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Non-formal education for a sustainable development program in Cairo

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Non-formal Education for a Sustainable Development

Program in Cairo

by

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Abstract

Education for Sustainable Development (ESD) is important for moving countries toward a sustainable future. In Egypt, ESD is not a common subject found in the national formal educational system, so non-formal education in ESD is needed. The research question is what is the best-suited structure for an experiential learning based ESD non-formal education program designed for private middle-school students in Egypt? To answer this question a review of existing international non-formal ESD programs and a needs assessment was conducted. The review examined five programs for common components; these components included activities such as experiments, camps, research, community engagement, general discussions about the topic at hand, and post courses activities to ensure the sustainability of their program. The needs assessment surveyed 285 students and 89 parents, and 15 interviews were conducted with science teachers in five international and private schools. Questions about the schools' inclusion of sustainable development activities, personal behaviors, and specifics about the design of the program like the length, learning styles used, and the frequency of field trips was included. The results indicated that respondents saw a need for non-formal ESD programs in Egypt focused on three main topics; energy, water, and waste. They felt that the design of the program should be customized according to different students' needs regarding the length and timing. Respondents also mentioned several challenges that should be considered such as the security status of the country, and the existing cultural barriers found in the Egyptian society towards conservation and SD. Based on these results, recommendations for a non-formal ESD program in Egypt are discussed.

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Introduction

The field of sustainable development has been the focus of numerous studies and global initiatives for decades. Many conventions have addressed this specific topic, for example, the three Rio Conventions (the UN Framework Convention on Climate Change [UNFCCC] in 1992, the UN Convention on Biological Diversity [UNCBD] in 1993 and the UN Convention to Combat Desertification [UNCCD] in 1994) (Buckler & Heather, 2014). Sustainable development (SD) has been defined as: "Development that meets the needs of current generations without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 45).

Sustainable development has been highlighted as a crucial development process that needs to be adopted by the world due to the accelerating decrease of natural resources which leads to the deterioration of the human environment and the negative impact it causes on the economic and social development (Drexhage & Murphy, 2010). Sustainable development calls for a convergence between three pillars: economic development, which ensures that economic growth maintains a healthy balance with the ecosystem; social equity, which tackles human inequality, social injustice, and poverty; and environmental protection, which tackles limited natural resources (Kates, Parris, & Leiserowitz, 2005).

Egypt has been suffering lately from developmental challenges, which prioritize the need for studying and exploring sustainable development (Handoussa, 2010a). These challenges are caused by 1) the continuous decrease of water per capita and the increase of water pollution, 2) the continuous increase in energy demand that results in an increase of subsidies and a decrease of energy resources, 3) the continuous deterioration in the air

quality, 4) the increase of waste resulting in pollution due to poor waste management, 5)

the decrease of agricultural production due to pollution and encroachment of lands, and

6) the continuous decrease in the biodiversity in Egypt (EcoConServ, 2003; ESCWA &

League of Arab States, n.d.; Handoussa, 2010a; ILO, 2010). Achieving the three pillars

of economic, social, and environmental sustainable development in Egypt, would

improve Egyptians' quality and standard of living (Abu Al Naga, 2012). The Egyptian

government in 2015 realized the importance of and the need for such a transition and

developed a report called "Sustainable Development Strategy. Egypt's vision 2030"

(EEDC, 2015). However, such a plan needs high level of awareness from the entire

country in order to be implemented.

Education is the main driver behind raising people's awareness; hence a

movement for Education for Sustainable Development (ESD) has risen. After the World

Summit on Sustainable Development in Johannesburg in autumn 2002, the United

Nations designated the period 2005 to 2014 as the decade of "Education for Sustainable

Development (DESD)" to be lead by UNESCO (Pro Europe, 2005).

> ESD is the educational process of achieving human development ("the three pillars
>
> of human development" proposed by UNDP: economic growth, social development,
>
> and environmental protection) in an inclusive, equitable and secure manner. The
>
> vision of Education for Sustainable Development (ESD) is a world where everyone
>
> has the opportunity to benefit from quality education and learn the values, behavior
>
> and lifestyles required for a sustainable future and for positive societal
>
> transformation (DESD, 2008, p. 8).

While ESD is to be implemented worldwide, according to the strategic plan for the pre-

higher education stage in Egypt 2014-2030 prepared by the ministry of education, and

Egypt's vision of sustainable development 2030 report, there is no plan by the Egyptian

government to mainstream ESD in formal education (EEDC, 2015; MOE, 2014).

Formal education is defined as "a systematic, organized education model,

structured and administered according to a given set of laws and norms, presenting a

rather rigid curriculum as regards objectives, content and methodology" (Dib, 1988, p.1).

Formal education has a set of characteristics, such as being organized physically around a

specific building that includes classrooms where students sit in a specific routine,

organized administratively in which roles are set for each person, and with a set

curriculum. If one or more of these characteristics are absent, then the type of education

could be considered non-formal education (Dib, 1988). Moreover, informal education is

concerned with the every-day learning experiences that humans go through or any

learning projects that humans engage in on their own (Jeffs & Smith, 1997).

Non-formal education (NFE) is defined as "any organized, educational activity

carried on outside the framework of the formal system to provide selected types of

learning to particular subgroups in the population, adults as well as children" (Coombs &

Ahmed, 1974, p.8). Non-formal education is characterized by decreased amount of

interaction time between teachers and students, flexible curriculum, a structure that

adapts to the needs of the students, and activities that take place outside of an institution

(Dib, 1988). Furthermore, although there are fewer initiatives in the non-formal education

sector, non-formal education is quite a bit more diverse than formal education.

Even though ESD initiatives have been focused on formal learning, recently a

great interest in non-formal education has developed with a number of different

initiatives and studies illustrating the importance of non-formal education (Rogers, 2004). Some researchers have highlighted that a greater portion of people's awareness of sustainable topics comes from non-formal education (Ballantyne & Packer, 2005). Others have mentioned the importance of non-formal education as a complement to formal education on sustainability and argued that it is a better-suited tool for ESD (AEGEE, 2013).

Non-formal education programs are more common internationally than in Egypt. Egyptian educational systems lack ESD since it is not mainstreamed in policies, however there are some non-formal ESD initiatives targeting children in Egypt. Some of these programs are Sinai Sustainability Cybernetics Center, Sekem Environmental Science Center, Wadi Environmental Science Center, Environmental Protection and Education Association, and Dayma.

Research Question

While there are few programs making an important contribution to ESD in Egypt, there is a need for additional non-formal education programs for children. Before developing such a program, it is necessary to gather data in order to learn what type of program is most likely to be successful. Thus the research question of the thesis is what is the best structure for an experiential learning-based ESD non-formal education program designed for private middle-school students in Egypt? To answer this question, a needs assessment targeted to middle school children in international and private schools, their parents, and their science teachers was conducted. These questions included different components that are used in five different non-formal education programs around the world. The results of the needs assessment were used to make recommendations for the

design of a non-formal sustainable education program to be used with Cairo based middle schoolers.

<div align="center">**Literature Review**</div>

The Need for Sustainable Development

 Sustainable development has become a buzz term recently; however it existed long before it made it to international conventions headlines. The emergence of the concept of sustainable development first started in the 50s, 60s, and 70s when several books highlighted the negative impact that humans have on the planet and argued that the current rate of growth and development would be unsustainable if it continued (Creech, 2012). One of the important books that had a great impact on humans' first understanding of the interconnections between the environment, social well-being, and the economy was Rachel Carson's, *Silent Spring* (Creech, 2012). These three interconnections were later called for when sustainable development emerged (Kates et al., 2005). Sustainable development was first endorsed in 1987 by the UN general assembly, and the concept matured over five years as the 40 chapters of Agenda 21, the UN document on sustainable development, was written (McKeoun, Hopkins, Rizzi, Christalbridge, 2008).

 Sustainable development emerged due to the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development (Drexhage & Murphy, 2010). According to the global environment outlook report, the depletion of natural resources is fast outpacing the ability of natural resources to regenerate (Agard et. al., 2007). This was supported by statistics, as 45 thousand square miles of forests are depleted worldwide each year, 60% of the world's major rivers have been dammed or diverted, and the population rate has

increased 34% in twenty years. These factors have direct impact on social justice, equity, and quality since resources are decreasing and the population is increasing so some people would have access to the remaining resources while others will not (Center for Environment Education, 2007). Also, other statistics indicated that if present consumption patterns continue, two out of every three humans on Earth would live in water-stressed conditions by the year 2025 (Global Environmental Outlook, 2000). Many countries have already been suffering from scarcity of different resources such as water, energy, and food. One of these countries is Egypt.

Sustainable development in Egypt. Egypt has been suffering lately from a number of developmental issues that need to be addressed sustainably. The first of these issues is water depletion, the Nile Water agreement had secured Egypt's water per capita in the 1950's as 2500 m3/capita/year, however due to the increase in the population it has decreased currently to 750 m3/capita/year, which is already below the international water poverty limit (1000 m3/capita/year of renewable water resources), unfortunately the current water per capita is expected to decrease to 250 m3/capita/year in 2050 (Handoussa, 2010a). Furthermore, the quality of water is decreasing due to pollution of waterways and groundwater from domestic and industrial wastewater and solid waste disposal (Handoussa, 2010a).

Another issue is the tremendous increase in energy demand due to the low prices of energy in Egypt, which is subsidized to encourage economic growth and industrialization. The government spent in 2003 around three billion Egyptian pounds to subsidize energy used in cooking called "Buta Gas" which is a mix of Butane and Propane, and around two-three billion Egyptian Pounds to subsidize diesel fuel to keep

the transportation costs low (EcoConServ, 2003). This subsidy increased to 70 billion

Egyptian pounds in 2007, twice the government's spending on defense and national

security and almost four times it is spending on health and education (Handoussa, 2010a).

These subsidies encourage wasteful consumption and decrease the chances of renewable

energies due to their high cost relative to the subsidized regular energy (EcoConServ,

2003). There are many layers in the energy sector that need to be dealt with in a

sustainable manner such as restructuring energy prices to eliminate inefficient usage and

abuse, diversifying energy sources by exploring renewable sources, and reducing energy

consumption (Handoussa, 2010a).

These issues are a fraction of the environmental problems currently facing Egypt.

For instance, the air quality in Egypt has been deteriorating over time. The air quality in

Cairo and Alexandria is getting worse due to energy-inefficient production techniques,

smelters and solid waste dumps, congested roads and natural environmental hazards, such

as dust and seasonal sand storms (ILO, 2010). The major contributors to the air quality

problems are the polluting industries such as the steel, cement, fertilizers, and chemicals

sectors, which are concentrated in and around the urban areas. These polluting industries

contribute to high ambient dust levels and Sulfur Dioxide that may be between two to ten

times the maximum safe levels (ESCWA & League of Arab States, n.d.). As a result,

urban areas suffer from a high concentration of total suspended particulates in the air,

which are generally much higher than the World Health Organization's (WHO) guideline

value, and there are high rates of asthma (ESCWA & League of Arab States, n.d.). Other

major sources in Egypt that contribute to particulate air pollution are urban solid waste

burning, industrial waste generation, and industrial heavy fuel use and diesel fuel

consumption in the transport sector. In addition, there is another seasonal based

contributor, which is agricultural waste burning. The air pollution has various negative

consequences on the population's health, and on the cultural heritage as well as it

damages monuments (ESCWA & League of Arab States, n.d.).

