

Overcoming the Climate Change Challenges through Vocational and Technical Education Programs

By

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Abstract

This article focuses on how to overcome the climate change challenges through vocational and technical programs. The study attempts to analyze the steps and strategies that might contribute in no small measure toward overcoming the challenges brought by climate change. These steps and strategies would be highlighted through deductive approaches demonstrating the contents, criteria and training needed to address this concern. The study design was descriptive as some Palestinian Vocational Education and Technical Training (VET) lecturers were chosen as respondents to the survey. These lecturers provide pertinent data and vital information that answers the research questions. Two different VET experts validated and determined the contents of the survey. The collected data were manually analyzed. The article consequently discovered that the extant structure of the Palestinian VET curriculum is incomprehensive in the face of overcoming climate change challenges, and thus needs substantial improvements toward global wants. The extent of resources, facilities, equipment, attention and inputs given to the Palestinian VET sector are captured at the lowest level. The absence of a significant relationship between sustainable growth and quality improvement of the Palestinian VET sector is largely stressed in the study. The pressure of climate change suggests that policy discourse and empirical updates are constantly required among VET stakeholders, policymakers, providers and government officials at determining sustainable development for the sector.

Keywords: Climate change, policy discourse, empirical updates, sustainable development.

Introduction

Humanity must move towards addressing the causes of climate change, although the seriousness of climate change receives some attention from the majority of scientists, however, climate change data and predictions are still ambiguous for many non-specialists. This leads to the adoption of a skepticism policy by most developing countries and neglect by most developed countries, which makes the probability of a temperature rise of more than 5 degrees Celsius in the coming decades to reach at least 50%.

Among those developing countries are the Arab countries. Despite the seriousness of the effects of climate change on them, their efforts are still very weak in contributing to measures to reduce climate change at all levels, such as waste management, transportation,

industry and infrastructure, in addition to urbanization, sustainable design and VTE programs that are still in their first stages of development¹.

Climate change poses a threat to the survival of the human race, as its effects affect all aspects of human life, starting with human health, food production, the natural environment, and unemployment challenges. Studies have confirmed that the costs of environmental degradation exceed economic growth rates, contrary to the prevailing belief among politicians that measures to mitigate climate change impede development and economic growth processes. This is contradicted by all recent studies, which confirmed that for every rise in global temperature of one degree Celsius, economic growth decreases by between 2% to 3%. Whereas the 2009 United Nations World Economic and Social Survey estimated mitigation costs at only 1% of global GDP, which is a small proportion compared to the costs and risks of the effects of climate change.

Studies have also confirmed that if the warnings of the dangers of climate change are ignored, the global economic losses may reach 20%. The most catastrophic crisis remains that the feeling of the effects of climate change will be more acute in developing countries that have the least ability to overcome problems and adapt to them, technologically and financially. This makes it necessary to take decisive action toward mitigating climate change. This article, in the context of the effect of climate change on employment, focuses on how to overcome the climate change challenges through vocational education and technical training programs. Toward curbing future tensions and looking beyond the current crisis, the study seeks to present steps, strategies and programs for getting rid of these challenges. Hence, the research questions go thus:

- i. What are the causes and effects of climate change challenges?
- ii. How can vocational education and technical training programs tackle climate change challenges?
- iii. Which areas can VTE programs address in the challenges caused by climate change?

Concept Elucidation and Emerging Challenges

Climate change is one of the biggest problems and the most important challenges facing humanity, because interest in it appeared at the end of the 19th century AD, after many scientists and researchers in climate, land and environment fields confirmed the scientific fact that the Earth's climate is constantly changing terribly, and this will affect the course of life of the earth's inhabitants in all areas².

The phenomenon of climate change has grabbed the attention of the international community for some time, and this was reflected in the international efforts to urge agreement on effective measures that limit the emission of gases that cause global warming, because climate change has become a threat and a security challenge, both for countries and peoples, which made it an issue for the scientific community that specialized in it, and moved to an issue at the level of social sciences and political sciences; rises to international political agenda; enter security discussions and brought about what is known as environmental security³.

¹ O'Brien, K. & Leichenko, R. (2000). Double exposure: Assessing the impacts of climate change within the context of globalization. *Global Environmental Change*, 10, 221-232.

