Department of Education

UNIVERSITY OF BATH

Working Papers Series

International and Global Issues for Research

How might Education Policy in the United Arab Emirates (UAE) support Education for Sustainable Development programmes?

Dina O. Faidi

No. 2016/5 December 2016

The working papers series aims to recognise the excellent work produced by the large community of graduate students and distinguished associates of the Department of Education at the University of Bath. The series has been designed to create opportunities to disseminate high quality research through our Departmental webpages, in a timely manner. The working papers series aims, in particular, to reflect and contribute to the global standing of the Department of Education as a leader of research in the areas of activity of its research clusters:

Internationalisation and globalisation of education

Educational leadership, management and governance

Language and educational practices

Learning, pedagogy and diversity

Abstract

This paper outlines the current situation in the United Arab Emirates (UAE) in terms of Education for Sustainable Development (ESD). It investigates whether there is an Education Policy that supports ESD and how effective it is. The paper emphasizes that not only there is a need to build awareness for (ESD) but there is also a need for skills attainment and change in behaviour that can create genuine sustainable development. The paper discusses examples of (ESD) programmes in the UAE and compares them to other global examples. It also outlines key challenges and resistance that might come in the face of change. It argues the importance of partnership between key stakeholders to achieve sustainability. It concludes that there is not yet clear education policy in the UAE that supports Education for Sustainable Development programmes. The limited accountability and weak measurement of results are considered to be the main obstacles. It also concludes that to successfully implement (ESD), the UAE government must take major steps forward with effective policies that bring tangible results and create change. If this does not take place, the subject of Education for Sustainable Development in the UAE will remain a media matter with just few implementations here and there. Hence, key steps toward forming such policy were suggested. Further research with comprehensive data collection is required.

INTRODUCTION

The UAE has one of the world's highest ecological footprints per capita being 9.5

hectares/per person; four times more than the global average of 2.1 hectares per person (Living Planet Report 2008*)*. One might wonder if it is even feasible to discuss the subject of sustainable development, let alone explore policies that would promote Education for Sustainable Development.

In the UAE, there are significant challenges to reducing carbon emissions, due to the resources required for desalinating drinking water, energy for the many construction projects and household needs, and food to feed a population exceeding 9.2 million (World Bank data, 2013). This is also a nation wherein citizens have most of their energy consumption needs met for free. Additionally, the entire population is tax exempted. The challenge to bring about tangible measurable changes might be too great.

Yet the situation in the UAE is not as gloomy as it might look. The government is aware of the challenges that lie ahead. And it is most promising that they have the means to make change happen.

The paper will outline the challenges that the UAE is facing. It will discuss how the UAE is addressing the subject of sustainable development and if the UAE government on a federal and local level is helping to achieve tangible results. Preliminary literature research suggests that results, if any, are not influencing the levels of carbon emissions.

Secondly, the paper asks how might education policy in the UAE support Education for Sustainable Development? It investigates if there are any clear policies for that purpose currently in place. After extensive research it appears that there are no written education policies in relation to ESD; hence the importance of the discussion question.

Sustainable development is one aspect of cultural development. For sustainability to be achieved it has to become part of the greater culture. To do so people need to be educated, as education leads to change in behaviour, which result in new, positive habits. Perhaps one way to establish such positive habits is through a 'paradigm shift' (Kuhn 1996, cited by Gough & Scott 2006) within the education system. Preliminary literature review proved that spoon-feeding and rote learning did not succeed in making students care enough about sustainability. The shift needed to achieve the intended goal of education is to create enough positive change of behaviour, to motivate students to work willingly toward future sustainability, along with acquiring sound transferable skills for them to know how.

In the UAE a number of schools such as Greenwood International School and Jebel-Ali Primary School (Eco-Schools UAE, 2013) are taking part in programmes that promote sustainable development through environmental education. These programmes focus on reducing water and energy consumption, creating a sense of responsibility and increasing general awareness. Participating schools often measure their success through the realisation of a recognized award, such as the *'Green Flag*.' The ultimate measure of success, however, should be the ability of schools to create a change of behaviour within children, parents, and teachers through learning tangible skills that can lead to sustainable lifestyle in the wider community.

In order to establish such programmes, legislative policies must be enacted and implemented by the relevant authorities to support schools. Then children, parents, and teachers might be capable of, and motivated to extend the benefits of these programmes beyond the schools' environment.

Third, this paper explores how the three groups above, teachers, students and parents, could be transformed from participants into active change

agents, maximizing a multiplier effect to increase the number of sustainability programmes. It presents successful examples from other countries such as UK, Sweden, and Australia that were able to create this change.

The paper concludes that although the UAE does not have clear policies to support ESD, the policy makers are able to change this fact. The UAE certainly has the ambition, the will, and the means to establish a proper education policy to support ESD. The paper suggests key steps to launch such potential policy.

EDUCATION POLICY IN THE UAE

The UAE Background

Since its foundation in 1971, the UAE's political system has been based on federal laws. The former ruler and the founder of the UAE, Sheikh Zayed bin Sultan Al Nahyan succeeded in creating a high degree of national pride among Emiratis during the 33 years (1971-2004) he ruled the country. There has been political stability since the UAE was founded (UAE Interact, 2013).

The country consists of seven emirates: Abu Dhabi, Dubai, Sharjah, Ajman, Umm al-Quwain, Ras al-Khaimah and Fujairah. Each emirate has its own ruler, who has the authority to set laws for the emirate he rules. Federal power is in the hand of the rulers of the two largest emirates: Abu Dhabi, the largest and richest emirate, and Dubai, the most economically advanced. The rulers of these two emirates share authority as the ruler of Abu Dhabi is the President of the UAE and the ruler of Dubai is the Prime Minister (O'Brien et. al., 2007 p.208). All seven emirs are members of the Supreme Council (Cabinet). This council is the top policy-making authority in the UAE (UAE Interact, 2013).

There is a legal constitution that was adopted in 1998. It unified many of the emirates' laws. No emirate can make a national decision without the consent of Federal National Council (FNC). This is the UAE's advisory council (Parliament) consisting of 40 members from the seven emirates (UAE Interact, 2013). Although the UAE is one country, each emir makes local policies (O'Brien et. al., 2007 p.209). Each emirate has its own authority body that sets national policies in the form of an Executive Council. Each Council would delegate some authority to certain agencies to play specific roles. As an example of such agencies with particular power are the Environment Agency in Abu Dhabi, Knowledge and Human Development in Dubai, and the Sharjah Emir Diwan (Court) in Sharjah (UAE Interact, 2013).

The UAE is generally not considered to be a democratic country. There are no political parties that can make or influence policies (Reiche, 2010 p. 378–382). Political power is distributed in a tribal style that matches the original formation of the union. The distribution of wealth generated from oil revenue, economic development, high incomes, and standards of living seem to compensate for the lack of democracy. Such affluence makes the chance of internal political eruption highly unlikely (Shihab, 2001).

Policy Making in the UAE

The leaders of the UAE understand the need to develop a more modernized political system. In 2006 the President of the UAE, Sheikh Khalifa bin Zayed Al Nahyan, launched a new electoral system. For the first time, since the birth of the country in 1971, an Electoral College elected half of the members of the FNC. The aim of this pioneering step was to allow the public to participate in policy making and to make the FNC a more credible governing body. The reforms also allowed women to be elected and now 18 per cent of the FNC members are women (UAE Interact, 2013).

