirements and standards, still face numerous economic and cultural challenges that limit their ability to achieve excellence in this field.

4. In contrast to the experiences of developed countries that have proven successful in implementing the Green School and seek to spread their experience to the rest of the developed world, developing countries have not all been able to implement the Green School because they still face many economic and cultural challenges in this field.

5. When compared to a traditional school project, a green school is a long-term investment because the greater design and building expenses are balanced and even generate an additional return from operation and maintenance expenses.

6. Providing a learning environment with good lighting and ventilation that makes students feel comfortable and allows them to see and hear each other appropriately has been proven in numerous studies to have a direct connection between students' learning in green schools and their performance levels and achievements. As a result, it creates all of the necessary conditions for students to be able to innovate in the classroom and improve their

performance. In other words, a green school can help a kid succeed by:

a) improving the educational atmosphere and creating comfortable learning conditions for students

b) Make appropriate changes to the learning environment, such as sound, lighting, temperature, and ventilation.

c) To be able to collect from operational costs and recycling processes, which may then be used to enhance classrooms as needed.

d) Allow students to do tests and school work without feeling tired or distracted, and away from noise and other sources of discomfort.

7. The school curriculum is considered to be the starting point for keeping up with economic, technological, and social changes, and it is the pillar toward which societies must turn to rehabilitate current and future generations so that it is based on the basic principle of achieving sustainable development, which is precisely what was confirmed by the standards contained in the document of reference for Palestinian curricula.

8. Outdoor education is one of the types of education that can be used under the concept of environmental education, in which it is based on the study of natural environments and how their elements interact, as well as identifying the challenges that face achieving sustainable development in all of its aspects, so that its educational effects on students are positive.

9. An attractive school is a type of school that provides students with effective learning opportunities and encourages them to achieve by providing a learning environment that includes a variety of educational activities that improve students' skills and ability to effectively deal with problems in the environment.

10. Environmental education is strongly intertwined to the concepts of sustainable development and green schools, as they are all

interconnected and affect one another to attain the desired social balance.

11. The Palestinian Ministry of Education has been working hard to raise the level of Palestinian curricula and align them with the pace of development and change in various fields, the most recognizable of these efforts was Palestine's ratification of the 2030 Sustainable Development Plan and the inclusion of quality, justice, human dignity, and equality standards in the Palestinian curriculum framework document, where these standards were able to achieve a set of 2030 Sustainable Development Plan goals by ensuring the establishment of sustainable cities, providing a clean environment, and protecting various resources from pollution.

#### Recommendations:

Based on the results of previous studies, the researcher suggests the following:

1. To promote developing countries' ability to implement green schools in the educational sector, the next generation must be made more aware of the importance of environmental problems and develop their responsibility for environmental issues.
2. The Ministry of Education directs the inclusion of Green School educational lessons in various educational curricula, including mathematics, science, arts, computer science, and others, in order to improve students' positive attitudes toward environmental concepts by developing a methodology that incorporates environmental issues and issues (including challenges and problems) into educational curricula.
3. The necessity to give rewards at the Arab country level to encourage the concept of green schools, so that schools that are best able to apply green school standards and requirements successfully and superiorly are rewarded.
4. Invite researchers to perform further studies in the Arab world in general, and the Palestinian world in particular, relating to the research issue, using alternative methodologies such as analytical or comparative approaches to

broaden the range and accuracy of the results that can be obtained.