² Wikinvest, (2010). Concepts: Global climate change. Retrieved from: <http://www.wikinvest.com/concept/Global-Climate-Change>

³ Intergovernmental Panel on Climate Change (2001). *Climate change 2001: Impacts, adaptation vulnerability*. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Geneva: UNEP/WMO.

The phenomenon of climate change has become one of the issues always on the global agenda in light of the potentially dangerous phenomena that threaten environmental security. It is very difficult to provide and meet all the demands of planet inhabitants in light of the excessive exploitation of natural resources, on the one hand, climate fluctuation and all the resulting dangers to the environment and human beings on the other hand, such as the phenomenon of desertification, floods, abnormal temperature rise, etc.

The industrial revolution based on fossil fuels in the past two centuries played a dangerous role in causing a state of pollution that the planet had never been exposed to before⁴. These types have resulted in gases that trap heat and prevent its return to outer space as directed by the natural system, such as carbon dioxide, and this is one of the most important causes of climate change as currently known and seen.

The term climate change refers to the imbalances and long-term changes that occur in the average weather of a region, including rainfall rates, temperatures and wind conditions. Climate change is getting more dangerous due to the escalating human activities, especially by its dependence on traditional fuels, and the slow transition to renewable sources as basic alternatives to the sources that produce gaseous pollutants⁵. In the human planet, the distribution of energy on the Earth's surface governs the equation of the amount of energy arriving on the Earth from the sun in exchange for the amount that it leaves as surplus to needs. These human activities are working to cause a fundamental imbalance in this equation; which leads to the occurrence of climate change and high temperatures through greenhouse gases. Hence, this energy is distributed geographically throughout the earth through winds, sea waves and other factors related, especially the Earth's gravity and some space relationships with other planets such as the sun, the moon and others.

The phenomenon of climate change has become one of the most prominent issues that are at the forefront of the world's concerns at present, given its connection and direct impact on various vital sectors, the most important of which are agriculture, water, energy, health, unemployment, to mention few, which made it receive wide attention by various international organizations and bodies concerned with the environment, and reinforced the convictions of climatologists that these changes result from the interference of human activity due to the release of greenhouse gases - into the Earth's atmosphere, and as a result of the use of fossil fuels to generate and use energy, when forests are burned and from agricultural activities and changes in land use⁶.

The United Nations Framework Convention on Climate Change, in Article 1, paragraph 2, defines climate change as "a change in climate attributable directly or indirectly to human activity that leads to a change in the composition of the global atmosphere and which is observed, in addition to the natural variability of climate, over similar periods". While the Intergovernmental Panel on Climate Change defined it as "all forms of changes that can be expressed in a statistical description, and that can persist for decades in succession, resulting from human activity, or internal interactions of the components of the climate system"⁷. In light of this introduction, this research presents an analytical presentation of the impact of climate

⁴ Muhammad Ramadan Al-Agha, 2019, Climate change, a complex human environmental catastrophe, "The debate between science, politics, and economics," a set of strategic studies for disasters and managing opportunities, Vol. 1, No. 3, p. 17.

⁵ Faris Mazloum Makki and Abbas Ghali, 2014, Climate Justice and Geopolitical Consequences, Anbar Jamalal for the Humanities, Vol. 2, p. 418.

⁶ Mohamed Balak, 2016, The problem of climate change and its implications for achieving environmental security in Algeria: What is after the Paris summit? Scientific Research in Environmental Legislation, Volume 7, p. 275.

⁷ Bousbain Tasa'adit, 2014, The Impact of Climate Changes on the Economy and Sustainable Development, First National Forum on Climate Change and Pollution, University of Colonel Akili Hamad Oulhaj Bouira, Algeria, p. 3.

change risks on unemployment. This research analyzes the methods of using Vocational and Technical Education to tackle climate change challenges.