Another major step took place in 2007 launching the first blueprint for the *'UAE Government Strategy 2008-2010'* a three-year plan for federal spending initiated by the President Sheikh Khalifa's National work programme. The aim is to create more synergy between the federal and local governments, increase efficiency, upgrade laws, and empower ministers and policy makers to better serve the public (UAE Interact, 2013).

In early 2010 the Supreme Council launched the *'UAE Government Strategy 2011-2013'*. This strategy was a stepping-stone to achieve the *'UAE Vision 2021'* launched by Sheikh Mohammed bin Rashid Al Maktoum, the Prime Minister (UAE Cabinet, 2013). In it, the government pledged to make the UAE *'one of the best countries in the world by 2021'* which will mark the fiftieth anniversary of the federation (UAE Vision 2021, 2012). The vision document originated from a need to bring the public and private sectors together under a unified system to achieve sustainable development (The official website of the Prime Minister of UAE, 2013).

The 'Vision 2021' document matches the UAE's 'Government Strategy 2011-2013' in terms of sustainable development goals. Both documents set the protection and sustainability of the environment as priorities. The strategy is to conserve natural resources, reduce the total carbon footprint, and create awareness by *'promoting an eco-friendly mindset and practices.'* These are major factors in the plan to achieve sustainability (UAE Cabinet, 2013).

Sustainable development is not only a legitimate and progressive goal for the government of the UAE but also an obligation that needs to be fulfilled in a country that is governed under Islamic values. O'Brien et al. (2007) argued how the values of Islam play a major role in the positive change of behaviour toward sustainable environment for Muslims. Protecting the environment and creating a sustainable world is right at the core of Islamic values as they quote the prophet of

Islam peace be upon him, Mohammad saying: *"Whoever plants a tree and diligently looks after it until it matures and bears fruit is rewarded"; and "If a Muslim plants a tree or sows a field and men and beasts and birds eat from it, all of it is charity on his part"; and again 'The world is green and beautiful and God has appointed you his stewards over it"* (Prophet Mohammad PBUH).

Education Policy

Overall, the UAE is committed to improve the quality of its legislation and implement policies in cooperation of all key stakeholders, including those in the education sector.

This commitment is clear on a federal level. In the 2013 zero-deficit federal budget, the budget for education alone allocated for the year 2013 was the highest with AED 9.9 billion, 22 per cent of the total allocated, giving education reform top priority (Khaleej Times, 2012)

The 2008 Middle East and North Africa (MENA) report showed that education systems for most MENA countries are in desperate need for reform (MENA Development Report, 2008). Numerous studies argue that education in MENA countries is of low quality. They link this directly to the low levels of economic growth in these countries (El Erian et al. 1998). Furthermore, El Erian et al. (1998) and Ridha (1998) found that education in the Arab countries focuses mostly on repetition and memorization, at the expense of students' critical thinking and problem solving abilities, the skills most needed for their future.

In the UAE, education policies are still made by governments of one emirate, independent of the others. In Abu Dhabi, public and private schools are under the supervision of the federal Ministry of Education (MoE) and the Abu Dhabi Education council (ADEC) respectively (ADEC, 2013). In Dubai, the Knowledge and

Human Development Authority (KHDA) regulates private schools and monitors the quality of education provided by them (KHDA, 2013). The federal MoE through a local office regulates public schools in Dubai.

One role of these authorities is to supervise education reform and set policies that will position the UAE as a knowledge economy hub (UAE Interact, 2013). One of the initiatives taken by the KHDA in Dubai was to persuade major international educational institutions to provide their programmes locally. The London Business School, Manchester Business School, and Cambridge University are now offering their programmes in Dubai (KHDA, 2013).

To facilitate international knowledge importation and attract international investors, the UAE and Dubai specifically have created clusters of 'free zones,' such as Dubai Knowledge Village (DKV), established in 2003 and Dubai International Academic City (DIAC), established in 2005. Today there are five such 'free zones' in existence (KHDA, 2013).

Since setting up (DKV) in 2003 there has been a 77 per cent increase in the number of international programmes offered to students (KHDA, 2013). In 2010-2011 the World Economic Forum ranked the UAE 25th out of 139 countries in the Global Competitiveness Index (GCI) (Policy in Action, issue 1, 2011).

A status that the UAE highly value at a time Dubai is campaigning to become the host for World Expo in 2020. An important meeting hub for global economy to explore opportunities and exchange knowledge on key world concerns including sustainable development. The prestigious Expo takes place every 5 years and Dubai city is candidate to become the host in 2020. The theme the UAE chose for its bid is *'Connecting Minds, Creating the Future'* a theme that promotes interconnectivity, shared global commitment and economic development which

requires lasting resources that cannot happen without creating a culture of sustainability (Expo2020, 2013).

To create a culture of sustainability, people in the UAE need to be educated on the matter. Specific education policies that target Education for Sustainable Development need to be in place. As Gough and Scott (2006, p.287, 288) put it, *"If sustainable development, in any credible definition, is to be through education, this requires, perhaps above all, that we learn to re-think our thinking about politics."*

After the Rio '*Earth Summit'* in 1992 the UAE adopted *'Agenda 21'*, an action plan that nations voluntarily adopt, which came out of the United Nations Conference on Environment and Development (UNCED) held in Rio (Agenda 21, 1992).

Since then, the UAE took major steps on the federal level to enhance sustainable development. The Environment Agency in Abu Dhabi (EAD) that was created in 1996 (Law No.4) under the name of ERWDA (Environmental Research and Wildlife Development Agency) and was later changed to its current name in 2005 under the law No. 16, was given full authority to protect environment and promote sustainable development. Several initiatives and educational programmes were launched by the EAD (Environment Agency-Abu Dhabi, 2013).

Another major step was empowering the Federal Environment Authority (FEA) to establish high environmental standards. The 1999's Federal Law No. 24 for Protection and Development of the Environment came into effect in February 2000. It set clear laws on environmental conservation, development of natural resources, pollution control, and Marine life preservation (Environment Agency-Abu Dhabi, 2013).

In October 2009, the World Wildlife Fund (WWF), in association with the Emirates Wildlife Society (EWS) and the Global Foot print network (GFN) launched an initiative named *'Al Basmma al Beeiya'* meaning the Ecological Footprint (Abu Dhabi Global Environmental Data Initiative, 2012). The UAE is only the third country in the world to carry out such an in-depth study. Their report concluded that the highest consumption of energy in the UAE was the household sector, contributing 57 per cent of the ecological footprint. Heads of households are obviously the key players in lowering the UAE's overall ecological footprint (Ecological Footprint Network, 2012).

Policy makers have taken the findings of this report and launched a few initiatives. In 2009, the EAD and WWF started an outreach campaign called *'Heroes of the UAE'* that aims to build awareness among local communities in creating sustainable lifestyles (Heroes of the UAE, 2012).

In 2009, the EAD and ADEC started a *'sustainable schools'* initiative, sponsored by Royal Dutch Shell Oil to educate students, teachers, and parents about sustainable development. The EAD launched several educational programmes and publications to support learning about ESD. For example, the *'Enviro Spellathon'* series for children aged 4-13, the *'Save Planet Earth'* book series, *'Al Daleel Al Bee'*, a guide to setting up and running environmental clubs, *'Towards a Sustainable World'* and the *'Green Schools Manual'*. It also launched an annual environmental competition, wherein children are encouraged to write stories related to sustainable development and find solutions to environmental problems. The winning stories are published and distributed by the agency (Sustainable schools, 2013 and pers. comm., 25 January 2013).