Another problem Egypt has been suffering from for a very long time is solid

waste management. This problem causes pollution and various diseases, and is the result

of inefficient collection of waste, and storage and disposal of municipal and hazardous

wastes. In the urban areas this problem is not as pressing as in rural areas where

collection and disposal systems are poorly developed and waste is usually accumulated

and burned on streets or thrown in lakes and canals. There is also another problem faced

regarding handling industry and hospitals hazardous and clinical wastes, which is usually

disposed of with municipal solid waste, increasing health risks for collection workers and

waste pickers (ESCWA & League of Arab States, n.d.).

Furthermore, there are other pressing challenges facing the agricultural sector.

First, there is generally weak law enforcement in regards to protecting the fertile lands,

which causes the encroachment of these lands for urban uses. Secondly, there is a general

trend of overusing agro-chemicals like fertilizers and pesticides, which causes

environmental pollution, water pollution, and soil pollution (ILO, 2010). Besides,

agricultural waste management isn't implemented in the country, and such waste ends up

either burned or discharged into irrigation canals (EcoConServ, 2003). As a result of

these challenges and others like soil degradation, wind erosion, desert encroachment,

decreasing fertility, and the increased industrial and urban waste contaminating Egypt's

agro-ecological foundation have resulted in crop production losses estimated at 53 %

(Moomaw et al, 2012). This affects the availability of affordable products and causes the increase of government spending on imported products (Moomaw et al, 2012).

Biodiversity in Egypt has been facing dramatic losses and mismanagement too. Habitat destruction is becoming one of the serious threats facing biodiversity due to the increasing population levels. Biodiversity loss is increasing due to the general lack of awareness and resources. Ecological problems such as shoreline erosion and floods have been reoccurring due to pollution and unsustainable developments (ILO, 2010). There have been various reports of biodiversity loss such as, in Hurghada out of 11 sites; three sites have a net loss of hard corals. Also, in regard to aquatic reptile species, out of each detected in Egypt, three are considered rare and the fourth is extinct (EcoConServ, 2003).

Egypt is one of the small contributors of greenhouse gas (GHG) emissions, which is measured at 0.7% of global GHG. However, Egypt's GHG emissions is on the rise, in 1990 Egypt's GHG emissions were 116,608 Gg of carbon dioxide (CO_2) equivalent which increased to 193,000 Gg of CO_2 equivalent in 2000. One of the main contributors of GHG emissions is the energy sector with 92% of the country's energy demand met by using fossil fuels (Handoussa, 2010a). Due to the above environmental challenges, and global impact, Egypt is subject to climate change threats. There have been many ecological manifestations and threat possibilities that show that Egypt is a country that will suffer from climate change such as the erosion of shorelines in coastal zone areas, and indications of flooding in the Delta due to rising sea levels. There are many other negative impacts of climate change on Egypt such as the further decrease in agricultural productivity due to the increase in average temperatures. Also, such negative impacts

could be manifested in vector borne diseases outbreak, which will increase the human

health hazards (ILO, 2010).

In conclusion, these issues will have negative effects on the three pillars of SD,

economic, social and environmental development. There is a need for these issues to be

managed in a sustainable way in order to enhance the quality and standard of living in

Egypt. However, in order to be able to achieve the transition to SD, one major contributor

is awareness and education.

Education for Sustainable Development (ESD)

While the concept of sustainable development was being established, the concept

of education to support sustainable development was being explored. Initial thoughts

concerning ESD were captured in Chapter 36 of Agenda 21, "Promoting Education,

Public Awareness, and Training." (McKeoun et al, 2008, p.12). ESD goes back to the

1992 United Nations Conference on Environment and Development (UNCED), in which

a framework was developed by 178 member states to address Agenda 21 - chapter 36; for

which UNESCO was assigned as the lead agency. In this chapter, education, training, and

public awareness were recognized as critical contributors to a transition to sustainable

development. The framework called for the reorientation of education to include

sustainable development. Other articles were agreed upon regarding the same issue in

three Rio Conventions (the UN Framework Convention on Climate Change [UNFCCC]

in 1992, the UN Convention on Biological Diversity [UNCBD] in 1993, and the UN

Convention to Combat Desertification [UNCCD] in 1994). These agreements have been

built upon since the launch of the decade of education for sustainable development in

2005, marking global initiatives to include sustainable development in education systems (Buckler & Heather, 2014).

ESD is based upon an ecological or relational view of the world that is designed to systematically create a cultural shift in the way we look at education and learning.

"Rather than a piecemeal, bolt-on response which leaves the mainstream otherwise untouched, it implies systemic change in thinking and practice, informed by what can be called more ecological thinking and values – essentially a new paradigm emerging around the poles of holism, systemic thinking, sustainability, and complexity" (Sterling, 2003, p.2).

As Sterling (2003) argues, the whole system of education needs to be changed from learning to compete and consume, to learning to care and conserve. And, according to UNESCO's report in 2005 on policy dialogue, sustainable development and cultural diversity are interrelated in their goals and objectives; hence they should be allies and flourish under one umbrella.

Education professionals usually initiate most education movements; however international political and economic forums pushed ESD because it was felt that ESD would lead to the practice sustainable development. Interestingly, the relationship between education and sustainable development is complex due to the fact that the most educated nations also have the highest rates of consumption in the world. For example, the United States has one of the highest per-capita energy consumption and waste generation in the world even though according to the UNESCO statistical yearbook and world education report, 80% of the population has post-secondary education and 20% has a higher education degree (McKeoun et al, 2008). So it was recognized that current

education is not the answer for achieving sustainable development, curricula must be

adapted to include a focus on conservation of resources, reduction of consumption levels,

and to incorporate ESD (McKeoun et al, 2008). An appropriately reoriented basic

education includes more principles, skills, perspectives, and values related to

sustainability than are currently included in most education systems. Hence, it is not only

a question of quantity of education, but also one of appropriateness, relevance, and

quality. In 2006, UNESCO produced an ESD toolkit in order to facilitate and guide the

transition towards ESD.

   ESD toolkit. The UNESCO ESD toolkit was formulated to address the need of

community and educational leaders to have an easy to use manual that would help and

enable them to initiate ESD in their countries. The toolkit includes general steps in order

to incorporate ESD and exercises to facilitate these steps. The kit highlighted different

skills, perspectives, and values that need to be taught by any ESD initiative in order to be

successful. The skills listed in the toolkit go beyond learning about global issues; these

skills help people to seek continuous learning, to live sustainably, and to have sustainable

livelihoods. Also, the skills listed are needed in adulthood and they fall under the

economic, environmental, and social elements of sustainable development.

   These skills include the ability to communicate effectively, to think about

systems, to think in time, to think critically, to separate quantity and quality, to move

from awareness to knowledge to action, to work cooperatively, to use different cognitive

processes such as knowing, inquiring, acting, judging, valuing and choosing, and to

develop an aesthetic response to the environment. Such skills enable people to live a

sustainable life and to encourage others to embrace such attitude towards life (McKeoun et al, 2008).

The toolkit also includes a set of perspectives that students need to learn within ESD in order to be able to understand global issues and local issues within a global context. One of the perspectives included in the toolkit is that social and environmental problems change through time and have a history and a future. This is one of the most important and is a core principle to be taught in ESD since a part of the definition of sustainable development is that our actions now will affect future generations' lives. Other crucial perspectives mentioned are that contemporary global environmental issues are linked and interrelated, individuals are local and global citizens, and individual consumer decisions have an effect on distant places. In addition, students should learn that humans have universal attributes, they should be able to consider different views and perspectives before reaching a decision, to understand the difference between economic values, religious values, and societal values, and take the view that technology and science cannot solve all of our problems (McKeoun et al, 2008). Many audiences such as national and provincial ministries, non-profit organizations, universities and colleges, teacher educators, school administrators, teachers, municipalities, and government officials used the toolkit (McKeoun et al, 2008).

The toolkit provides steps to be followed by countries in order to create an ESD curriculum. The first step to develop an ESD based curriculum is to have stakeholders identify knowledge, issues, perspectives, skills, and values central to sustainable development in each of the three components - environment, economy, and society. These will solely depend on and be customized to community needs and challenges, (see

figure 1 for an example of what one community could select). The second step is called "Strengths Model" because it raises the capacities of teachers and identifies components of existing curriculum that can contribute to ESD rather than reorienting education to address sustainability. In this approach, every discipline and every teacher can contribute to sustainability education. To implement such a model it is necessary to ensure that educators and teachers are aware of sustainability concepts and principles, so that they will be able to pinpoint the areas in the existing curriculum that can be tied to sustainability by giving examples or additional knowledge, issues, perspective, skills or values related to sustainability. Leaders of the ESD initiatives can then create awareness among the educational community of the identified existent and potential contributions. Afterwards, these contributions can be integrated together to create an ESD program to be taught to students and learners. The collaboration between different educational disciplines in conveying knowledge, issues, skills, perceptions, and valued related to ESD can also contribute to better raising awareness about ESD (McKeoun et al, 2008).

	Environment	Economy	Society
Knowledge*	hydrologic cycle	supply and demand	conflict
Issues	protecting and managing freshwater; managing hazardous wastes	combating poverty	changing consumption patterns
Skills	the ability to acquire, manage, and analyze data	the ability to identify components of full-cost accounting	the ability to think critically about value issues
Perspectives	linkage/interrelationship between/among contemporary global environmental issues	look beyond local and national boundaries	universal attributes of being human
Values	ecological value of undisturbed land	value of a sustainable livelihood	economic value, religious value, and societal value compete

* The integration of knowledge in the three sectors is important to show human-environmental interactions and impacts.

Figure 1: What a country might identify as knowledge, issues, perspectives, skills, and values central to sustainable development in each of the three components. Reprinted from Education for sustainable development toolkit (p.24), by R. McKeown et al. (2006) UNESCO Education Sector.

One of the countries that used the toolkit was Canada in 1993 when the province of Ontario requested that all local school boards create outcomes-based ESD curriculum. The first phase included curricula for students in Junior Kindergarten up to Grade 9; however only general guidelines were given so that each area could develop curricula that were customized to their needs. It was required that local school boards consult with community members, develop new goals, review the existing systems, and accordingly omit, reorient or insert needed topics. This step was accomplished by consulting different stakeholders, like the corporate sector, students, parents, staff, and members of the public and posing one question for all to answer: What is the knowledge, skills, and values students should have by the time they graduate from school? The answers were then categorized into six main graduation requirements, which were translated into the curriculum. These six main requirements were literacy; aesthetic appreciation and creativity; communication and collaboration; information management; responsible citizenship; and personal life skills, values and actions. Even though these outcome requirements do not include the word sustainable, each of them includes in the description the skills and perspectives mentioned in the ESD toolkit. For example, the literacy requirement includes skills in questioning, investigating, critical thinking, problem solving, and decision-making. Also, the students can apply what they learned later on in work, leisure, further studies, daily living and lifetime learning.