#### References

- [1] Abu Ali, Nasif (2012). Sustainable development in traditional architecture in Saudi Arabia. Master thesis, Umm Al-Qura University, Saudi Arabia.
- [2] Abu Ali, Nayef (2012). Sustainable development in traditional architecture in Saudi Arabia. Master thesis, Umm Al-Qura University, Saudi Arabia.
- [3] First Voluntary National Review on the follow-up and implementation of the 2030 plan for Sustainable Development (2018). Sustainable Development Goals. Available on: <http://www.palestinecabinet.gov.ps/WebSite/Upload/Documents/PNVR-Ar.pdf>.
- [4] United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development. Available on: <http://www.un.org/sustainabledevelopment/ar>.
- [5] Bani fares, Mahmoud (2009). Environmental education in the school curriculum. Jordan, Hamada foundation for university studies, publishing and distribution.
- [6] Jamil, Muhammad (2008). The role of the school of basic education in achieving the principles of sustainable development. A1, Arab educational, cultural and scientific organization. Tunisia: International Association of Dawa and Islam.
- [7] Hamdi, Ghada (2013). Green School in Indonesia. Available on: <https://www.almasryalyoum.com/news/details/241085>
- [8] Hanna, todry (2016). The attractive School is a gateway to address the phenomenon of girls dropping out of Education. Faculty of Education, Mansoura University.
- [9] Hanafi, Muhammad (2016). Green School, a proposed vision for the reform of technical education in the light of global developments. Faculty of Education, Mansoura University.
- [10] Saroji, Talaat (2009). Social development from modernity to globalization. Cairo, modern university office.
- [11] Saada, An Evaluation Study of green government schools in the West Bank.

- Master's thesis in Architecture, Faculty of Graduate Studies, An-Najah National University, Palestine.
- [12] Saad, Imad (2014). Environmental education between responsibility and sustainability. E-cities environment magazine issued by the Center for education and environmental awareness in the UAE. No. 9, Environment Center for Arab cities.
- [13] Environmental Quality Authority (2017). Cross - sectoral Environment Strategy 2017-2022. Available on: <https://andp.unescwa.org/sites/default/files/2020-10/Cross-sectoral%20environment%20strategy%202017-2022.pdf>.
- [14] Tawil, Fatiha (2013). Environmental education and its role in sustainable development –a field study in the middle education institutions in Biskra city-. Thesis for PhD in sociology, Mohammed Khedr University-Biskra -.
- [15] Abbas, Bahman (2015). Green architecture. Research on green buildings.
- [16] Abdel Fattah, Hoda (2015). How to make School attractive to the child. Fourth and second international scientific conference. Faculty of Education Port Said University entitled Towards a child-friendly school between April 18-19.
- [17] Ghanem, Tafida (2015). A proposed module in green technology based on the process of technological design and its effectiveness in developing the skills of designing technological models and decision-making in the Environmental Science course for third grade secondary students. Journal of scientific education, 18 (1), 1-44.
- [18] Ghanem, Tafida (2020). The inclusion of national and International Sustainable Development Goals in the curricula of Public Education proposed vision –the tenth Conference of the Faculty of Arts BeniSuef University towards building a strategy for sustainable development in Upper Egypt under the humanities.
- [19] Keziz, Amal (2019). Sustainable green school and the culture of Environmental Education –International and Arab models about the Green School - Journal of Human Sciences and society. Volume 8, No. 1, pp. 155-179.
- [20] Mohammed, Karima (2020). A proposed curriculum in science based on the principles of green chemistry and its applications to develop awareness of environmental sustainability and positive thinking among middle school students. Journal of the Faculty of Education, Ain Shams University, No. 44, pp. 209-314.
- [21] Mutawa, Ibrahim (2005). Environmental education. Pyramid: International House for publishing and distribution. B
- [22] Melhem, Ahmed (2016). The opening of the first Green School in Palestine with the increasing trend towards environmentally friendly energy tools. Available on: <https://www.al-monitor.com/ar/contents/articles/originals/2016/10/west-bank-green-school-environment-awareness.html>.
- [23] Nisreen, Keziz (2017). Developing real estate construction towards a sustainable society: green buildings as a model. Journal of development and Applied Economics. Number 2. Mohamed Boudiaf University, Messila.
- [24] Ministry of Education (2008). Second strategic plan for educational development 2008-2012. Palestine.
- [25] Ministry of Education (1998). First Palestinian curriculum plan, Palestine.
- [26] Ministry of education and higher education (2016). Reference Framework document for the development of national curricula. Palestinian curriculum Center, Palestine.
- [27] Wahibi, Saleh and Ajami, Ibtisam (2003). Environmental education and its future prospects. II. Damascus, Syria, Dar Al-Fikr.
- [28] UNESCO (2013). Education for Sustainable Development. Translation of Hanan Abdullah anqadi. United Nations Educational, Scientific and Cultural Organization.
- [29] Al-Amayra, Tasnim (2019). The degree of inclusion of the requirements of the green economy in the curricula of the College of engineering and its relationship to the degree of environmental awareness among its students. Master's thesis in education, curriculum and teaching methods. Middle East University.
- [30] Al-Sayyed&Noha, Al-Sayyed, and Medha (2022). Engineering a future curriculum in Home Economics in light of green school