However, with all of these positive initiatives, a clear education policy

for sustainable development does not seem to exist in the UAE on a local level or federal level.

SUSTAINABLE DEVELOPMENT

In 1987, the World Commission on Environment and Development officially defined sustainable development. In their report *'Our Common Future'* also known as *'Brundtland'* report after its author Go Harlem Brundtland, sustainable development was defined as*: "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs"* (Brundtland report 1987, p.37).

A definition although considered by many as 'vague' was the most agreed by scholars and scientists (Tilbury et al. 2002). It was not an easy task for many to define such a broad concept in just few simple words to be understood by the mass public. Most scholars agreed on the term as it means everything to everyone as Rauch (2002) named it a *'universal spell'*. Even more, some scholars argued that the definition is a positive opening for debate and discussion between concerned players (Sauve', 2002, cited by O'Brien et. al. 2007).

At the 1992 Rio Earth Summit, the subject became a global government concern and part of 'Agenda 21' with a new definition under what they called Principle 3: *"To equitably meet developmental and environmental needs of present and future generations"* (Agenda 21, 1992).

It was generally agreed that the concept of sustainable development does not involve preserving natural resources alone but it rather stands on three major pillars; economy, social and environment development. One cannot stand without the other (Stevens, 2005). A sustainable economy cannot be reached without creating protective measures and means of development to both social and

environment. Gough (2002) emphasised this point and confirmed that these three pillars must be interlinked in order to form a better understanding of sustainable development needs.

Dealing with one pillar without the others can create an imbalance and lead to 'unsustainable' results (OECD, 2008). In spite of the individuality of each country the interconnectivity of the three pillars is the foundation for sustainable development anywhere in the world (OECD 2008). Therefore aiming for sustainable future we must not only strive for economical growth. OECD (2008) argued that although the world's GDP grew from merely $16 trillion in the 1970s to more than $40 trillion in the 2000s, yet it added more pressure on our natural resources and increased the level of CO2 emissions. More so, consumers at large other than the elite 'green' consumers are not yet contributing significantly to sustainability (OECD 2008). Hence, one growth without the other can certainly disrupt the core foundation of sustainable development.

One thing is for certain, the world is facing huge environmental challenges as a result of the imbalance, such as climate change, air pollution, natural resources scarcity and alarming reducing biodiversity (McCormick et al. 2005). An example of the challenges that lay ahead, in 2007 the international panel of climate change stated that it might be less than a decade for the world to witness global climate change side effects caused by the destructive economic and industrial activities led by some of the wealthiest countries such as UK and USA (Hargreaves, 2007).

During the 2012 Rio+20 summit, 20 years after Rio Earth summit, the United Nations requested further commitments from governments through setting clear Sustainable Development Goals (SDGs) based on 'Agenda 21'. This was considered one of the most important outcomes of the summit. Sustainable

Development Goals need be clear, attainable and measurable integrating the three pillars of sustainability: economy, social and environment. Even though they are set on a national level SDGs must have a universal outlook (Rio+20, 2012).

SDGs can then be incorporated within the Millennium Development Goals (MDGs) to be set by 2015 for the launch of UN post-2015 development agenda. Once set by governments, they can then form the foundation of national 'green economy' policies that leads to sustainable development (Rio+20, 2012).

Sustainable development process promotes change driven by values and principles (Tilbury et al. 2002). Griggs et al. (2013) argued that change couldn't happen without stakeholders' commitment and action, including revisiting national policies, penalizing unsustainable actions, putting a value to natural resources, and increasing International collaboration through global agreements related to sustainability issues such as climate change. Only then sustainable development might be achieved.

THE UAE AND SUSTAINABLE DEVELOPMENT

The UAE's leaders' forward thinking has achieved political stability that played a major role in its progress. The UAE is considered one of the most innovative countries, the third in the region according to the 2013 Global Innovation Index report, the only Arab country that has matched developed countries such as the United States, the United Kingdom and Switzerland on development indicators (The Global Innovation Index, 2013).

The challenge within the UAE lies in the fact that within a short period of time the UAE has become one of the most prosperous nations, even exceeding some developed countries with a GDP per capita of around $ 49,000 and a growth rate of 4 per cent annually (Compiled using latest data from CIA, World Bank, and

various international sources, 2013) According to Forbes Magazine the UAE is now the world's 6th richest country with a GDP (PPP) Per capita of $47,439 (estimated from 2009) (Forbes, 2013).

Achieving such development quickly, with massive infrastructure projects and a constant increase in its population has added pressure to an already unsustainable environment. Dubai is known to have the highest ecological footprint per capita in the world at 9.5 hectares per person, four times the global availability of 2.1 hectares (Emirates 24/7 staff reporter, 2012). This is mainly the result of a need for energy for water desalination that the country depends upon (Elgendy, 2010). The UAE is known to be one of the highest energy consumers per capita in the world (Heroes of the UAE, 2012).

In Dubai, the massive and fast growth in construction and the rich lifestyle created serious environmental problems such as running out of energy resources, the increase level of salinity due to seawater desalination that causes a major threat to marine life, and waste treatment plant shortage. The country needs to take major steps to prevent any further environmental crises and achieve sustainability (Alderman, 2010).

In 2011, the Dubai Supreme Council of Energy partnered with UNDP to establish the Dubai Carbon Center of Excellence to promote low carbon economy, the first of its kind in the Arab region (Sustainable Arabia, 2012). During a conference organized by UNDP and the Dubai Supreme Council of Energy in 2012, named 'Sustainable Arabia: Clean Energy', the UAE Minister of Environment and Water Rashid Bin Fahad explained how the UAE's sustainable development strategy themed '*green economy for sustainable development'* launched by Sheikh Mohammed Bin Rashid Al Maktoum the Prime Minister in 2012 would help tackle the current 'critical situation'. Hence, the ultimate aim for the UAE is to become a

'leading country in the area of sustainability' (Sustainable Arabia, 2012).

The UAE is taking serious measures toward sustainable development. Abu Dhabi, the emirate that contains 95 per cent of the UAE's oil resources (Reiche 2010, p. 378–382), in its effort to lead sustainability, released a 20-year plan to tackle the issue (Abu Dhabi Urban Planning Council, 2013). It has also been championing initiatives for sustainable development such as Masdar City the first zero-carbon city in the UAE.

Promoted to be the most sustainable city project in the world, it aims to function with zero-energy and zero-waste and to be the largest carbon-neutral city in the world (Reiche 2010, p. 378–382). Masdar was announced in 2006 and is anticipated to be complete in 2016. Working towards renewable energy solutions and new technologies can promote sustainable living and a low carbon future. It also aims to create a generation with the skills to find solutions for generations to come, not only for the UAE but the world at large (Nader 2009 p. 3951-3958). Through its academic programmes and research activities the Masdar Institute of Science and Technology will produce highly technical skilled people and will provide instant jobs by attracting more than 1,500 companies specialising in renewable energy (Reiche 2010, p. 378–382).