These principles were different from the usual curricula goals developed by professional academics because they were closely related to the needs of the community and included sustainability values without having to impose them. Public participation is

considered a crucial technique to ensure sustainability, because it involves communities

from the beginning by asking for community insights, involving them by incorporating

public values into decisions, thus increasing civic engagement, and helps guarantee the

involvement of communities in carrying out these decisions. The next phase school

boards implemented was reviewing the existing curricula taking into consideration the six

main objectives. Curricula were reviewed and altered in order to infuse sustainability

values as the graduation outcomes were addressed. The school boards also reexamined

the tools used for teaching and also the school practices itself to be consistent with the

new curricula and values taught. The third phase was concerned with making sure that

the new curricula would be implemented, which was addressed by conducting several

trainings for teachers in order to raise their awareness and capacities to be able to teach

the new curricula. The reform was considered successful on the basis of academic

rigorousity due to the fact that changes came from within and it was relevant to students'

outside lives. Also, this experience demonstrates the importance of addressing

sustainability based on community's needs and strengths.

In summary the ESD toolkit entails a specific set of skills and perspectives that

needs to be taught in order to be effective (Table 1). However, the toolkit refers to the

Earth Charter as the main source of the values that should be included.

Skills	Perspectives
- The ability to communicate effectively (both orally and in writing). - The ability to think about systems (both natural and social sciences). - The ability to think in time – to forecast, to think ahead, and to plan. - The ability to think critically about value issues.	- Social and environmental problems change through time and have a history and a future. - Contemporary global environmental issues are linked and interrelated between and among themselves. - Humans have universal attributes (e.g., they love their children).

- The ability to separate number, quantity, quality, and value. - The capacity to move from awareness to knowledge to action. - The ability to work cooperatively with other people. - The capacity to use these processes: knowing, inquiring, acting, judging, imagining, connecting, valuing, and choosing. - The capacity to develop an aesthetic response to the environment.	- Looking at their community as well as looking beyond the confines of local and national boundaries is necessary to understand local issues in a global context. - Considering differing views before reaching a decision or judgment is necessary. - Economic values, religious values, and societal values compete for importance as people of different interests and backgrounds interact. - Technology and science alone cannot solve all of our problems. - Individuals are global citizens in addition to citizens of the local community. - Individual consumer decisions and other actions effect resource extraction and manufacturing in distant places. - Employing the precautionary principle by taking action to avoid the possibility of serious or irreversible environmental or social harm.

Table 1: Set of skills and perspectives mentioned by the ESD toolkit. Reprinted from Education for sustainable development toolkit (p.22), by R. McKeown et al. (2006) UNESCO Education Sector.

The Earth Charter. The Earth Charter was founded in 1997 in order to

formulate a global document to guide the transition to sustainable development (The

Earth Charter, 2012). The Earth Charter Commission was formulated and launched in

2000 by an independent international agency. The Earth Charter formulated values in

order to guide and assess individuals, organizations, institutes, businesses, and

governments in making this change. These values involve four principles: respect and

care for the community of life, ecological integrity, social and economic justice, and

democracy, nonviolence, and peace. However, the Earth Charter is recognized as an

incomplete document, therefore different communities need to build on it as they form

their own understanding and implementation measures of sustainable living and

development (Rockefeller, n.d). Since its foundation, the Earth Charter has hoped to

inspire local, regional, national, religious, and other groups to develop their own charters

that give expression to the universal values of the Earth Charter within a framework and

in a language appropriate to their distinctive traditions (Rockefeller, n.d). As a result,

according to the Earth Charter annual report, more than 80 countries have developed their

national earth charters. However, some countries only developed their national earth

charters and did not put it into practice while others are active like Mexico, the

Netherlands, Spain, Brazil, Costa Rica, India, Russia, Germany, the United States, Kenya,

Australia, India and the United Kingdom (Earth Charter International, 2013).

The Earth Charter provides general guidelines based on diverse global experience

for any kind of educational program or activity that wants to integrate its principles. The

first point mentioned in the guideline is for implementers to ensure the consistency with

the Earth Charter's values and principles. Its values and principles such as respecting

diversity, emphasizing participation, and learning from locally based knowledge and

activities should be maintained in order to enhance critical thinking. The second point is

to integrate Earth Charter in existing programs and materials. The guidelines further

explain that it could be very difficult to make room for new content when it comes to

formal education, hence opportunities should be identified in order to incorporate the

Earth Charter within the existing formal curricula systems. The third point is related to

respecting cultural diversity as a central value; implementers should avoid preaching and

respect the right of individual learners to independently hold or reject values. The fourth

point mentioned in the guidelines tackles the necessity of a multidisciplinary approach,

linking and integrating the sciences, humanities, and the creative arts. This integrated

approach's main idea is to understand the impact and consequences of one aspect on the other such as the linkages between humanity's social, environmental, political, ethical and economic challenges. Moreover, the guidelines also emphasize the importance of "learning by doing" in order to bridge the gap between abstract concepts and real life, which includes things such as community outreach activities, a field trip to experience live examples of a specific topic, activities that mimics real life situations, such as role playing, and "hands on" education experiences with research-oriented activities. The sixth point indicates the importance of relating the materials taught to the learners' real life experiences, which enhances the education process and better links information in the learners' minds. Lastly, the guidelines specify that it's essential to connect learners with educators to develop shared knowledge and professional support through virtual or electronic networks (The Earth Charter Initiative, 2009).

Since the launch of ESD many nations have started adopting ESD in their policies and practices. The launch of the toolkit and the Earth Charter has helped nations throughout their implementation of ESD. However, the implementation has varied according to each government.

International experiences of ESD. Since the DESD launch, nations and regions across the world have engaged in developing ESD strategies and frameworks or reviewing existing ones (Mula & Tilbury, 2011). According to current practices, the top countries in sustainability include ESD in their policies and practices (RobecoSAM, 2013). For instance, the top country in sustainability is Sweden where the government has included sustainable development in all its policies since the United Nations (UN) conference on human environment in Stockholm in 1972. As a result, ESD has been

incorporated in all curricula from preschool to adult education with many different initiatives for motivation like scholarships, diplomas and awards (Chung, 2013).

According to the "2011 National Journeys towards ESD" document produced by UNESCO, different countries (Chile, Indonesia, Kenya, The Netherlands, and Oman) have taken different strategies to embed ESD in their policies and education (Mula and Tilbury, 2011). For example, Chile's National Policy on ESD, 2005–2014 uses community-learning approaches to integrate ESD, and is enhanced by national and regional plans. Another strategy used by Chile in order to progress towards ESD is utilizing the civil society organizations as key players in reaching their goals (Mula & Tilbury, 2011). Furthermore, Indonesia has developed an ESD framework based on community and democratic learning approaches; however it has faced various challenges socially, economically and environmentally (Mula & Tilbury, 2011). On the other hand, Kenya incorporated ESD using a strategy that integrates capacity building, advocacy, vision building, partnerships and coordination (Mula & Tilbury, 2011). The Netherlands has used a different strategy to embed ESD across all sectors, which is developing a model framework, the Learning for Sustainable Development (LfSD) program. LfSD implements an integrative approach, which realizes the importance of non-formal and informal education as well as formal education to reach its goal. The program highlights the importance of social and lifelong learning (Mula & Tilbury, 2011). As for Oman, its strategy as a response to DESD is to incorporate ESD in formal education settings and to build relationships with the business sector and use these relationships to provide ESD education for adults (Mula & Tilbury, 2011).

In 2013, another document was produced "2013 National Journeys Towards ESD"

to further document and highlight the strengths of two countries' (Morocco and South Africa) ESD initiatives and strategies. Morocco has succeeded in gaining full support from the government to effectively achieve a sustainable development culture in the country. Many ministries and stakeholders were brought together to support and achieve the same goal of ESD by The National Charter for Environment and Sustainable Development. As a result each is realizing the role they have in order to implement ESD, for example the ministry of education is taking steps in order to mainstream ESD in formal education. Also, NGOs realized the importance of the role they have to play, and many of them are making a huge difference and impact on ESD. Moreover, in-formal education sectors like the media are fulfilling their role to raise the awareness of the society about sustainable development (UNESCO, 2013).

As for South Africa, ESD is mainstreamed within the national curriculum policy. Different aspects of ESD issues and agendas are integrated into the country's transformation agenda; like human rights, healthy environments, inclusion and social and environmental justice. Also, policy dialogues have been adapted to mainstream ESD related issues as well, such as education, environment, economy, science and technology. Furthermore, collaboration exists between different ESD stakeholders within informal practice based networks in provinces (UNESCO, 2013). A powerful tool, the National Teacher Development Network, was developed in South Africa; it supports teachers and raises their capacities in order to be able to teach the environmental components in the curriculum. In addition, ESD is strongly supported by an existing culture in South Africa which is based on resource-based learning – open resources network, online availability of materials and resources. The South African government also strongly supports private

sector innovation regarding sustainable development practices. Also, further efforts and

expansions are being done in the field of ESD research and innovation, and in increasing

the range of ESD offerings in higher education (UNESCO, 2013).

Each country listed above implemented ESD by focusing on specific tools and

practices. While there has been a great emphasis on formal education in order to

mainstream ESD, there are other sectors and methods of teaching that can have a deeper

effect such as non-formal education.

Non-formal education (NFE) for sustainable development. Education

is mainly categorized into three different styles, formal, informal, and non-formal

learning. Formal learning is characterized by being highly structured in terms of

objectives, timing, and support. It also occurs in a specific institution like schools or

universities and leads to certification (Linder, 2011). On the other hand, informal learning

is not structured or aimed at certification, it usually happens through everyday life such

as in working places, through family, or in recreational time (Linder, 2011). Non-formal

learning usually is semi-structured, and is implemented outside of educational systems. It

is structured in terms of objectives, timing and support, however it does not aim at

certification and is voluntary (Linder, 2011). There are differences between the three

types of learning, which are summarized in Table 2. Furthermore, two distinct features of

non-formal education are the centralization of the whole process on the learners' needs

and capacities. The second feature is the aim to enhance learner's professional and

personal growth (Dib, 1988). Non-formal learning is used for both children and adults,

however for the sake of this thesis we will focus on non-formal initiatives that are aimed

at children.

	FORMAL (intentional)	NON-FORMAL (intentional)	INFORMAL (functional – unintentional)
AIM	Yes	Yes	No
PLAN	Yes	Yes	No
PROCESS	Yes	Yes, flexible	No
SPACE	Fixed	Important, but not fixed	Unimportant
LEARNING	Conscious	(Un/sub)conscious	Unconscious
TYPE OF LEARNING	Information, knowledge	Competences	Anything
MISTAKES	Punished – classification	Allowed, appreciate and being worked with	We learn through mistakes, „the more the better"
AIMED AT	Individual	Individual and group	Individual
RESULTS	Same of everyone	Similar	Different
RESPONSIBILITY FOR RESULTS	Educator	Participant, group, educator	Individual
GROUP-ROLE	Has influence, but not important	Very important	If exists, plays a role
GROUP-AGE	Peer	Inter-generational	Inter-generational
GROUP-INTERACTION	Competition	Cooperation	
PARTICIPATION	Compulsory	Voluntary	Automatic
LEADER	Directive, set	Indirective support, setting	None

Table 2: Differnces between formal, non-formal, and informal education. Reprinted from NFE book. The impact of non-formal education on young people and society (p.8), by Novosadova, M., Selen, G., Piskunowicz, A., Mousa, S., Suoheimo, S., Radinja, T., Schrey, T. …. Reuter, P. (2007) AEGEE Europe.