The Nature of Vocational and Technical Education

The emergence of vocational and technical education

In ancient civilizations such as the Egyptian civilization in the days of the pharaohs and the Greek and Roman civilization, the society's view of manual work was characterized by an inferior view, and intellectual work was characterized by a high view of appreciation. Islamic civilization came and glorified employment and the employee, and encouraged citizens to work and earn in many verses in the Noble Qur'an and the honorable hadiths of the Prophet, which increased the demand for productive individuals. Arab societies enjoyed an affluent life due to the increase in products, and the freedom of their movement from one country to another. This necessitated the education and training of citizens, and this was done through traditional apprenticeship, where the citizen learns according to their teacher (the owner of the craft). The result of that was the urban, agricultural and commercial development in different countries.

As soon as the different countries become weak, people left work, and production as well reduces. They began to restore their old tribal ideas with a lack of respect for professionals, intellectual and linguistic works. After the colonial rule became established, aspects of community development were neglected, and the activity of this government in the educational field was limited to what it needed as tools to complete the management of the affairs of this colonial state. The natural growth of society and its view of work froze, and on the contrary, Western systems developed their societies educationally, and the idea of traditional apprenticeship arose to educate young people on a profession in Germany. This idea developed with the industrial progress until it became the most prominent vocational preparation system in Europe that supports industry and production and develops its social concept towards work and occupation.

Technical and vocational education systems have been linked to economic development. In poor and less developed countries, the tasks of technical and vocational education and training are often the duties of the government, financing and management. This is due to the weak economies of these countries. In the medium-developed country, where the economy is more developed, the government occupies a share of the financing, and the production sector occupies the other share. In industrialized countries, the production sector occupies the largest part of the financing, and this financing is accompanied by the responsibility for development. In less developed countries, the last word in technical and vocational education and training systems is the government, due to the weakness of the production sector. In industrialized countries, the responsibility for development, management and supervision rests with the production and services sector, represented by the Chambers of Industry and Commerce. The government shares this responsibility to the extent that it maintains justice in the distribution between individuals and different regions to give sufficient stability in society.

Technical and vocational education does not create jobs, but it has a high return if it is closely related to the actual demand for jobs, because creating job opportunities are usually linked to the general economic policies of the country such as trade, savings, spending and inflation. Technical and vocational education plays its role effectively by developing the human capital that the economic life of the country needs. Its effectiveness increases when these numbers match the available job opportunities. In a study of a number of technical and vocational education and

training systems in developing countries, it was found that the success of these systems depends on managing the economy, stimulating investment, and creating job opportunities, as well as on a period centred on the needs of the current and expected fields of work.

Information System of Labour Market

Most Arab countries suffer either from the lack of an efficient national labor market information system that covers the demand for manpower and the supply of manpower (outputs of education systems, including vocational and technical education and training) or the existence of an information system that does not provide up-to-date information in a timely, accurate and clear manner that facilitates the budget process between supply and demand. The Arab Labor Conference, in its thirty-fourth session held in March 2007, issued Resolution No. (1356) which “calls on Arab countries to establish a database to collect data and information on the labor market and analyze it at the local, regional and international levels to facilitate the exchange of Arab information and experiences. The Arab Strategy for Manpower and Employment Development addressed this aspect, stressing the need to: “Design an information network about the labor force through which labor market and employment indicators are monitored and implemented through a global communication network in Arab countries”.

The importance of such decisions and directions stems from the fact that the lack of information and data related to human resources, whether in terms of comprehensiveness or accuracy, leads to difficulties in formulating policies, developing strategies, and making decisions regarding employment and unemployment issues, and leads to obstacles when conducting studies, research and evaluation activities in work aesthetics. It is no secret that such information and data deal with the three components of human resources, which are the supply side of the workforce which includes human resource development systems, the demand side which includes the requirements of productive institutions, as well as the links and channels between the two sides that include operating services.

Therefore, the establishment of an information base on the labor market, through an Arab network for this purpose, aims to identify the characteristics of the labor market and the changes that occur in it, thus contributing to the development of policies, procedures and programs necessary to deal with these characteristics and changes, and making projections and predictions about resource indicators of human resources; and serving the decision maker, policy maker, job seeker, employer and others.

Methodology

The research applied a study design that is descriptive. Okeme, Alawa and Akwagiobe (2014) opined that descriptive survey research computes and obtains data from certain people or things representing an entire group⁸. Some VET lecturers and experts in Palestine represented their colleagues in the academic and professional fields in the study. The study sample was 100 respondents where 25 participants represent each part of the country. A qualitative method was used for data collection using Focus Group Discussions (FGDs). Two VET experts (academician and industrial experts) from both industry and university ascertained the validity of the instrument.