Although Abu Dhabi has a more sustainable approach to development, Elgendy (2010), an architect and sustainability consultant, argued that Dubai promoted green buildings in urban planning and marketed the concept, to promote sustainability presenting design concepts of towers with *'green features'* (Elgendy, 2010). Yet, Elgendy (2010) questioned how green these buildings really are or if they are just *'greenwash'* projects for media propaganda. Elgnedy (2010) also argued that the project tackles individual building plans rather than holistic planning for the city at large. He concluded that in spite of the lack of a clear

framework for sustainability in Dubai, there remain a few projects that are sustainable. *'Xeritown'* is one example that is now under construction in Dubailand on 278 square kilometers. When completed it will host seven 'themed worlds' with parks and venues that promote eco-tourism. *'Xeritown'* planning is based on promoting sustainable development with its main emphasis on energy conservation and the sun's passive energy. It also focuses on using local resources in landscaping, such as plants that can adjust to the local climate. The name of the project reflects its mission as it was derived from the concept of Xeriscaping a modern landscaping technique that was designed to tackle severe scarcity of resources utilizing passive design strategies (Elgendy, 2010).

More than any other Arab country, the UAE is making continuous efforts to find alternative sources of energy. In the recent World Economic Forum (WEF) the CEO of Emirates Nuclear Energy Corporation, Mr. Al Hammadi stressed these efforts and affirmed the commitment to finding other sources of energy. He explained in that meeting how the UAE's energy policy is being reformed through studying other countries' practices and policies. In '*The Evaluation and Potential Development of Peaceful Nuclear Energy Policy'* released in April 2008, the UAE committed to collaborate with international bodies to avoid risks of nuclear proliferation and sustainability. In October 2009 the UAE signed and released a federal law to prohibit nuclear proliferation (WEF report, 2013).

Although the UAE aim is to create clean energy from peaceful nuclear energy, experts in environment issues like Mohamed Raouf, Environmental Director of Gulf Research Centre debates if it is a logical solution. He argues that although clean yet not renewable, creates waste and the uranium supply like oil supply is projected to run out within 40-50 years. Hence, creating yet another environmental future problem (Alderman, 2010).

An alternative for sustainable energy in the UAE would be to shift to other sources of energy, such as hydrogen energy, an energy carrier that is clean, controllable and unlimited and can be produced from many energy resources such as oil, natural gas, solar and wind energy. Many researchers and policy makers believe that this can be the key to achieve sustainable development in the UAE meeting its future energy demands without adding pressure on the environment (Kazim, 2010, p. 2258).

EDUCATION FOR SUSTAINABLE DEVLOPMENT

There is a Chinese proverb that says*: 'if you are thinking a year ahead, plant a seed. If you are thinking a decade ahead, plant a tree. If you are thinking a century ahead, educate the people'* (Anon, Chinese proverb).

'*Brundtland'* report stated that *'the needs of the present should be met without compromising future needs'* (Brundtland report, 1987). Hence, a considerable level of awareness, knowledge and action to produce positive results is needed. Education for Sustainable Development purpose must carry more than transfer of knowledge. It should promote the changing of behaviour and enhance the ability to act and contribute to change. It is important to remember to include diversity of culture, views and humans while learning about sustainability (Moore, 2005, cited by Nordén and Hansson, 2005).

When the United Nations Decade of Education for Sustainable Development (DESD 2005-2014) was declared in 2002, it gave education a major and formal role in the process to achieve sustainable development on a global level. The main vision for (DESD) is to help change behaviour, values and lifestyles within learners at all levels to create a truly sustainable future (DESD, 2013).

A need to agree on one definition to what Education for Sustainable

Development mean is a first step to be able to develop effective tools to promote it. Many writers around the world debated over establishing a common meaning in particular to the word Development. Elliott (1998) as an example linked it to the economy and its growth. While Rauch (2002) argued this point of view, Bonnett (2002) rejected to interlink human with nature development and challenged other scholars that all need to agree on what need to be sustained first. Gough (2002) went further in pointing out that sustainable development is more of a journey rather than a destination.

With such confusion over what the concept of sustainable development means to many, understanding how to 'educate' on the matter is even more confusing Rauch (2002). Not only that, since the introduction of the notion of educating for sustainable development in the 1980s, views varied and many debated over what does this education include and whether it is related or not to other terms such as environmental education. Sauvé (1996) had argued that it is not easy to point out the differentiation or the relationship between the different terms. Some thought that there is a need to introduce a new terminology to clarify all the confusion. Such terminologies suggested by some scholars are: *'education for sustainable futures'* (Sauvé, 2002), *'sustainable development as a frame of mind'* (Bonnett, 2002). Other alternatives suggested, include *'Education for Sustainability', 'Environmental Education for a Sustainable Future' or 'Sustainable Education'* (Reid *et al.,* 2002).

It is important to understand that Education for Sustainable Development is not only environmental education as it was thought of before. It must incorporate a wider scope in learning to include the three pillars that Gough (2002) argued about which are economic, social and environment. Gough (2002) emphasized the importance of understanding how social and economic work together with our environment as argued: *"We cannot hope to separate our*

understanding of the environment from our social and economic interactions with it" (Gough 2002, p.65).

It also should consider, as Sauvé (1996) argued the human needs and rights as
part of the ecosystem that we need to preserve. Without human involvement and a shift in mind-set about how to educate taking place, change will not happen.

To meet the sustainable development pressing needs of the 21st Century the role of educational systems, institutes, role of educators and most important education policies must be reviewed. Without that, effective sustainable development learning cannot be attained. Sterling (2008) argued that education theories in general do not promote sustainability. UNESCO's report which came out after the Rio Summit of 1992 seemed to agree with him as it pointed out that *"much of current education falls far short of what is required"* (UNESCO, 2002, p.9). Hence, education might not necessarily be the solution but rather part of the problem.

A need to change educational models is what Sterling (2008) argued for which includes a new way of looking at education and learning that puts cultural views into consideration (Sterling, 2008).

In its implementation scheme after the 2005 declaration, the UN stated that a one model for ESD does not exist. Yet, it defined key characteristics that must be included in any ESD programme some of which are: be based on principles and values of SD, includes the three pillars of SD, fulfill local needs while considering international consequences, use formal and informal education, build capacity, and promote critical thinking skills (UNESCO 2005).

Thus, reviewing literature of how ESD is presented around the world can shed some light to the kind of education model possible to have in relation to the multifaceted concept of sustainable development.

ESD AROUND THE WORLD

Worldwide, ESD is increasingly becoming the key for future success. Ofsted declared in its survey in 2009 that: *"In the most successful schools, education for sustainability was an integral element of the curriculum and all pupils and staff contributed to improving the sustainability of their institution"* (Ofsted, 2009, p.4).

In UK, a report was published by the Council for Environmental Education (CEE) in 1998: Education for Sustainable Development in the Schools Sector (CEE 1998) defined ESD as follows: *"Education for sustainable development enables people to develop the knowledge, values and skills to participate in decisions about the way we do things individually and collectively, both globally and locally, that will improve the quality of life now and without damaging the planet for the future"* (CEE report 1998, p.3).

This report was important in defining the role of teachers in contributing to ESD as it was written by a group of teachers commissioned by the government, which led to revision of National curriculum for the year 2000. It was concluded in several studies that the knowledge teachers had was of great value in teaching a subject. Yet the studies did not confirm that teachers understand in specific what sustainable development is. This is what Hart and Nolan (1999) would argue in their conclusion of their literature review and suggest that further investigation is needed on the matter.