- requirements to instill sustainability concepts, green product innovation skills and academic childhood support for vocational middle school students. *Journal of research in the fields of specific education*. Volume 8, issue 42, pp. 711-795.
- [31] Mohammed, Karima (2020). A proposed curriculum in science based on the principles of green chemistry and its applications to develop awareness of environmental sustainability and positive thinking among middle school students. *Journal of the Faculty of Education*. Issue 44, Part IV, pp. 209-314.
- [32] Abdel Aal, Huda (2021). Fayoum University is a green university supporting sustainable scientific research: a proposed concept based on Wageningen's expertise and research in the Netherlands and the University of Sherbrooke in Canada. *Educational journal*, Part 91, pp. 4015-4137.
- [33] Al-Qudra, Hamed (2022). Envisioning a proposal to transform schools in Palestine into green schools in the light of global models. Volume 13, No. 38, pp. 196-212.
- [34] Ahuja, S. (2013). *Green Chemistry and Other Novel Solutions to Water Pollution: Overview*. Washington: American Chemical Society, DC.
- [35] Bartosh, O., Tudor, M., & Ferguson, L. (2005, April 7–11). Environmental education and its impact on students' test scores: A study of Washington State middle schools. San Francisco, CA: Annual Meeting of the American Educational Re-search Association. Bartosh, O., Tudor, M., Ferguson, L., & Taylor, C. (2006). Improving test scores through environmental education: Is it possible? *Applied Environmental Education and Communication*, 5(3), 161–169.
- [36] Browning, M. and Rigolon, A. (2019). School Green Space and Its Impact on Academic Performance: A Systematic Literature Review. *Int. J. Environ. Res. Public Health* 2019, 16, 429.
- [37] Chakraborty, A., Singh, M., Roy, M. (2018). Green Curriculum Analysis in Technological Education. *International Journal of Progressive Education*, Volume 14 Number 1, 2018
- [38] Dietze, B. (2016, October 6). A blog: The importance of increasing children's outdoor play opportunities [Web log post]. Retrieved from <http://www.cccf-fcsge.ca/2016/10/06/a-blog-the-importance-of-increasing-childrens-outdoor-play-opportunities/>
- [39] Douglas, E., Gordon and Hon, A. (2010). Green Schools as High Performance Learning Facilities. National Clearinghouse for Educational Facilities at the National Institute of Building Sciences
- [40] Ghent, C., Trauth, A., Dell, K. and Haines, S. (2014). The Influence of a Statewide Green School Initiative on Student Achievement in K–12 Classrooms. *Applied Environmental Education and Communication An International Journal* 13(4)
- [41] Gough, A., Lee, J. and Tsang, E. (2020). Green Schools Globally Stories of Impact on Education for Sustainable Development: Stories of Impact on Education for Sustainable Development. Available et: [https://www.researchgate.net/publication/344007195\\_Green\\_Schools\\_Globally\\_Stories\\_of\\_Impact\\_on\\_Education\\_for\\_Sustainable\\_Development\\_Stories\\_of\\_Impact\\_on\\_Education\\_for\\_Sustainable\\_Development](https://www.researchgate.net/publication/344007195_Green_Schools_Globally_Stories_of_Impact_on_Education_for_Sustainable_Development_Stories_of_Impact_on_Education_for_Sustainable_Development)
- [42] Iwan, A. and Rao, N. (2017). The Green School Concept: Perspectives of Stakeholders from Award-Winning Green Preschools in Bali, Berkeley, and Hong Kong. *Journal of Sustainability Education*, no. 16.
- [43] FA: Hersh F. Mahmood, Hooshang Dabbagh, Azad A. Mohammed, Comparative study on using chemical and natural admixtures (grape and mulberry extracts) for concrete, *Case Studies in Construction Materials*, Volume 15, 2021,
- [44]
- [45] Kumar, S. (2022). A quest for sustainium (sustainability Premium): review of sustainable bonds. *Academy of Accounting and Financial Studies Journal*, Vol. 26, no.2, pp. 1-18
- [46] Allugunti, V.R. (2019). Diabetes Kaggle Dataset Adequacy Scrutiny using Factor Exploration and Correlation. *International Journal of Recent Technology and Engineering*, Volume-8, Issue-1S4, pp 1105-1110.