Effectiveness. According to Ballantyne and Packer (2005) most of the sustainable

education literature is focused on formal education programs, yet people's understanding

of environmental conservation and sustainable development is usually developed through

other sources. As a result, the field of education for sustainable development has recently

shifted from the focus on formal education to a focus on the non-formal education sector

(Ballantyne & Packer, 2005). Many regions such as Europe have highlighted non-formal education for sustainable development as a crucial contributor to ESD. A survey among 27 European countries showed that many people learned about sustainability only through the field of non-formal education (AEGEE, 2013). NFE was seen as a necessary compliment to formal education on sustainability, and one in three respondents considered it to be better suited for this particular task (AEGEE, 2013). Ballantyne and Packer (2005) argue that non-formal initiatives objectives' include many sustainable development aims such as changing attitudes, evoking feelings, developing a sense of personal, cultural and community identity, and making decisions about moral and ethical issues.

There are many examples of how effective non-formal education is with communicating the principles of ESD and also with empowering students to collaboratively work with each other and with their local communities (Buckler & Heather, 2014). A study investigating the impact of a non-formal education activity, school field trips, on students' environmental awareness, found that learning in natural environments encouraged a change in students' behaviors and attitudes toward the value of nature, the relationship between humans and nature, locus of control, and resource management (Goldman, Assaraf & Shaharabani, 2013). Moreover, according to a case study done in Israel to measure the effectiveness of non-formal sustainable education, such programs heightened students' sensitivity to human–environment interrelationships and helped them to develop a more ecological worldview. After the program, students demonstrated greater perception of humans as part of the environment, an increased sensitivity to human impact on the environment, and changed their view of non-human

nature from an anthropocentric to a more eco-centric orientation (Goldman et al, 2013).

   The adoption of non-formal education by international entities. The United

Nations Economic Commission for Europe (UNECE) integrated non-formal education

methods in their strategy. UNECE mentions in their strategy for ESD, that non-formal

ESD has a special role as it is often more learner-oriented, participatory and promotes

lifelong learning (2009). Also, it is acknowledged that there is a great need to promote

non-formal education in order to achieve ESD goals because it motivates students to

engage in the study of the curriculum. This engagement emerges from personal interests

and the need to acquire more information, knowledge and skills, to question and reflect

upon knowledge and information, participate in real life actions, and raise their quality of

life rather than emerging as a school requirement (Jucker & Mathar, 2014). It is also seen

important for ethics education because values are applied and tested when people are

engaged in action outside in the real world rather than from inside a classroom (The Earth

Charter Initiative, 2009). Furthermore, in the final report of the Decade of Education for

Sustainable Development, many countries have reported their experiences with non-

formal education. For example, Georgia reported that NGOs are promoting ESD through

non-formal education by helping schools to establish eco-clubs. Some of them are

conducting different activities, (e.g. meetings, workshops, seminars, and TV programs,

etc.) for school children, the general population and other interested groups. Cyprus also

reported that programs implemented in different communities through their

Environmental Education Centers provide hands-on experience with topics previously

discussed in classrooms, giving greater depth in comprehension. For instance, when

studying the topic of sustainable consumption and production, students had the chance to

further enhance their understanding of the topic by visiting and working in local trades through non-formal education programs with professionals. Hence, through non-formal activities, students had the chance to learn how to be responsible consumers.

    Types of NFE. There are several types of NFE that can be differentiated by their relationship with formal schooling systems. The para-normal type is usually NFE that happens as a substitute to formal education for those who could not benefit from formal education systems. This type is basically a condensed curriculum of formal education and they are very common in developing countries. There are several examples of this type of NFE such as literacy programs or private tutoring (Caron & Carr-Hill, 1991). The other type is popular education, which has no relationship with formal education. This type is mainly directed to the marginal groups in communities and is run by voluntary organizations with an objective of collective development rather than individual development. This type can include adult literacy projects, co-operative training, political mobilization, and community development activities (Caron & Carr-Hill, 1991). Another type is called personal development, which consists of learning programs organized by cultural institutions that promote leisure time activities. The most common types of personal development are fitness centers, sports clubs, heritage centers, short courses, and self-therapy programs (Hoppers, 2006). The fourth type is para-formal; it has been called para-formal because it works closely with formal education. This type of NFE is usually short and problem oriented trainings that serve distinct and limited learning needs (Hoppers, 2006). The para-formal type is widely used with ESD because it improves the comprehensibility of the formal curriculum and further builds on it in terms of life long skills, problem solving, and critical thinking. This type has been widely implemented in

different countries through using experiential learning (Buckler & Heather, 2014).

Experiential learning & NFE. NFE based on experiential learning is frequently used in sustainability education because they both have similar objectives such as a student centered learning, and the development of several skills such as critical thinking, problem solving, and decision making (Cox, Calder & Fien, 2010). This method is used to engage and empower students through hands-on experiences, and involves in-class activities as well as off-campus activities, including service learning projects for local organizations, internships, field trips, site visits and overseas travels (Domask, 2007). According to the Association of Experiential Learning (2011) it is defined as:

"A philosophy and methodology in which educators purposefully engage with students in direct experience and focused reflection in order to increase knowledge, develop skills, and clarify values" (para. 2).

There are several steps that comprise experiential learning, such as experiencing or exploring, sharing and reflecting, processing and analyzing, generalizing, and application (NIU, 2014). Experiential learning can reinforce course content and can be an opportunity for learners to prepare for career paths. Besides experiential learning is based on learners learning from another learner rather than from an instructor, the instructor acts like a guide rather than a teacher. The whole experience revolves around learners since the first steps till the end and they learn by sharing experiences. Experiential learning boosts the opportunity for learners to fully learn new skills and knowledge through hands-on, collaborative and reflective learning experience (Haynes, 2007). These experiences can lead to the development of learners' different skills such as,

communication skills, confidence, and decision-making skills due to tackling real world

problems (NIU, 2014).

Experiential learning builds a diverse and sustainable education especially

through learning in locations outside the school. This technique has been shown to

enhance learners' motivation, physical activity and social behavior, while also optimizing

the learning outcomes programs (Fägerstam, 2012; Mygind, 2007). Furthermore, learning

outside the school enhances the learning of curricula by allowing students to experience it

in its natural setting (Barford, Alesandru, Linder, Katting, Johansson, Skanstorm, &

Grafe, 2012). There are various types of learning outside a school setup such as one-day

field trips to monuments and natural sites, adventure trips, fieldwork, and community

based development projects (Rickinson, Dillon, Teamey, Morris, Choi, Sanders, &

Benefield, 2004). Most schools employ this technique in the primary and secondary

grades with a specific emphasis on environmental, social and personal development

aspects in the pupils' general education. However, it is usually limited by the requirement

that it be relevant to the school curricula, for example nature activities that are related to

science course content.

While there are some factors that enhance ESD such as NFE or the use of

experiential learning, there are other factors that hinder the progress of ESD. These

factors could be as a result of lack of ESD integration, or lack of ESD enforcement in

formal education, or lack of institutionalization (Buckler & Heather, 2014).

ESD challenges. ESD has faced many challenges. According to a DESD report

in 2008, these challenges were mainly integrating sustainable science and education,

strengthening and integrating different levels of education for sustainable development,

and sharing information and knowledge between different parts of the world (DESD, 2008). After a decade of ESD and its implementation in different countries, a DESD report in 2014 reported that the challenges had become further alignment of education and sustainable development sectors, more work for institutionalizing ESD, and improving monitoring and evaluation (Buckler & Heather, 2014).

It has been recognized by DESD, that the progress of ESD is hindered by the fact that education and sustainable development policy are not aligned (Buckler & Heather, 2014). Many states have reported that the main barriers to implementing ESD are the lack of integrating ESD into national development policies and plans, and weak inter-ministerial communications. In order to ensure that education systems support sustainable development objectives and that sustainable development policy makers provide the support for education, a dramatic increase in the cooperation and coordination between different ministries should take place (Buckler & Heather, 2014). Egypt is one of the countries where there is a lack of integrating ESD into policies and plans. According to the strategic plan for the pre-higher education stage in Egypt 2014-2030 prepared by the Ministry of Education, there is no mention of ESD or its integration within the formal education system (MOE, 2014). Hence, the use of non-formal education programs could be a valuable supplementary technique.

The other challenge mentioned was to increase work for institutionalizing ESD, since many UNESCO member countries reported the lack of full implementation of ESD across education systems, policies and planning. There has also been a slow response in the actual implementation of ESD in areas such as changing curriculum and raising the capacities of teachers (Buckler & Heather, 2014). The report has suggested raising

teachers' capacities through giving special attention to teacher training institutions. Such

a challenge needs to be handled in a different way that goes beyond efforts done by

individuals. It needs to be mainstreamed in order to maintain such efforts when faced

with changes in politics, priorities or personnel. It also requires actions to deepen the

concept of quality education that would facilitate the inclusion of relevance, purpose and

values for sustainability. Moreover, in order to maintain efforts for ESD, post DESD,

there is an urgency to establish global goals, to continue and expand the national focal

points and to coordinate different stakeholders. Another criteria that would ensure the

institutionalizing of ESD which needs to be further developed and continued is raising

the capacities of policy makers, education leaders, and practitioners (Buckler & Heather,

2014). The report suggested increasing capacities through adult non-formal education and

by developing adequate training institutions. Furthermore, there is a need to improve

ESD monitoring and evaluation tools in order to be able to assess ESD programs, the

extent of their implementation and the outcomes they generate. The improvement of

these tools would lead to the documentation of programs and their impact, which would

result in a continuation of learning and improvement, and initiatives could be built upon

by another program or country (Buckler & Heather, 2014). There are also other

challenges facing education for sustainable development specific to each country. For

example, in Egypt there is slow response from the government to incorporate ESD in the

current national formal education curriculum (MOE, 2014).

Education and ESD in Egypt

There are various sectors within the Egyptian educational system, which structure

Egyptians' values and culture. Various initiatives have been initiated in order to enhance

learning outcomes and to compensate for the non-inclusion of ESD in formal education curriculum.

Formal education. There are different schooling systems for the pre-university stages in Egypt, one is the state educational system, which is completely under the government authority and strictly follows the regulations of the Egyptian Ministry of Education (MOE). There are two types of state schools, public schools which require minimal tuition and experimental schools which teach the English language from early grades and are also subsidized by the government. Another sector is the religious education, Azhari schools, which are sponsored by Al Azhar religious university. There are also the private schools, some of these schools only teach the national curriculum, and others have various curricula included in the same school. Another emerging sector is the international schools sector, which has been expanding over the last 10 years. These international schools include American, British, German, French, Canadian and Pakistani curricula (Abdou, 2012). According to MOE 2014 statistics, there are 41,346 public schools and 6,174 private schools in Egypt. Also, in 2012/2013 84.2% of middle school children are in public schools, 10% in Azhari schools, and 5.8% (276,773 children) in private schools.