To enable students to contribute to change, first we must enable the teachers. In 2010, UNESCO launched a special programme for this purpose. The

programme's objective is to reach out to teachers worldwide, educating and supporting them in their effort to educate students on ESD issues. The UNESCO's *'Teaching and Learning for a Sustainable Future'* programme is a multimedia programme supported by a website and CDROM (UNESCO, 2010). With around 60 million teachers worldwide, the key to change behaviour and instill values and lifestyles lies in their hands. The programme is designed to contribute to change and even help policy makers around the world in their effort to create a sustainable future (UNESCO, 2010).

ESD in Primary Years

In UK in 2006, the government launched the *'Sustainable Schools'* initiative (QCA, 2002; DfES, 2006 cited by Nikel 2007). Since 2010, the government no longer supported the initiative. It is now funded by the Sustainability and Environmental Education (SEEd) and other NGOs, and continues to create and support more sustainable schools in the UK (SEEd, 2013).

In Germany an ESD pilot programme targeting schools took place between the years (1999-2004) named *'BLK 21'* it targeted modelling citizens' competence for sustainable development the programme was expanded to another initiative *'transfer 21'* aims to further enhance sustainable innovation at schools (BLK, 1998; de Haan & Harenberg, 1999 cited by Nikel 2007).

In Denmark, a policy released in 1995 that called *'A Green Approach to Education and Training'* obliged teachers to integrate sustainable thinking across teaching of all subjects (MVU, 1998 cited by Nikel 2007).

ESD and Higher Education

In Sweden, the International Institute for Industrial Environmental Economics (IIIEE) at Lund University had developed an online program by the name (YMP) stands for

the *'Young Masters Program'*. This international program is aimed to students between the age 15 and 18 years old and their teachers. It is divided into two phases. In phase 1, the first 8 weeks are dedicated to learning about sustainability, what are the threats and who are the stakeholders. To understand how things are going around the world and have a better perspective to the real situation, they learn about Chapter 36 of 'Agenda 21' (Agenda 21, 1992, cited by Nordén & Hansson, 2005). Phase 2 is for ten weeks and the focus is on finding solutions and ways of improvement. A phase 3 can follow as an optional choice. Taking a project based on real life situation where they can apply the concepts learned (Nordén & Hansson, 2005).

Nordén & Hansson (2005) released results that stated the programme was able to accomplish two objectives of the ESD. First, it succeeded to transfer knowledge and understanding of ESD. Second, it made it easier for stakeholders to interact and network through the programme (UNESCO, 2005). The power of linking people from all over the world through this online programme was a tremendous factor for the success of the programme (Nordén & Hansson, 2005). ESD should start on a local level with a global perspective as what happens at a global level can affect the local level (UNESCO, 2005).

Many scholars debated the effectiveness of ESD at higher education level (e.g. Bonnett 1999; Corcoran and Wals 2004 cited by Ellis & Weekes 2008). The debate was mainly on whether to integrate this learning within the existing models of education or there is a need for 'paradigm shift' in learning (e.g. Sterling 2001; Jucker 2002 cited by Ellis & Weekes 2008).

UK government understood the importance of integrating ESD as a 'core competence' for higher education students (HM Government, 2005) through promoting *'sustainability literacy'* which means that every graduate should have a

good level of understanding of the matter of sustainability, the need to change and acquiring specific skills to contribute to the change toward future sustainability (Parkin et al. 2004 cited by Ellis & Weekes 2008).

The UK government launched several initiatives to integrate *'sustainability literacy'* into the higher education curriculum. Some of these initiatives are Leadership and Sustainable Development Masters, capacity building work with partners in the business sector and the Future's Higher Education Partnership for Sustainability programme (HEPS) funded by the Higher Education Funding Councils of England, Scotland, Wales and Northern Ireland (UNESCO, 2006). The HEPS is a three-year initiative established by Forum for the Future in 2000 and involves 18 universities and colleges from across the UK. Based on existing good practice, it provides useful tools to help course designers identify and prioritise sustainability elements in any existing or new courses (Forum for the Future, 2013).

ESD and early childhood Education

Early years are the critical years for children to learn fundamental values, skills and behaviours. When ESD starts at these early years, children can cultivate sustainable habits that can remain with them a lifetime (Pramling, I. & Kaga, Y. (Eds.) 2008).

Yet and as Davis (2008, p.18) argued *"Education for sustainability in the early years is a significantly under-practised, under-resourced and under-examined field. Yet they will bear the high price our generations are leaving behind for them"*. Even Gore (2006) in his documentary *'An Inconvenient Truth'* emphasised the burden we are leaving behind for the next generation on Earth.

In Australia a project named *'Sustainable Planet Project'* targets children between 2 ½ -5 years old came out in 1997 out of a personal initiative from

the team of a day care centre. They wanted a project that can link the learning at the centre with home tasks. They found that the common element between home and the centre is environment. They used personal passion in the subjects learned and applied at home such as gardening and recycling. The motto they chose for the project: '*saving our planet, become a conscious part of the solution'* (Davis, 2008). The simple idea of this project became an integral part of the center's daily practices and created, as Davis (2008) would call it *'sustainability ethic'* from a very early start.

EXAMPLES OF EDUCATION FOR SUSTAINABLE DEVELOPMENT IN THE UAE

Despite the fact that the UAE is considered to have one of the highest ecological footprints in the world, there are serious initiatives and policies set at local levels by schools, nurseries, environmental agencies, education authorities, and local communities.

In 2008, the Knowledge and Human Development Authority (KHDA) in Dubai launched a pilot ESD project that involved seven local schools. It aimed to achieve three things: integrate environmental education within the curriculum; integrate sustainable school buildings; and, change everyday habits to be truly sustainable and an example to others (KHDA, 2009). To benchmark the seven schools, Fatima Al Marri, CEO of the Schools Agency at KHDA and other officials from the KHDA traveled to Germany and the UK to visit sustainable schools and meet experts. Al Marri understood that ESD is not only about building awareness. In her interview with Arabian Business's reporter she stated: *"It's about research, about being as innovative as you can, about capacity-building, so that the environment will cut through economic and social issues. That's what sustainability is all about"* (Slayman, 2008).

To achieve this vision, KHDA partnered with international and local

environmental agencies such as the United Nations Environmental Program (UNEP) and the Dubai Electricity and Water Authority (DEWA). To address changes of behaviour, inspections are done at local schools and penalties are given for the abuse of natural resources such as water leakage or over-use of electricity. Historically, public schools in the UAE have not paid (DEWA) bills and therefore they were not aware of any over-use. When school leaders were presented with (DEWA) bills they were shocked at the level of consumption (Slayman, 2008). The new awareness helped bring about the changes in behaviour that the pilot programme was designed to achieve. The programme will now be supported with a system of incentives and penalties. As Mrs. Al Marri named it, a *'Shock for good'* strategy (Slayman, 2008).

In 2009, the Environment Agency in Abu Dhabi, together with Abu Dhabi Education Council (ADEC) launched a programme aimed at creating environmentally sustainable schools in Abu Dhabi. To aid schools in their efforts to become environmentally sustainable, a website was dedicated to the project with guidelines for a green audit. The site also helped school leaders train their teachers and reach out to parents and the local communities (Sustainable Schools, 2013). A monthly assessment of each school enrolled in the Sustainable Schools programme determined the short-listed schools. During the academic year 2011-2012, 30 out of 103 schools enrolled in the programme had been short-listed as potential programme award winners. A green school audit of each school measured consumption of five elements: water, energy, land, air, and waste. The winning schools of the sustainable school project are recognised at an awards ceremony held end of each academic year (Khaleej Times Staff reporter, 2012). In 2012, awards went to 14 schools that were able to establish genuine, holistic, and sustainable practices. They were able to transform behaviours within the school and their local communities. The winner of the Most Sustainable School award was Al Talee'a School in Al Ain (EAD, 2012).