⁸ Okeme, I., Alawa, D. A. & Akwagiobe, C. U. (2014). Entrepreneurial skills required by secondary school graduates for economic success in cocoa production in Ikom Local Government of Cross River State, Nigeria. *Journal of Education and Practice*. International Institute for Science, Technology & Education. 5 (16), 174-183.

The data was analyzed manually following the research questions. The research respondents and participants were selected due to their years of experience in handling VET matters, contents, structures and programs. The trustworthiness and the validity of the qualitative data were confirmed through long-term engagements with the participants.

Results, Discussion and Findings

Research Question 1: What are the causes and effects of climate change challenges?

Causes of Climate Change

A questionnaire was used across the 4 regions in Palestine including Jordan valley and Ghawr; Coastal and inner plains; Mountain and hills; and Southern desert. The respondents in these regions provided the data via a five-point Likert format such as “Very Low Extent” (1 point); “Low Extent” (2 points); “Moderate Extent” (3 points); “High Extent” (4 points) and “Very High Extent” (5 points).

Causes of Climate Change	Very Low Extent (1)	Low Extent (2)	Moderate Extent (3)	High Extent (4)	Very High Extent (5)
Human activities	–	–	–	–	/
Man-made emissions of CO2	–	–	–	–	/
Greenhouse gases	–	–	–	–	/

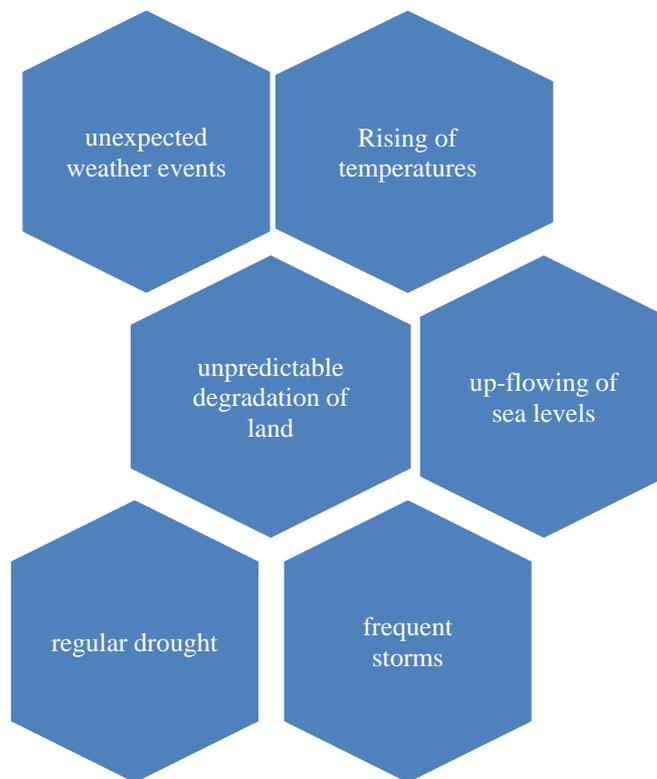
The above data shows that three (3) major factors are responsible for the emergence of climate change in Palestine. To a very large extent, Human activities, Man-made emissions of CO2 and Greenhouse gases cause climate change, thus affects job availability in the country. The current study posits that Vocational and Technical Education and Training could be of rescue.

Concerning the effects posed by climate change, climate change poses a threat to the survival of the human race, as its effects affect all aspects of human life, starting with unemployment, human health, food production and economy. Many studies uphold that climate change harms the economy. These studies confirmed that the costs of environmental degradation exceed economic growth rates, contrary to the prevailing belief among politicians that measures to mitigate climate change impede development and economic growth processes. This is contradicted by all recent studies, which confirmed that for every rise in global temperature of one degree Celsius, economic growth declines by 2% to 3%, while the global economic and social survey issued by the United Nations in 2009 estimated the costs of mitigation. It accounts for only 1% of global GDP, which is a small proportion when compared to the costs and risks of the effects of climate change.