Culture. The Egyptian national curriculum has 12 grades, which are mandated to be taught in all public/ private schools with the exception of international curriculum-based programs/schools. There are general values taught through the Egyptian national educational system, which sets the general culture in Egypt. One of the main impacts is bringing up students to be socially conservative due to the fact that the curriculum is not culturally or religiously pluralistic, hence it does not encourage intergroup harmony or

tolerance towards different groups of people or different value systems (Atta-Allah,

2012). This matter is further complicated due to the dominant role of the teacher, which

is highly weighted because of the learning style used in most schools. These teachers

impose their own values and beliefs when it comes to different topics, which is coupled

with a lack of open discourse and critical reasoning (Faour, 2012). The general learning

style used is rote learning, which eliminates skills like critical thinking, open discussions,

and relating the knowledge to real life, and it also creates the culture of "memorizing just

to pass". Finally, there is lack of citizenship education, the skills, and values students

need to gain in order to play a healthy role in the political and social life (Baraka, 2008).

These cultural components are deeply embedded within the Egyptian society. These

components are also encouraged by the general Egyptian system like lack of policies that

encourages sustainable development practices. As a result, according to the Egypt Human

Development Report, a majority of Egyptians see the state as the sole responsible entity

to offer them a good quality of life and to meet their needs and aspirations (Hendoussa,

2010b). This culture contradicts with the general skills, perspectives and values of ESD.

Hence there are limited cultural resources when it comes to ESD, and neither parents nor

students understand how crucial ESD is (Ramzy & Wahieb, 2012). So applying SD

education program needs to take into consideration these challenges and to be sensitive to

these cultural barriers. In the case of private and international schools the culture is

completely different. A number of private schools in Egypt include a variety of

extracurricular activities and community service internships to enrich their programs in

religious education. The private school ethos or culture is marked by the norms and

values of its administrator (Faour, 2012). Many of these schools adopt an environment of

multicultural tolerance, which is implemented throughout the school. Also, some of the

schools inject activities that would teach the Egyptian culture, heritage, values, and

religion in order to compensate for international curricula used. Furthermore, many of

these schools make use of extracurricular activities in order to relate the curriculum to

real life and to induce critical and creative thinking (Chenard, 1999).

      NFE in Egypt. In the Arab States region, ESD is primarily focused on

environmental issues and has a stronger presence in formal education than in non-formal

and informal education (UNESCO, 2010). In the case of Egypt, there are only a few

initiatives in the non-formal education targeting children; therefore there is not much

literature available in this area. Sinai Sustainability Cybernetics Center is a project that

aims to enhance and create a sustainable society of the local community in Sinai village

by providing educational programs related to the original natural self-healing system of

life on earth (Enterprise forum, 2013). Sekem Environmental Science Center offers

classes on environmental topics; it encourages learning outside the classroom and

enhances environmental awareness (Sekem, 2015). Dayma is a project that takes people

on trips with the objective of raising their environmental awareness (Dayma, 2014).

Environmental Protection and Education Association (EPEA) is a NGO that works in the

field of nature conservation, and has an educational youth program that aims to raise

youths' awareness regarding nature through fieldwork and outdoor activities (EPEA,

2014). None of these programs offer prices information on their website.

      There has also been a growing trend in several international schools in Egypt to

send students to summer camps. These camps have a wide range of objectives such as

cultural exchange and the appreciation of nature. For example, one school is embracing

this trend and has a program called "School without Walls" which explores different

locations in Egypt and abroad with an objective of learning by doing (Hayah Academy,

2014). An international school has a program called "School without Borders" which

consists of cross-curricular, academic activities outside the framework of the classroom

to build on skills and knowledge (Canadian International school of Egypt, 2015). Another

school provides different trips for the middle school students and each trips is tailored to

the curricula, social, and physical needs of students of that age group. Trips are mainly

offered in the Middle East area or inside Egypt (Cairo American College, 2015). In

addition, a school provides local and international educational field trips for the purpose

of enhancing learning (The American International School, 2014). These examples target

middle school students, and middle school is an especially appropriate age for

incorporating NFE and ESD into the educational experience.

Characteristics of Middle School Children

Throughout middle school, students go through cognitive and physical changes.

At this age, they develop a sense of themselves, which is derived from the biological

processes that mark their transition into adulthood. Brain development at this age also

takes a leap, with increasing capabilities in child's information processing and learning

skills, their knowledge of different subjects, their ability to apply their knowledge to new

learning situations, and their awareness of their own strengths and weaknesses as learners

(Eccles, 1999). According to recent research, in this stage the brain goes through a

growth spurt then a period of pruning, when heavily used connections between parts of

the brain are strengthened and unused connections deteriorate (Eccles, 1999).

The process of "hardwiring," which continues throughout adolescence, means that

the intellectual activities given the most time, the most opportunity to strengthen the

connections in the brain, will influence learning for the rest of the student's life (Wilson

& Horch, 2002). This sophistication in cognitive abilities also induces thoughts about

their future, development of goals and their understanding of the world (California

Department of Education, 1989). During middle school stage, each individual forms

his/her adult personality, basic values, and attitudes; hence they are explorers,

adventuresome and curious, and have intellectual capacities that are rarely touched by

traditional learning styles or schools (Lounsbury, 2000). Thus, middle school is an

especially appropriate time to integrate ESD into the non-formal educational experience.

Thesis Objective & Research Gap

The developmental problems facing Egypt need to be addressed by people who

are aware of sustainable development and who are able to change behaviors in order to

have a sustainable society. By conducting a program review and a needs assessment, this

thesis takes a step towards designing a non-formal education for sustainable development

program for middle school students. The aim is that such a program could introduce the

concept of sustainable development at middle school so that young Egyptians will be

aware and inspired for their future careers and daily life choices. Also, this research

contributes to the limited literature found on Egypt in relation to non-formal education

needs and design.

A review of five different ESD non-formal programs in different parts of the

world (USA, Europe, Britain, Africa, Asia) can help us to understand which practices and

components are most commonly used. This approach makes it possible to build on

existing programs, learn from previous experiences, and to not duplicate efforts (NAAEE,

2009). It is also important in choosing programs or components to incorporate in a non-formal program in Egypt that they be evidence-based, relevant to Egyptian culture, and viable. In addition to a review of existing programs, a needs assessment should be conducted before designing a non-formal education for sustainable development program based on experiential learning. Needs assessments are used prior to designing educational projects in order to serve participants better, to set priorities according to the data gathered, to allocate resources appropriately, and to gather ideas from different stakeholders (NOAA, 2009). According to the guidelines for excellence in non-formal environmental education programs, needs assessment is one of the first steps that should be taken in order to ensure there is a need that will be fulfilled (NAAEE, 2009).

Program Review

A research was performed in order to discover what programs' components should be included to develop the surveys. Five programs were selected as representative of non-formal education programs according to three criteria. The selection criteria included: geographical location, program structure, and impact and type of support. The programs were chosen to ensure geographical diversity as they operate in different areas around the world, in the U.S.A, Europe, Africa, U.K., and Asia. Also, they were chosen to ensure diverse structures when it comes to activities offered to learners such as including experiments, camps, research, community engagement, general discussions about the topic at hand, and post courses activities to ensure the sustainability of their program. The third criterion was to ensure that these programs were successful either because they included evaluations that demonstrated an impact on learners, or because they had support through different schools or government entities.

The program review revealed a number of initiatives for students around the world that incorporate experiential learning and living sustainably during the time of the program, while focusing on sustainable values. Each of the programs primarily focuses on students in schools, but some also offer their courses/ programs for adults.

The Ecology Program International. In the U.S., The Ecology Program International's main mission is to improve awareness and conservation through field study. According to an outcome evaluation done in 2013, the program had a strong impact on the students; mainly students had changed their behaviors and attitudes towards the environment, and the program had inspired them for future career tracks (The Ecology Program International, 2013). This program conducts their field studies internationally to encourage cultural diversity and intercultural dialogue. As stated earlier, understanding and appreciating cultural diversity is key to sustainable development.

Centro Turistico Studentesco e Giovanile (CTS). Another program is CTS, which is implemented in Italy. This program promotes intercultural collaboration between students through environmental education and promoting biodiversity. It also promotes research and knowledge of Italy's local heritage. The program engages different communities where their centers are located by teaching them along with the students. The program also customizes its activities with students according to each group; these activities are mainly field trips, saving marine life, lab work, experiments, and art projects. The prices are only indicated upon inquiry (CTS, 2014).

Anala Outdoors. India also offers non-formal educational programs such as Anala Outdoors, which is committed to creating an environmentally conscious society through outdoor activities in India. These activities are mainly field trips to different

areas, which vary according to the topic at hand, identifying current practices of conservation or management of resources, discussions with instructors, conducting research, and engaging with communities. They offer their courses to students based on the formal education curriculum and to adults as team building activities. The program also supports children with special needs and educates them about the environment (Anala Outdoors, 2013).

The Field Study Council. Another program offered in the U.K., is The Field Study Council, which aims for more understanding of the environment so that people appreciate its needs and protect its diversity. They offer their field trips inside the U.K. with various lengths depending on the groups' needs and to all ages of school students. It has been recognized by many formal schools as a program that is successful at translating formal curriculum into activities that students' enjoy, learn more, and experience more. The centers are committed to reduce the environmental impacts of their activities so they regularly have sustainable practices and they are registered under the Eco-Centers award (FSC, 2014).

Cape Town Environmental Education Trust (**CTEET**). In South Africa there are various non-formal education programs offered like CTEET. The aim behind this program is to provide children the chance to visit conservation areas and to ignite an interest and passion in them for conservation and sustainable living. They offer courses and camps based on the needs and preferences of different school groups. They also offer an Eco-School program that recognizes the schools that adopt sustainable practices. And they establish Eco-Clubs to sustain the effect of the program on the students. Additionally,

they select the students who have the most passion about the environment each year in order to take them to more camps (CTEET, 2013).

        Components selected for the research. These five programs are further detailed in (Table 3) in order to highlight the different components used in each. These components were addressed in students' and parents' surveys in order to assess the need and interest for each one in Egypt.