Even nurseries promote ESD in the UAE. The Blossom Nursery in Dubai, the first nursery in the UAE to become carbon neutral, promotes ESD for its children. The nursery has succeeded in offsetting over 40 tons of carbon emissions (Green stories, 2012). Although this amount may be insignificant compared to large organizations, it is a good start. Both simple and advanced measures were taken to reach a target of reduced carbon emission levels. Some measures were as simple as using potato peelings in the gardens as compost and recycling paper. More advanced measures; included using tinted windows to reduce heat and the filtration of tap water to eliminate plastic bottles (Green stories, 2012). The nursery follows an environmental calendar that recognizes occasions such as Earth Day. In 2011, Blossom Nursery received a certificate from the Swiss non-profit foundation *'My climate'* for its contribution to sustainable development within the local community (Green stories, 2012).

The World Wildlife Fund provides another example of ESD in the UAE. In association with the Emirates Wildlife Society (WWF-EWS), it has helped create over 30 eco-schools through the Foundation for Environmental Education's (FEE) Eco-schools programme. This programme models ESD based on a seven-step method and encourages students, teachers, and parents to curb carbon emission within schools. The winning school takes home the prestigious *'Green Flag'* award, recognised by United Nations Environmental Program (UNEP). In May 2012 five schools won the prestigious Green Flag: Greenwood International School in Dubai; Al Hala Cycle 1 School for Boys in Fujairah; Raffles International School (West) in Dubai; Adhen Cycle 1 School for Girls in Ras Al Khaimah, and Dubai International Academy (Dubai city guide, 2013).

On an individual level, Kehkashan Basu, a 12-year-old student from Deira International School, established an environmental organization called *'Green*

Hope UAE'. Aims to create awareness amongst youth to contribute into saving the planet. Her efforts were endorsed by the KHDA and she is posted as one of the partners on the 'What Works' website that aims to help private schools collaborate on both local and international issues. *'Green Hope UAE'* has joined forces with other youth environmental entities on projects that target a greener future. Ms. Basu is considered to be the youngest coordinator of a major group in the UNEP and she was the youngest participant at Rio+20 in Brazil in 2012 (What Works, 2013).

One can conclude, and after extensive research and literature review, the examples given in this paper are not more than separate initiatives taken by few educational institutes or even individuals and sponsored by environmental agencies. Although the government endorsed several of these initiatives, concrete and tangible education policy to support ESD programmes does not seem to exist on both local and federal level in the UAE.

CONCLUSION

ESD programmes will not succeed without sound strategies that aim to empower. By creating a sense of ownership and responsibility only then change of behaviour toward sustainability can happen (Hungerford & Volk, 1990).

Furthermore, there is a need for transferable skills to guarantee that students are graduating with skills that enable them to make ethical decisions and contributing to sustainable development. Derived from literature review, UNESCO's and OECD's recommendations, key competencies that need to be acquired out of any ESD programme include knowledge of the subject, critical thinking skills, citizenship, attitudes, and values (UNESCO 2005, OECD 2008).

Although no one model for all exists for ESD programme, there are key characteristics for any ESD programme that the UN had defined which policy

makers can use as guideline to form their own national policy for ESD (UNESCO 2005). Ultimately, ESD programmes should be designed with clear end in mind and that is the key competencies that need to be acquired.

In the UAE, there is a tremendous opportunity to create the change needed for sustainability through education. The advantage of being a culture driven by Islamic values can play a major role in influencing behaviour (Richardson, 2004). If Muslims return to the true values of Islam they are bound to sincerely care about making the change needed to create sustainability (Nassef, 2001).

Additionally, the UAE with its wealth and power can learn from best practices from around the world. It can benefit from the strong alliances it has with civil societies and NGOs such as UNDP and UNEP involved already in several initiatives in the country. Policy makers can borrow policies from other countries that proved to be working.

OECD (2008) proposed a practical approach to ESD that policy makers in the UAE can use as a guideline for policy formation. The approach is flexible enough to adapt by any country based on its culture and existing policies. The approach suggests the following ingredients: Courses to be integrated within the curricula at all levels, concepts to cover the three pillars of sustainable development, SD strategies to be integrated in the learning systems based on students' levels, setting SD measurements indicators, practices with real projects such as eco-schools, green projects, and sustainable consumption (OECD 2008).

Moreover, as OECD Programme for International Students Assessments (PISA) was launched in 1997 to inspect efficiency of formal education (OECD 2008), a similar programme to inspect the effectiveness of ESD can be placed. This will ensure accountability needed to any ESD programme.

Another key approach would be the involvement of private sector in the formation of policies. Private sector can help the government in resolving critical sustainable issues while growing its business and creating job opportunities. A good example would be the partnership between GE and Dubai Metro with the use of natural gas in public transportation (Sustainable Arabia, 2012, session 4). Also teaming up within the public sector itself can be the way to a true 'green economy' (UNESCO 2005).

To conclude, if the UAE is committed to support ESD programmes as it promotes, the government will need to build a national plan, covering two important aspects. First, provide guidance by setting clear and attainable education policy dedicated to ESD. Second, establish measures of accountability on a national level with a universal perspective to ensure that unsustainable actions are no longer tolerable. A good start might be by setting an effective plan against unsustainable consumption of energy in households. Key steps for policy makers were suggested in this paper. Yet for a detailed policy proposal further research with comprehensive data collection is required.

REFERENCES

Alderman, L., 2010. Dubai Faces Environmental Problems After Growth [online]. *The New York Times*. Available from: http://www.nytimes.com/2010/10/28/business/energy-environment/28dubai.html?pagewanted=all&_r=0 [accessed 27 May 2013]

Al Mahmoud F., EAD official, personal communication [25 January 2013].

Agenda 21, Rio de Janeiro, 1992 [online]. *Report of the United Nations Conference on Environment and Development-, United Nations General Assembly*, Available from: http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm [accessed 20 November 2012]

Abu Dhabi Education Council (ADEC), 2013. Available from: http://www.adec.ac.ae/en/Education/Pages/default.aspx [Accessed 27 May, 2013]

Abu Dhabi Global Environmental Data Initiative, 2012. *Al Basma Al Beeiya* [online]. Available from: http://www.agedi.ae/pages/content/al-basma-al-beeiya.html [Accessed 30 October, 2012]

Abu Dhabi Urban Planning Council, 2013. Abu Dhabi 2030 Urban Structure Framework Plan [online]. Issued by Abu Dhabi Urban Planning Council. Available from: http://www.upc.gov.ae [Accessed 16 May, 2013]

Brundtland report, 1987. *Report of the World Commission on Environment and Development: Our Common Future*, UN documents. Available from: http://www.un-documents.net/our-common-future.pdf [accessed 17 February 2013].

Bonnett, M., 2002. Education for sustainability as a frame of mind, *Environmental Education Research,* 8, pp. 9–20.

CEE Report, 1998. *Education for Sustainable Development in the Schools Sector: a Report to DfEE/QCA from the Panel for Education for Sustainable Development* [online]. Council for Environmental Education. Available from: http://www.cee.org.uk {accessed 17 October 2012].