Studies have also confirmed that if the warnings about the dangers of climate change are ignored, the global economic losses may reach 54%. The most catastrophic crisis remains that the effects of climate change will be felt more acutely in least-developing countries like Palestine that have the least ability to overcome and adapt to problems, academically, technologically, skillfully, professionally and financially. Most developing countries are basically below the poverty line, which means that an increase in temperature leads to catastrophic results, and at the forefront of those countries are the Arab countries including Palestine which are located in a very arid region. This makes it necessary for Arab countries including Palestine to take decisive action toward mitigating climate change.

Effects Of Climate Change

The following diagram represents the responses of respondents as regards the effects of climate change on Arab and Palestinian communities. On a level-play ground, the respondents equally revealed that the following factors are responsible for the detrimental effects.



Speaking from the perspective of Palestine and Arab countries, the respondents unanimously stated that despite the small contribution of least-developing countries like Palestine to climate change, they are the most exposed to the dangers of climate change. The respondents claim that Palestine and Arab countries bear the largest share of the consequences of the catastrophic effects of climate change, due to its being the scarcest region for water resources and high temperatures. This recent study confirms that the rise in temperatures is directly related to the increase in the rate of evaporation, and what worsens the situation is that the Arab region is among the most water-scarce regions, which poses a threat to natural and physical systems in the region.

According to the respondents, the rises in sea levels lead to the destruction of coastal urbanization for Palestine that has weak physical or technical capabilities to confront these dangers, including the Arab countries, whose beaches extend for a length of 34,000 km, of which 18,000 km are inhabited. The agricultural sector and wetlands were also affected, in addition to the decrease in the total area of the state.

As a matter of reality, the aforementioned effects could be a reliable foundation for proposing programs, steps and strategies to overcome climate change challenges.

Research Question 2: How can climate change issues be tackled with VTE programs?

While exploring ways and approaches to overcome climate challenges through VTE programs, the respondents suggested programs that address and develop effective responses to climate change, help understand its causes and consequences, prepare to live with its effects,

and enable learners to take appropriate action to adopt more sustainable lifestyles. The structures of VTE help decision-makers understand the importance of developing mechanisms to combat climate change at the national and global levels.

Sixty per cent of the respondents encourage Palestine communities to learn via Vocational and Technical Education about how the climate affects them, what they can do to protect themselves from negative effects, and how to reduce their impact on the climate. VT education helps increase the resilience of vulnerable communities as they are more vulnerable to being adversely affected by climate change. They recommended that VT education should be rooted in the Palestinian educational curriculum for sustainable development.

Climate change programs by expanding climate change educational activities into non-formal education, through Media, Communication and Partnerships are essential. These holistic programs shall integrate key sustainable development issues such as climate change and disaster risk reduction into education, in a way that addresses the interrelationships between environmental sustainability, economic viability and social justice. The programs can also promote participatory teaching and learning methods that motivate learners and enable them to change their behaviour and take action for sustainable development. The respondents believe that the program shall help people understand the impact of global warming today and increase "climate education", especially among young people. Beyond that, VT education should be placed at the central part of the international response to climate change.

Toward ensuring quality education, the Palestinian government should be encouraged to issue several policy documents that identify VT training and education for sustainable development. The intervention of educational contents, structure and curriculum will limit various institutional supports. These interventions shall include integrating the values of Education for Sustainable Development into the school's philosophy, curriculum development and capacity building for teachers, trainees and educators; Education for Sustainable Development pedagogical curricula; and Education for Sustainable Development thematic activities and education on climate change.

Almost all the respondents emphasized that Education for Sustainable Development (ESD) is a component of compulsory education, but it is limited to higher education, adult education and vocational and technical education and training. They strongly suggested that the Ministry of Education should release a guiding document that specifically identifies the VTE sector as a sector that needs reform toward achieving sustainable development goals of the Palestinian economy.

Research Question 3: Which areas can VTE programs address in the challenges caused by climate change?

Vocational and technical education and training programs could help in overcoming climate change challenges through substantial intervention and contribution. Approximately 90 per cent of the respondents expressed that vocational and technical education is weak in Palestine. The diagram below indicates the unemployment rate in Palestine as of 2021; the percentage of those that are attending vocational and technical education; labour market needs and required skills in Palestine.