Program	Core principles	Components	Support/ Awards/ Achievements
The ecology project international (USA)	- Engages youth from local communities - Promote behavioral change - Promotes the use of dispositions and competencies. - Improves environmental literacy - Creating conservation leaders	- Field trips (international) - Field research (collecting data) - Field basis research project - Presenting data findings (written and oral) - Culture exchange (between students and community) - Students – scientists partnership - Competitions for alumni (conservation efforts) - Camps - Discussions of topics - Lab work	- Rated as one of the top NGOs in 2010. - Awarded by the sustainable business council with the eco seal of strive towards sustainability. - Awarded by the "Serve Montana" governor's office of community service for its dedication in educating the next generation of conservation leaders. - High impact on changing students' behaviors (Evaluation done in 2013). - Awarded by EcoIndex best monitoring and evaluation methodology in 2013 and 2014, and one best lessons learned in 2013
CTS (Italy)	- Promote citizenship and cultural exchange - Engage children from community - Customizing programs to each student group - Collaboration between organization and teachers - Promote collaborative work	- Field trips (Local) - Collecting data/ research - Presenting data findings (written and oral) - Practicing living sustainably - Experiments - Art projects - Saving biodiversity field activities - Discussions of topics	- Recognized by many schools and universities. - Recognized by the Italian government - Actively involved with youth and politics. - Recognized by the ministry of environment. - Contributed to writing the European chart for sustainable tourism.
Anala (India)	- Creating environment conscious society. - Support children with special needs. - Programs are customized according to formal education curriculum - Cultural interactions -Develop self learning approaches	- Field trips - Camps - Street plays - Participation of local community - Community as teachers - Discussions of topics -Research -Presenting data findings (written and oral) - Community service (ex. Educating community members) - Readings	- Recognized by many schools - Recognized by many NGOs - The founder is recognized by the United nations universal peace federation as their ambassador for peace. - Awarded by CMS Vatavaran, New Delhi for his environmental concerns and endeavors at National Institute of Design. - Impacted around 200,000 youth to change their attitudes towards the environment. - Active within the community to create awareness.
FSC (UK)	- Programs are customized according to formal education curriculum - Collaboration with communities visited	- Field trips - Research/ Analysis - Field research (collecting data) -Presenting data findings (written and oral)	- Awarded Quality Badge by The Council for Learning Outside the Classroom - Awarded the Secondary Geography Quality Mark by the Geographical Association in 2010

	- Inspiring environmental understanding - Support children with special needs.	- Discussions of topics - Practicing living sustainably - Readings - Lab work	- Centers are registered under the Eco-Centres award
CTEET (South Africa)	- Customizing programs to each student group - Programs are customized according to formal education curriculum - Emphasis on group work - Focuses on youth from local communities	- Field trips - Camps - Games - Discussions of topics - Research/ Analysis - Field research (collecting data) - Group discussion - Concerts - Practicing living sustainably - Alumni career coaching	- Partners with ministry of environment - Partners with endangered wildlife trust - Partners with SAB 3 (local television channel) - Manages the eco-school programme

Table 3: Components of five different non-formal programs around the world

Assessment Research Design

Mixed methods research will be applied in order to assess program needs. Mixed methods research inquirers draw liberally from both quantitative and qualitative assumptions when they engage in their research (Creswell, 2003). According to Creswell (2002), mixed methods research is mainly used to understand a research problem in a comprehensive way. It allows room in one study for collecting, analyzing, and mixing both quantitative and qualitative data. The combination of quantitative and qualitative methods is complimentary and allows for more complete analysis (Creswell & Clark, 2011). This type of research was used in the present study in order to gather complete data from three different stakeholders (students, parents and science teachers) since there is a gap in the literature available to make assumptions about non-formal education needs in Egypt. Furthermore, mixed methods allowed for data triangulation, using different sources of information in order to increase the accuracy of a study (Creswell & Clark, 2011).

There are three issues that need to be addressed while designing a mixed methods study, priority, implementation, and integration (Creswell, Plano Clark, Guttman, & Hanson, 2003). Firstly, priority is the weight given to each method, either quantitative or qualitative and which is given more emphasis in the study. Secondly, implementation is the order of data collection and analysis conducted, whether it is in sequence or in chronological stages, one following another, or in parallel or concurrently. Thirdly, integration refers to the phase in the research process where the mixing or connecting of quantitative and qualitative data occurs (Creswell, Plano Clark, Guttman, & Hanson, 2003).

In this study priority was given to quantitative methods to understand the general preferences of stakeholders. Also, it used concurrent mixed method design, which is converging quantitative and qualitative data in order to provide a comprehensive analysis of the research problem (Creswell, 2002). Quantitative data was collected through surveys with students and parents in order to assess the need for a non-formal field study education for sustainable development program, to learn which components they would be interested in, and to discover their daily behaviors regarding sustainable activities. Each item on the survey was chosen based on the review of the five non-formal education programs. For each program its components have been identified to understand what a non-formal education program engage learners in to reach the learning outcomes. Also, to understand what practices are included in these programs in order to ensure its sustainability post courses.

The qualitative component was gathered through in-depth interviews with teachers in order to dig deeper and examine the general trends of schools. This method also made it possible to understand students and parents from the perspective of experienced teachers. Science teachers were chosen since according to Shohdah (1992) science teachers are more aware of environmental problems than other subject teachers. These stakeholders were selected from international and private schools.

Methods

Participants

After obtaining the approval of the International Review Board (Appendix 1), data was gathered through five different schools, an American international school targeting upper class students, an American international school targeting middle class

students, a British international school, a private school that includes British, national and American curricula, and an American international school with a religious affiliation. Table 4 includes more details about each school.

	School "A"	School "B"	School "C"	School "D"	School "E"
Private / International	International	International	International	Private	Religious International
Curriculum	American	American	British	American/ British/ national	American
Middle school years	Three years	Three years	Four years	Three years	Four years
Target	Upper class	Middle class	Upper/ middle class	Upper/ middle class	Upper/ middle class

Table 4: Five schools specifications

In two cases student and parent surveys were distributed throughout the middle grade due to the limited number of classes, in one case it was an equal sample of students from the three/ four grades were chosen, and in two cases, classes were selected by the head of the middle school grade according to convenience, one in each grade. The total number of surveys collected from students was 285, and from parents it was 89 (Table 5). As for the teacher interviews, it depended on how many teachers were dedicated for the middle school grade, in some cases head of science departments were interviewed, or teachers teaching several middle school grades, or teachers teaching only one grade. Teachers were also selected by the head of middle school grade according to the availability of the teachers, and the total number of teachers was 15 (Table 5).

Stakeholder	Total number of respondents	Gender		Age
		Females	Males	
Students	285	134	151	11 – 14 years old

Parents	89	53	36	Late twenties - forties
Teachers	15	9	6	Mid twenties - forties

Table 5: Total number of respondents

The three target groups were introduced to education for sustainable development definition and the different topics that are taught such as water, energy, waste management, and biodiversity to ensure that the answers given were based upon a common understanding of the topic. Also, they were introduced to the general components that compromise non-formal programs and the purpose behind it. Students were told that non-formal education programs are held outside the school walls, it included field trips, hands on activities such as experiments and research, and engaging with different communities. For the students and teachers these introductions were communicated orally and for the parents it was communicated on paper. Pilot surveys and interviews were conducted in a different private school with ten students, five parents, and two teachers. Pilot testing was conducted in order to ensure that the surveys were easy to read and understandable and based on feedback the instruments were revised. The revisions included changing a three point Likert scale to a six point Likert scale, and the definition of biodiversity was added to the researcher's introduction to participants. Furthermore, an introduction of the study and the researcher was added to the documents sent to parents. Finally, 'does not apply' was added to the Likert scale addressing their daily behaviors. No revisions were required for teachers' interviews. These pilot surveys and interviews were not included in the results. Four different consent forms were used; for students (Appendix 2), parents (Appendix 3), teachers (Appendix 4), and an extra one

for parents to approve the participation of their children before they sign their own

consent form (Appendix 5).

Each stakeholder was informed about the purpose of the study, the procedures

used to collect the data, and was assured that there were no potential risks or costs

involved. Anonymity and confidentiality were maintained throughout the study. The

researcher ensured anonymity by detaching the written consents from the questionnaires.

No identifying information was entered onto the questionnaires, and questionnaires were

only numbered after data was collected. Furthermore, the ethical principle of self-

determination was also maintained through treating subjects as autonomous agents by

informing them about the study and allowing them to voluntarily choose to participate or

not. Lastly, information was provided about the researcher in the event of further

questions or complaints.

Materials

Quantitative. Middle-school students (n=285) were surveyed to assess the need

for a non-formal education for sustainable development program, to find out which

components they would be interested in, and to discover their daily behaviors regarding

sustainable activities (Appendix 6). Closed-ended questions were used because they are

easy to administer, to analyze, and help to avoid poor articulation from children

(Crawford, 1997). They also make it possible to obtain data from a large number of

respondents. The survey consisted of 22 questions, questions one through seven a Likert

scale was used with choices varying from 'strongly agree' to 'do not know'. These

questions were used to understand students' general preferences when it comes to non-

formal education program structure. Questions eight through ten closed/ open questions

were used, students were offered pre-defined choices and an 'other' area in case

respondents had additional responses that were not included. These four questions asked

about specifics such as the length of the program, preferred learning styles, preferred

topics, and the frequency of the field trips. Questions 12 through 22, a Likert scale was

used with choices varying from 'always' to 'never', and an 'other' area in case

respondents had additional thoughts. These questions were used to discover their daily

behaviors.

Another survey was developed for parents to assess their sustainable activities,

their preferences when it comes to summer programs and what kind of activities they

would like their children to engage in (Appendix 7). Surveys were sent for parents in

order to allow them the opportunity to do it in the comfort of their home and return it

back to school, a total of 285 surveys were sent and 89 were returned. No incentives were

included. Definitions of sustainable development and non-formal education were written

as an introduction for the survey in order to help ensure a common understanding. The

questionnaire consisted of 18 questions; they were a mix between closed and open

questions to make it less time-consuming for parents to respond (Polit & Hungler, 1993).

The open-ended questions were included, as these provide more diverse detail. These

details were needed for the study to understand whether parents are aware of the

sustainable development activities done in school with their children and to understand

the potential barriers that the program would face. The first four questions were

dichotomous questions with a choice of yes and no with a related open question to obtain

more details. These questions were concerned with general trends included in schools

regarding SD and non-formal education programs, to identify whether parents think there

is a need for ESD, and to identify whether they would send their children to a summer school. Questions five through seven were concerned with the non-formal education program, parents were given predefined choices with an 'other' area in case respondents had additional thoughts. These questions were specific to understand parents' preferences regarding non-formal education programs like the length, price and camping. Questions eight through 18, a Likert scale was used with choices varying from 'always' to 'does not apply'. These questions were used to discover their daily behaviors. Finally, parents were given two consent forms to sign, one for their children to participate in the study and the other is for them.

Qualitative. Another set of questions was developed for science teachers. Interviews were conducted with 15 science teachers to understand what kind of activities the school encourages, what kind of activities middle school children enjoy, and their suggestions for a non-formal program design (Appendix 8). Interviews were chosen in order to get more in depth data and opinions regarding current school practices and the design of a non-formal program. In each school the head of science department was interviewed, while the rest had shorter experiences varying from three to five years.

Procedure

Forty different schools were identified through online research and were approached some by email and some by visits. These schools were selected based on being international or a private school. The emails consisted of an introduction to the thesis topic and the methodology. Seven schools agreed to help with the research, however only five were selected to gather a diverse sample of different school profiles. The head of each school's middle grade chose the sample of students according to

convenience; which is a non-probability sampling method. These students were given

parents' surveys in order to be filled and returned back to school. The package included

an introduction to the research and definitions of the main concepts, consent form, survey,

and consent forms for their children to participate in the study. Once parents' surveys and

consent forms were collected students' surveys were conducted. In some cases these

surveys were done with entire classrooms and in other cases surveys were done with an

equal sample of students in the three middle school grades. Teachers' interviews were

done either before surveys were conducted or after, according to each school's

circumstances. The science teachers were not present during student survey sessions.