Central Intelligence Agency, 2013. Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/ae.html [accessed 15 May 2013]

Davis, J., 2008. What might education for sustainability look like in early childhood? A case for participatory, whole-of-settings approaches, in "The Contribution of Early Education to a Sustainability Society" pp.18-24. UNESCO Publications.

DESD, 2013. United Nations Decade of Education for Sustainable Development (2005-2014) [online], DESD. Available from: http://www.desd.org [accessed 13 May 2013]

Dubai city guide, 2012. *UAE Waves Green Flags For A New Generation Of Eco-Leaders. Five UAE schools are recognized for their outstanding eco-efforts by gaining Green Flag status [online].* Dubai city guide. Available from: http://www.dubaicityguide.com/site/news/newsdetails.asp?newsid=37824&newstype=Company%20News [Accessed 12 May 2013]

Elgendy, K., 2010, Dubai Experiments with Sustainable Development [online]. Carboun Middle East Sustainable Cities. Available from: http://www.carboun.com/sustainable-design/dubai-experiments-with-sustainable-development/ [accessed 20 October 2012]

Elliott, J., 1998. *The Curriculum Experiment. Meeting the Challenge of Social Change.* Milton Keynes, Open University Press.

El-Erian, M., Helbling, T. and Page, J. (1998). "Education, Human Capital Development, and Growth in the Arab Countries." Paper presented at the Joint Arab Monetary Fund, Arab Fund for Economic and Social Development Seminar on Human Resource Development and Economic Growth-Abu Dhabi, 17-18 May, 1998.

Ellis G. & Weekes T. (2008): Making sustainability 'real': using group enquiry to promote education for sustainable development, Environmental Education Research, 14:4, 482-500

Earth Policy Institute, 2012. Available from: http://www.earth-policy.org [accessed 14 October 2102]

EXPO2020, 2013. Available from: http://expo2020dubai.ae/en/ [accessed 20 August 2013]

Ecological Footprint Initiative, 2012. Available from: http://www.footprintnetwork.org [Accessed 30 October, 2012]

EAD, 2012. *Sustainable Schools Initiative Transforms Student Behavior Across the Emirate [online]*. EAD. Available from: https://ead.ae/en/news/ssi.awards.aspx [accessed June 20, 2012]

Emirates 24/7 staff reporter, 2012. *UAE using 225% more energy than Europe [online].* Emirates24/7. Available from: http://www.emirates247.com/news/emirates/uae-using-225-more-energy-than-europe-2012-09-07-1.474523 [accessed 20 October 2012]

Environment Agency-Abu Dhabi, 2013. Available from: https://www.ead.ae [accessed May 2013]

Eco-Schools UAE, 2013, *Awarded schools* [online]. Available from: http://www.ecoschoolsuae.org/en/awarded_schools.php [accessed 25 August 2013]

Forbes, 2013. Available from: http://www.forbes.com/sites/bethgreenfield/2012/02/22/the-worlds-richest-countries/ [accessed 15 May 2013]

Forum for the Future, 2004. Learning and skills for sustainable development: developing a sustainability literate society - guidance for higher education institutions. Higher Education Partnerships for Sustainability (HEPS) (2004). Available from: http://www.forumforthefuture.org/sites/default/files/project/downloads/learningandskills.pdf [accessed 20 February, 2013]

Griggs D., Stafford-Smith M., Gaffney O., Rockström J., Öhman M., Shyamsundar P., Steffen W., Glaser G., Kanie N., Noble I., 2013. *Policy: Sustainable development goals for people and planet*. Nature 495, 305–307.

Gough, S., 2002. Increasing the value of the environment: a 'real options' metaphor for learning, *Environmental Education Research,* 8, pp. 61–72

Gough S. & Scott W., 2006. Education and sustainable development: a political analysis. *Educational Review*, 58:3, 273-290.

Gore, A. 2006. *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About It.* Emmaus, Pa.: Rodale.

Green stories: Blossom-First carbon neutral school in UAE, 2012 [online]. Go Green. Available from: http://www.go- green.ae/greenstory_view.php?storyid=1845 [accessed 17 September 2012]

Hart, P. & Nolan K., 1999. A Critical Analysis of Research in Environmental Education. *Studies in Science Education*, 34:1, 1-69

Hargreaves, A., 2007. Sustainable Leadership and Development in Education: creating the future, conserving the past. *European Journal of Education,* Vol. 42, No. 2.

Herbert, T., 2008. *Eco-intelligent education for a sustainable future life.* Paper from the report of the workshop: The Contribution of Early Childhood Education to Sustainable Society. P. 63-66. UNESCO, Paris Available from: http://unesdoc.unesco.org/images/0015/001593/159355e.pdf [accessed 20 February 2013]

Hungerford, H. & Volk, T., 1990. Changing learner behaviour through environmental education. *Journal of Environmental Education*, 21(3), 8–21.

HM Government, 2005. Securing the future: Delivering UK sustainable development strategy, [online]. HM Government. Available from: https://www.gov.uk/government/publications/securing-the-future-delivering-uk-sustainable-development-strategy [accessed 25 January 2013]

Heroes of the UAE, 2012. Available from: http://www.heroesoftheuae.ae/en [accessed 30 October, 2012]

Kazim, A., 2010. Strategy for a sustainable development in the UAE through hydrogen energy. *Renewable Energy*, Vol.35 (10), pp.2257-2269.

KHDA, 2009. KHDA launches the "Education for Sustainable Development" [online], available from: http://www.khda.gov.ae/en/News/KHDANews.aspx?ID=15024 [accessed 15 May, 2012]

Knowledge and Human Development Authority (KHDA), 2013. Available from: http://www.khda.gov.ae/en/Home.aspx [accessed 12 May 2013]

Khaleej Times, Basit, A, 2012. *Cabinet approves UAE budget* [online]. Khaleej Times.

Available from: http://www.khaleejtimes.com/kt-article-display-1.asp?xfile=data/uaebusiness/2012/October/uaebusiness_October364.xml&section=uaebusiness [accessed 17 September 2013]

Khaleej Times staff reporter, 2012. *Sustainable schools project in Abu Dhabi in final stage* [online]. Khaleej Times. Available from: http://www.khaleejtimes.com/kt-article-display-1.asp?section=educationnation&xfile=data/educationnation/2012/may/educationnation_may58.xml [Accessed 12 November 2012]

Living Planet Report 2008, WWF, Switzerland. Available from: http://awsassets.panda.org/downloads/living_planet_report_2008.pdf

McCormick, K., Elisabeth Mu, E., Norde´n, B., Hansson, L., Carl Foung, C., Arnfalk, P., Karlsson, M., Pigretti, D., 2005. Report of educational initiatives. Education for sustainable development and the Young Masters Program. *Journal of Cleaner Production,* 13, 1107-1112

Mena Development Report, 2008. The Road Not Travelled, Education Reform in the Middle East and North Africa (2008). *The World Bank*. Available from: http://siteresources.worldbank.org/INTMENA/Resources/EDU_Flagship_Full_ENG.pdf [Accessed 27 May 2012]

Nader, S., 2009, Paths to a low-carbon economy: the Masdar example. *Energy Procedia,* 1, pp. 3951-3958.

Nassef, O. A., 2001. Environmental protection an Islamic perspective. *Paper delivered to Muslim World League Conference*, Kuwait.