As regards the unemployment rate, the following diagram shows its substantial fluctuation:

Table 1: Unemployment Rate in Palestine

DATE	VALUE	CHANGE by %
2020	25.9	2.17%
2019	25.3	-3.50%
2018	26.3	2.26%
2017	25.7	7.27%
2016	23.9	4.09%
2015	23.0	12.03%
2014	20.5	3.22%
2013	19.9	3.59%
2012	19.2	9.09%
2011	17.6	-17.83%
2010	21.4	4.74%
2009	20.5	

Source: <https://knoema.com>

The above diagram is an indication of strengthening VTE programs to tackle unemployment challenges in Palestine. Beyond engaging unemployed individuals with skills, VT education would adequately prepare people for labour market needs.

In a similar vein, the below table explains the providers of VTE in Palestine as per level and type of the institute.

Table 2: Vte Providers, Level and Kind Of Institute

Level	Type of Institute	Duration of Training	Provider
Level 4: Technician	Post-secondary level technical colleges, or technical courses in community colleges	Two years after successful Tawjihi 19-- accredited by MOHE	Mostly non-governmental (private, NGOs and United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) except for Palestine Technical Colleges (PTCs) under Khadoori-the governmental body)
Level 3: Craftsperson/ Vocational	Secondary level vocational secondary schools (VSS) and vocational units in academic schools	Two years in vocational schools in the 11th and 12th grades	VSS is run by the PA (MOE currently) and VSS run by NGOs
Level 2: Skilled worker	Vocational training centers (VTCs)	One scholastic year (9-11 months)- 900 hrs. and above	MOL, MOSD, NGOs & UNRWA
Level 1: Semi/limited skilled worker	VTCs	Hours to months (less than 900 hrs)	All the above provide short courses, CSOs and private sector institutes

Number Of Students' Level, Vte Areas & Institutes

Students & Institutes Between 2018/2019						
Vte Levels	Institutes (2018/2019)		Total	Students (2018/2019)		Total
	West-bank	Gaza		West-bank	Gaza	
Level 4	18	12	30	7,440	30,949	38,389
Level 3	31	8	39	4,381	641	5,022
Level 2	37	13	50	7,243	1,847	9,090
Level 1	156	37	193	8,511	1,758	10,269
Total levels	227	69	296	21,646	34,554	57,748

Source: *National Team. 2020. Torino Process Report (TRP) 2018-2020. ETF*

Between 2018/2019, the above table indicates that 296 institutes were providing VTE training in West bank and Gaza, and 57,748 students were available within these years.

Evidently and undoubtedly, the available students are powerless and insignificant in the course of tackling national climate challenges, hence, more efforts are needed toward ensuring that Palestinian young graduates and unemployed citizens know the value and essence of vocational and technical educational training. The research respondents unanimously opined that investing in VTE training is promising in overcoming climate change.

Conclusion and Recommendations

There is a need for the expansion of VTE programs to meet the needs of the different populations, age groups, geographical areas, small and medium enterprises, and the informal sector in the labour market. Palestine youths must take a bold step toward securing, protecting, preserving, sustaining, maintaining and acquiring professions that serve the environment and society and contribute to its relevance and construction. Hence, society's view of VT education alongside climate change challenges must be reviewed and revisited. More Palestinians need to be trained with vocational and technical developments and updates. VTE curriculum must be compatible with the demanded skills in the labor market.

The capabilities of VTE lecturers, experts and professionals are categorically meaningful for positive transformation in the Palestinian context. The study shows that effective integration of VTE programs and contributory intervention of VTE experts would give more weight to the efforts of controlling climate change challenges in Palestine. The existing VTE structures, contents and programs in Palestine should be globally weighed, designed and enhanced by experts toward scaling up the curriculum.

After perfection, the study recommends that: the managers of vocational and technical education should thereafter utilize their respective science and technology understanding to handle climate change challenges. Vocational and technical education professionals should assist governments (national, state, and local) to draft the needed legislation that will actualize the principles of UNESCO. There should always be a constant revision of vocational education and technical training curriculum toward equipping students with techniques for reducing natural disaster risk.

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