Students were introduced to the definition of SD provided by the UNESCO, while

highlighting the need for it in Egypt by giving examples of the energy, air pollution, and

water problems faced. Also, non-formal education was introduced giving them examples

of non-formal ESD programs existing such as the five reviewed to form the survey, and

the definition of the term biodiversity. Students were told that the survey is voluntarily

and if they chose not to fill it there will not be any consequences. And when they agreed

to fill the surveys, the consent form was given to them to sign (Appendix 2). After

students signed the consent forms, they were given the surveys while confirming that

they can ask any questions if needed. The surveys were collected when students finished.

 Teachers were given an explanation of sustainable development was provided in case

they were not aware of it, and an introduction to non-formal education was given. The

interview consisted of seven. Notes were taken throughout all the interviews conducted.

Data Analysis

Quantitative and qualitative data were analyzed concurrently and integrated into the

overall interpretation of results. Descriptive statistics such as pie, bar charts, and tables

were used to visually explain results for each stakeholder. The open-ended questions

were analyzed through quantitative content analysis by the researcher with the aim of

quantifying emerging characteristics and concepts. Content analysis is the process of

analyzing verbal or written communications in a systematic way to measure variables

quantitatively (Polit & Hungler, 1995). Themes were extracted from the qualitative

responses in parents' surveys and then these themes were grouped and quantified. The

researcher noted teachers' responses during the interviews. Themes were extracted from

these notes and grouped accordingly and then quantified. In both cases, the researcher

engaged in an interactive process between a careful reading of the text, design of

preliminary themes, fitting of texts into these themes, and refinement of themes till most

of the text fitted into the existing set of themes (Franzosi, 2007). An external researcher

did the same procedure, and 90% of the themes were similar. The other 10% were

reached discussed until agreed upon.

Results

The results were generally consistent between the five different schools, so they

were combined for the purposes of analysis. This section presents the combined results

both quantitative and qualitative, for the student and parent surveys and the teacher

interviews.

Results from Student Surveys

Background and preferences. Before they were introduced to SD, students

were asked if they knew what it was. Only students in two of the schools reported a

familiarity with it. Students were given the choices as a Likert scale from 'strongly

agreed' to 'strongly disagree' and 'don't know' throughout questions one to seven. The

results presented group strongly agree with agree and strongly disagree with disagree. For

the first question, as figure 2 indicates below, 122 students agreed to attending a

sustainable development summer program, however among them (27 students) wrote

underneath that they agree to go if not in the summer. Also, 51 students disagreed, 26

said they don't know, and 86 were neutral.
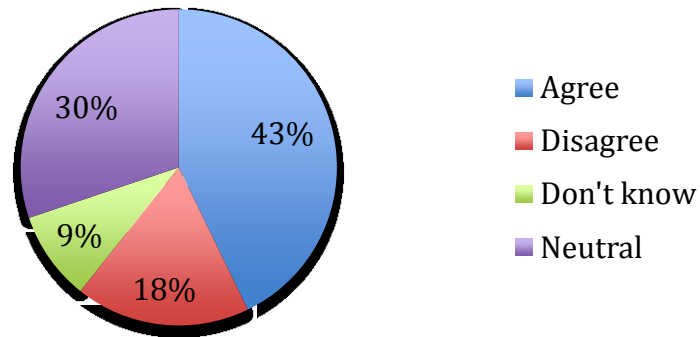
Figure 2: Percentages of students wanting to attend ESD summer program

Furthermore, the majority of students (n=112) indicated that they had previous

experience with sustainable development projects (in school/ extra curricular activities/

hobby), 106 disagreed, 40 were neutral, and 27 didn't know (Figure 3).
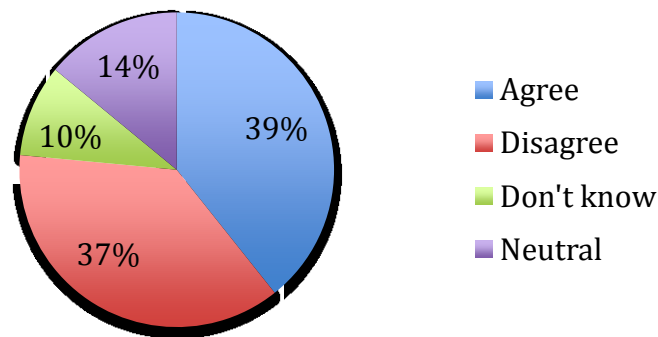
Figure 3: Percentages of student who had previous experiences with SD projects

Also, figure 4 indicates that the majority (n=123) agreed that their school provides

sustainable development education, while 91 students disagreed, 39 didn't know, and 32

were neutral.
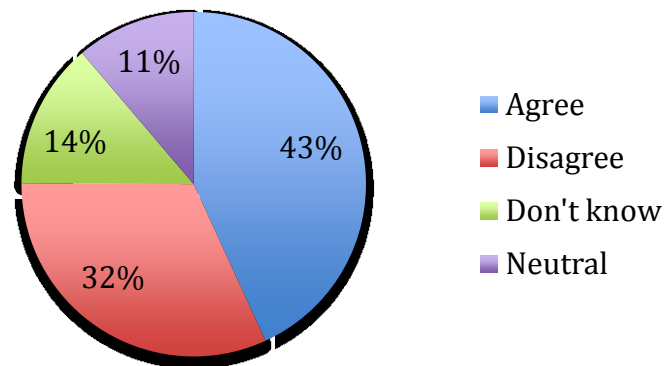
Figure 4: Percentages of students' response to the availability of SD education in their schools

The majority of students agreed (n=119) to the fourth question that asked about

their interest in implementing what they learnt in the summer program as a school project,

82 disagreed, 65 were neutral and 17 disagreed. Moreover, 178 students agreed to

implement projects in collaboration with people living in communities visited throughout

the ESD program, 54 were neutral, 34 disagreed, and 15 didn't know. There was a high

interest among students in learning how to live sustainably, as 190 agreed, 51 were

neutral, 25 disagreed, and 16 didn't know. Additionally, question seven got the highest

number of agreement (n=216), which asked about the students' preference for a camp

rather than going back home every day, while 32 disagreed, 25 were neutral, and 10

didn't know. See (Table 6) for a summary of questions one to seven.

	Agree	Disagree	Don't know	Neutral
Q1: I would like to attend a SD program in the summer	95 (43%)	51 (18%)	26 (9%)	86 (30%)
Q2: I have had previous experience with SD projects	112 (39%)	106 (37%)	27 (10%)	40 (14%)
Q3: My school provides ESD	123 (43%)	91 (32%)	39 (14%)	32 (11%)
Q4: I would be interested in implementing what I learned as a school project	119 (42%)	82 (29%)	17 (6%)	65 (23%)
Q5: I would like to collaborate on SD projects with the people who live in the communities we visit	178 (64%)	34 (12%)	15 (5%)	54 (19%)
Q6: I would like to get to know hot to live sustainably for the of the program	190 (67%)	25 (9%)	16 (6%)	51 (18%)
Q7: I would like to sleep over at the camp	216 (76%)	32 (11%)	10 (4%)	25 (9%)

Table 6: Summary of students' results (Questions one to seven)

On questions eight through ten students were given choices that depend on each

question. The first question asked about the length of the program, 123 students chose a

week, 59 chose two weeks, 22 chose three weeks, 30 chose four weeks, and 24 chose four

months (Figure 5). However, there were 21 students who chose "other", three of them

preferred the program to be less than a week, two preferred it to be in between one and

two months, four wrote more than three months, three indicated they would like it to be for a year, three wanted it to be for the whole 12 grades of education, and six wrote none.
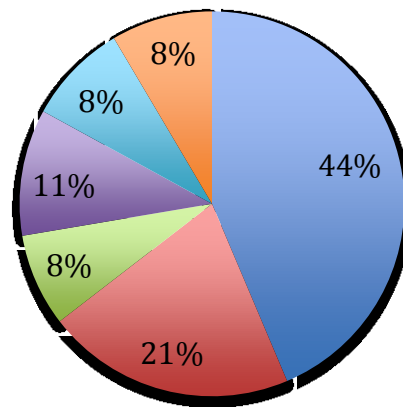
Figure 5: Students' preference length of ESD program

As illustrated in figure 6, the topic that students preferred to learn about was energy (n=155) followed by water (n=148) followed by waste (n=99), and the two least chosen topics were biodiversity (n=94) and agriculture (n=86). The "other" section was chosen by seven students indicating their interest in learning about health.
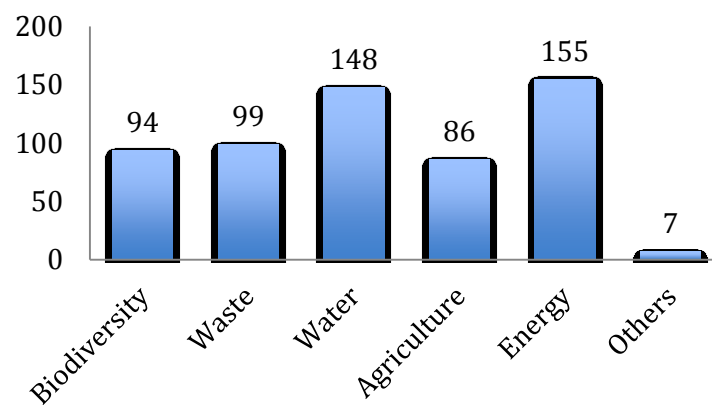
Figure 6: Students' responses to which topics they prefer to learn about

Question ten asked students about their favorite way to learn about something (see figure 7). Activities and videos were the most preferred, followed by group work, and the least preferred were listening to experts and reading. Other students indicated other favorite ways of learning, five wrote games, one wrote experiments, one wrote online research, one wrote teachers, and one wrote music. For question 11, 159 student indicated that they would like to have as many field trips as possible during the length of the program, while 52 chose from two-three field trips, 29 chose one-two field trips, 21 chose three-four, and 22 chose none.
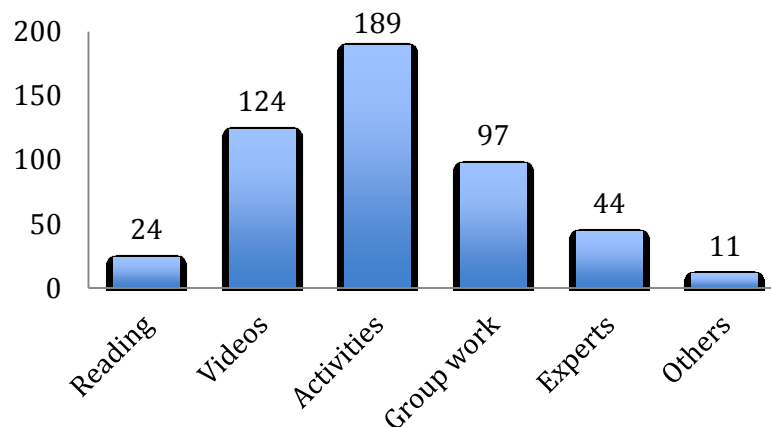
Figure 7: Students' responses for their favorite ways of learning