- [47] Karpudewan, M. , Ismail, Z. & Mohamed, N. (2011). Green Chemistry: Educating Prospective Science Teachers in Education for Sustainable Development at School of Educational Studies, USM. *Journal of Social Sciences*, 7 (1) , 42-50.
- [48] Kerlin , Santos and Bennett , Steve, Rosemarie and William(2015) , Green Schools as Learning Laboratories? Teachers' Perceptions of Their First Year in a New Green Middle School , *Journal of Sustainability Education* , Vol. 8, January 2015.
- [49] MacKellar, J., Constable, D., Kirchhoff, M., Hutchison, J. and Beckman, J. (2020). Toward a Green and Sustainable Chemistry Education Road Map. *J. Chem. Edu*
- [50] Ministry of Education- Ontario, 2010; Green schools Resources Guide-A Practical Resource for Planning Building Green Schools in Ontario. Available at: [http://www.edu.gov.on.ca/eng/policyfunding/greenschools\\_guide.pdf](http://www.edu.gov.on.ca/eng/policyfunding/greenschools_guide.pdf)
- [51] National Environmental Education & Training Foundation (NEETF). (2000). Environment-based education: Creating high performance schools and students. Washington, DC. Retrieved from <http://www.neefusa.org/pdf/NEETF8400.pdf>
- [52] Ozmehmet, E. (2005). Design Attitudes Towards Sustainability in School Buildings. *The World Sustainable Building Conference in Tokyo*, Sep. 27-29m 2005, No. 01-074.
- [53] Ragheb, A., El-Shimy, H. and Ragheb, G. (2016). Green architecture: A concept of sustainability,” *Procedia - Social and Behavioral Sciences*, vol. 216, pp. 778 – 787.
- [54] Ramli ,Masri, Mohd and Abd Hamid, NurHidayatuljamilah, Mawar Haji, Mohd. Zafrullah Haji. Taib and Norhazarina (2012), A Comparative Study of Green School Guidelines , ASEAN Conference on EnvironmentBehaviour Studies, Bangkok, Thailand, 16-18 July
- [55] Sobel, D. (2005). Place-based education: Connecting classrooms and communities. Great Barrington, United States of America: Orion Society.
- [56] Somwaru, L. (2016). The Green School: a sustainable approach towards environmental education: Case study. *Brazilian Journal of Science and Technology*.
- [57] Suryani, A., Soedarso, S., Saifulloh, M. and Muhibbin, Z. (2019). Education for Environmental Sustainability: A Green School Developmen. *IPTEK Journal of Proceedings Series*
- [58] Sutherland, S., &Legge, M. (2016). The possibilities of “doing” outdoor and/or adventure education in physical education/teacher education. *Journal of Teaching in Physical Education*, 35(4), 299-312.  
<http://dx.doi.org/10.1123/jtpe.2016-0161>
- [59] Suzuki, D. (with Hanington, I.) (2017, June 1). World Environment Day reminds us to reconnect with nature [Web log post]. Retrieved from <http://www.davidsuzuki.org/blogs/science-matters/2017/06/world-environment-day-reconnect-with-nature/>
- [60] U.S. EPA. 2010. Indoor Air Quality Tools for Schools. <http://www.epa.gov/iaq/schools/>
- [61] U.S. Green Council (2007). *Leed for Schools for New Construction and Major Renovations*, First edition. Available at: <http://www.usgbc.org/Docs/Archive/General/Docs2593.pdf>
- [62] Wheeler, G., Thumlert, C., Glaser, L., Schoellhamer, M., &Bartosh, O. (2007). Environmental education report: Empirical evidence, exemplary models, and recommendations on the impact of environmental education on K-12 students. Olympia,WA: Office of Superintendent of Public Instruction.
- [63] Zhao , He and Meng, Dong-Xue, BaoJie and Fan-Qin, (2015) , The green school project: A means of speeding up sustainable development? , *Geoforum* 65 (2015) 310–313.