Nordén, B. and Hansson, B., 2005. Meeting over Cultural Boundaries: Networked Learning for Sustainable Development, presented during the 5th International Networked Learning Conference.

Lancaster, UK, 10-12th April 2006.

Nikel J., 2007. Making sense of education 'responsibly': findings from a study of student teachers' understanding(s) of education, sustainable development and Education for Sustainable Development. *Environmental Education Research*, 13:5, 545-564

O'Brien, J., Keivanib, R., Glassonb, J., 2007. Towards a new paradigm in environmental policy development in high-income developing countries: The case of Abu Dhabi, United Arab Emirates**.** *Progress in Planning,* 68, pp. 201–256.

OECD Insights, 2008. *Sustainable Development: Linking Economy society, Environment*. OECD Multilingual summaries. Available from: http://www.oecd.org/insights/41773991.pdf

Ofsted, 2009. Education for sustainable development: Improving schools, improving lives. Available from: www.ofsted.gov.uk/resources/education-for-sustainable-development-improving-schools-improving-lives [accessed 25 January 2013]

Pramling, I. & Kaga, Y. (Eds.), 2008. The Contribution of Early Childhood Education to Sustainable Society. UNESCO**.** Available from: http://unesdoc.unesco.org/images/0015/001593/159355e.pdf [accessed 20 February 2013]

Policy In Action, Issue 1, 2011. *The UAE in the global knowledge Economy: Fast–Forwarding the Nation*. Published by the Emirates Competitiveness Council (ECC). Available from: www.ecc.ae [accessed 12 May 2013].

Ridha, M. J., 1998. "Charting the Future Education and Change in the Arab Countries: A Platform for the 21st Century." Paper presented at the Joint Arab Monetary Fund, Arab Fund for Economic and Social Development Seminar on Human Resource Development and Economic Growth - Abu Dhabi, 17-18 May, 1998.

Rauch, F., 2002. The potential of education for sustainable development for reform in schools. *Environmental Education Research*, 8:1, 43-51

Reid, A. D., Scott, W. A. H. & Gough, S. R. (2002) Education and sustainable development in the UK: an exploration of progress since Rio, *Geography*, 87(3), 247–255.

Reiche, D., 2010. Renewable Energy Policies in the Gulf countries: A case study of the carbon-neutral ''Masdar City'' in Abu Dhabi. *Energy Policy*, 38, pp. 378–382.

Richardson, P., 2004. Possible influences of Arabic-Islamic culture on the reflective practices proposed for an education degree at the Higher Colleges of Technology in the United Arab Emirates. *International Journal of Educational Development*, 24, pp 429–43.

Rio+20, 2012. *Report of the United Nations Conference on Sustainable Development.* United Nations. Rio de Janeiro, Brazil 20–22 June 2012. Available from: http://www.uncsd2012.org/content/documents/814UNCSD%20REPORT%20final%20revs.pdf

Sauve', L., 1996. Environmental education and sustainable development: a further appraisal, *Canadian Journal of Environmental Education,* 1, pp. 7–35.

Sauve´, L., 2002. Environmental education: possibilities and constraints, *Connect: UNESCO International Science, Technology and Environmental Education Newsletter,* 27, pp. 1–4.

Shihab, M., 2001. United Arab Emirates: A New Perspective, 2001, *Economic Development in the UAE,* pp. 249-259. Available from: http://www.uaeinteract.com/uaeint_misc/pdf/perspectives/00.pdf [Accessed 20 May 2013]

Slayman, F., 2008. *Dubai's first sustainable schools trial is under way - but are schools ready for the change?* Pilot Light [online], Arabian Business. Available from: http://www.arabianbusiness.com/pilot-light-84073.html [accessed 15 May, 2012]

Stevens, C., 2005. Measuring Sustainable Development [online]. *OECD, Statistics Brief*, No. 10. Available from: www.oecd.org/statistics [accessed 21 November, 2012].

Sterling, S., 2008. Sustainable Education – Towards a Deep Learning Response to Unsustainability [online]. *Education for Sustainable Development*. Issue 6, PP. 63-68. Policy & Practice a development Education Review. Available from: http://www.developmenteducationreview.com/issue6-perspectives1?page=show [accessed 13 May 2013].

Sustainable Arabia: Clean Energy, 2012. Conference report. Organized jointly by Dubai Supreme Council of Energy and UNDP. Dubai-UAE, 2-3 May, 2012. Available from: http://websiteabudhabi.com/demo/egbc/images/academy/2012%20Sustainable%20ArabiaFinal%20report%20UNDP%20SCE.pdf

Sustainability and Environmental Education, 2013. Sustainable schools [online]. Available from: http://seed.co.uk/edu/sustainable-schools/ [accessed 25 January 2013]

Sustainable Schools, 2013. Available from: https://sustainableschools.ead.ae [accessed 12 May, 2013]

Tilbury, D., Stevenson, R.B., Fien, J., Schreuder, D., (eds.), 2002. *Education and Sustainability: Responding to the Global Challenge,* Commission on Education and Communication, IUCN, Gland, Switzerland and Cambridge, UK. xii + 206 pp.

The Global Innovation Index 2013. Available from: http://www.globalinnovationindex.org/content.aspx?page=gii-full-report-2013#pdfopener [accessed 1st September, 2013]

The Official website of the Prime Minister of UAE, 2013 [online]. Available from: http://uaepm.ae/english/federalgovernment/pages/thevision.aspx [accessed 27 May, 2013]

UAE Interact, 2013 [online]. Available from: http://www.uaeinteract.com/government/ [accessed 13 May 2013]

UAE Cabinet, 2013. *Highlights of UAE Government Strategy 2011-2013.* Available from: http://uaecabinet.ae/Documents/VisualLinks%20Files/PMOStrategyDocEngFinV2.pdf [Accessed 27 May, 2013]

UAE Vision 2021 document, 2010 [online]. Available from: www.vision2021.ae [accessed 23 October

2012]

UNESCO, 2002. *Education for Sustainability. From Rio to Johannesburg: Lessons learnt from a decade of commitment*. World Summit on Sustainable Development. Johannesburg, 26 August – 4 September 2002. UNESCO, Paris.

UNESCO, 2005. *United Nations Decade of Education for Sustainable Development 2005-2014. International Implementation Scheme.* Draft January 2005. UNESCO, Paris.

UNESCO, 2006. *Education for Sustainable Development in Action Technical Paper N°3. Drivers and Barriers for Implementing Sustainable Development in Higher Education*. Göteborg Workshop December 7-9, 2005. Available from: http://unesdoc.unesco.org/images/0014/001484/148466e.pdf [accessed 25 January 2013]

UNESCO, 2010. Teaching and Learning for a Sustainable Future [online]. Available from: www.unesco.org/education/tlsf/mods/theme_gs.html. [accessed 25 January 2013]

What works, 2013 [online]. KHDA. Available from: http://www.whatworks.ae/Pages/en/Partnersen.aspx [Accessed 12 May 2013]

World Economic Forum Report, 2013. Energy Vision 2013. Energy transitions: Past and Future [online]. Prepared in Partnership with IHS CERA. Available from: http://www3.weforum.org/docs/WEF_EN_EnergyVision_Report_2013.pdf [accessed 30 May 2013]

World Bank data, 2013. United Arab Emirates (online). World Bank. Available from: http://data.worldbank.org/country/united-arab-emirates [accessed 17 September, 2013]