Student lifestyles. The second section of the survey asked about students' lifestyles giving them choices ranging from 'always' to 'rarely' and 'does not apply'. The results presented show only the practices that are performed by the respondents and group 'always' and 'usually' together (Figure 8). The practices that were highly performed by the students were not littering (n=183), followed by switching off lights and TV when not used (n=173), followed by turning off the tap while brushing teeth (n=164), followed by eating locally grown food (n=144), followed by carrying a flask

rather than buying plastic bottles (n=112), and lastly reusing their plastic waste for crafts

and decorations (n=107). However, there were other practices that were not adopted by

the students such as riding bicycles rather than cars when there is a chance (n=90),

donating old electronic gadgets (n=90), volunteering for environmental projects (n=64),

taking plastic bags when going to the supermarket (n=55), and using the fan instead of

the air conditioner (n=45).
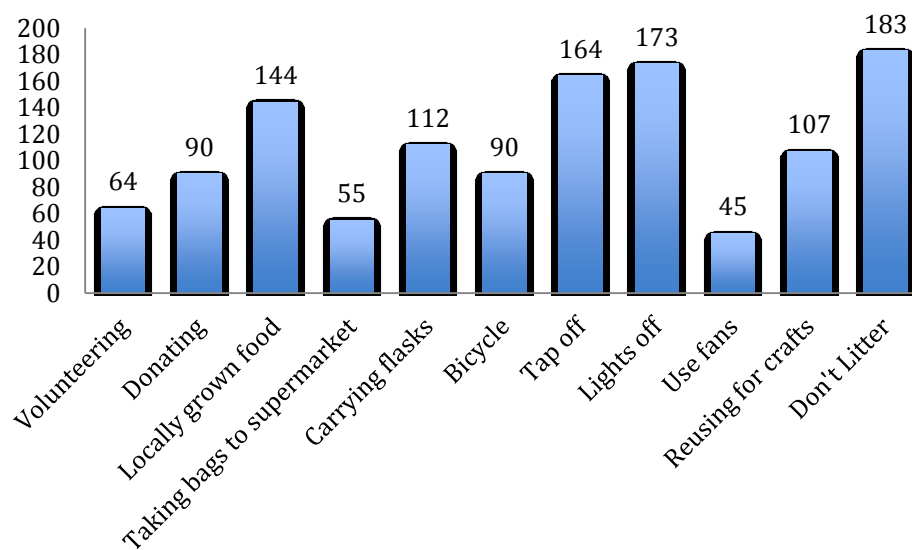
Figure 8: The SD practices adopted by students

Parents' Results

Eighty-nine parents were asked 11 questions that were categorized into three

different sections, the first focused on their knowledge about SD and the school, the

second asked about their preferences regarding ESD program, and the third asked about

their sustainability practices.

Knowledge of sustainable development. For the first question, 88 of

parents thought that ESD is important and only one said no because the parent thought

that the children in that stage are too young to learn about SD. Reasons given as to why

ESD is important was categorized under six different sections as figure 9 illustrates, skills and development, knowledge and awareness, citizenship, environment, resources, and others. Sixteen parents indicated that ESD is important due to the skills and development their children will gain such as, problem solving, succeeding in life, developing their personalities and behavior, and accepting diversity. In addition, 20 parents chose knowledge and awareness as the reason behind ESD's importance, answers varied from the need to learn about global issues and perspectives, raising their knowledge regarding SD, and to gain more knowledge from outside the school because there is not enough in school. Also, 15 parents indicated that ESD is important to achieve responsible citizenship, such as encouraging children to be better citizens, more civically engaged, socially responsible, help the society, and to improve the country. The lowest category was parents' concern towards the environment, which was mentioned only by five participants. These concerns highlighted the importance of the environment, and the need to be able to help improve the environment, and to be in harmony with nature so we wouldn't disrupt the life cycle. Yet, the majority of parents' were more concerned with resources such as water and energy (n=29) since their scarcity affects them directly. They see that ESD is important for future life, ensuring quality of life, being able to use resources efficiently, and in order to be able to maintain productivity. Furthermore, one parent said that SD is a crucial topic and that's why ESD is important.
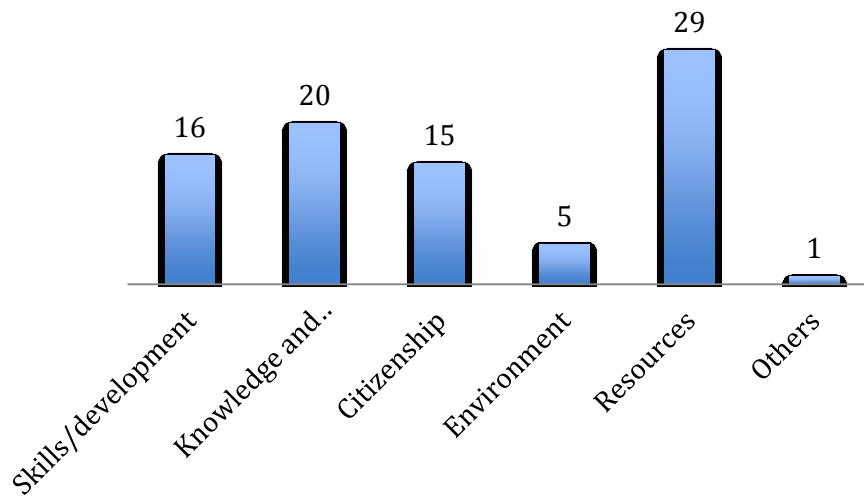
Figure 9: Parents' reasons why ESD is important

When asked about whether their child's school had sustainable development

activities, 35 parents said that their school did have such activities and 52 said that they

didn't have them. Those 35 parents indicated the various activities (see Figure 10), 13

parents said that the school has waste separation or recycling projects, five said that the

schools engage students in charity related activities, eight indicated various projects such

as science fair, Earth Day, and a green club. Also, four parents indicated that the school

engages students in UN conferences, three said informed coaching, one said biodiversity

protection activities, and two said that their children planted or went to farms with the

school.
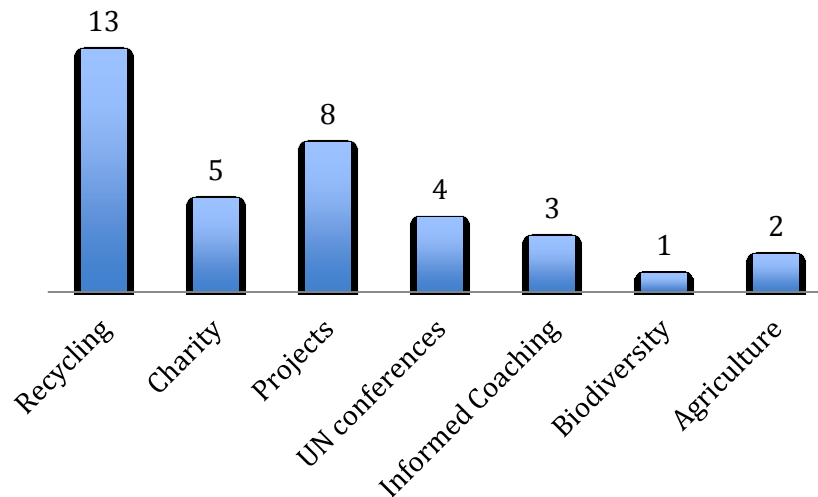
Figure 10: Parents' responses of what kind of SD activities is offered by schools

As Figure 11 indicates the majority of parents (n=72) said that the schools do not have non-formal education programs in the summers, while 16 said the school has such program. The 16 parents who said they have non-formal education programs in the summer, indicated that they vary from scouts, educational field trips, volunteering with heart patients, cultural & historical activities, and learning crafts. Table 7 provides a summary of the results for the first three yes/no dichotomous questions.
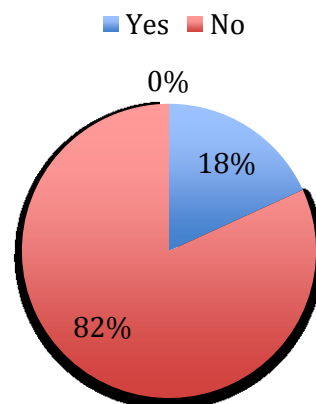
Figure 11: Parents' responses to the availability of non-formal education programs offered by the school

	Yes	No
Q1: Do you think educating children about SD is important?	88 (99%)	1 (1%)
Q2: Do you know of any SD activities done at school with your children?	35 (40%)	52 (60%)
Q3: Does the school provide non-formal education programs in the summer?	16 (18%)	72 (82%)

Table 7: Summary of the results for the first three dichotomous questions

Summer program preferences. The second section of questions starts with asking parents whether they will be willing to send their children to a summer program, 65 parents said yes, and 17 said no. The reasons indicated by parents as to why they wouldn't send their children to a summer program are: seven said to take a break from academic year, two said that their children are good at school, one said due to sports related commitments, one said that the whole family will move out of Egypt, and one said that their children is too young to go to a summer program. Also, in regards to their preference length of the program (Figure 12), 10 parents indicated they would like it to be for one week, 35 parents preferred two weeks, eight preferred three weeks, 17 preferred four weeks, two preferred more than a month, and four indicated other preferences. The other preferences were, one parent said as long as possible, another parent said two days per week for as many weeks, another said more than once for short periods to cover different subjects, and another said it doesn't matter.
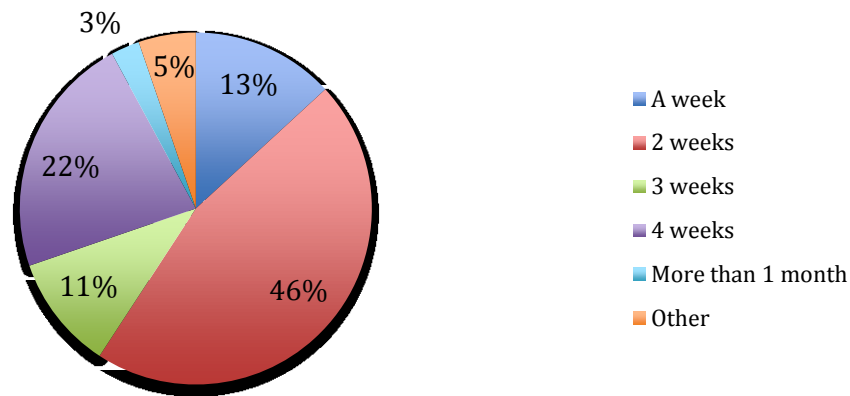
Figure 12: Parents' preferences regarding the length of an ESD program in the summer

The next question focused on the amount of money they are willing to pay for a two

weeklong summer program, the majority of the parents (n=69) chose 1,000-5,000 LE,

three chose 5,000-10,000 LE, two chose above 10,000 LE, one chose less than 1,000-

5000, and six said it depends on the activities offered (Figure 13). Furthermore, when

asked about their preferences regarding overnight options, 56 parents indicated they

would like their children to come back home, and 30 parents indicated they would like

the program to be a camp. For those 56 parents, 36 indicated that they would be fine if for

longer trips their children could sleep over, and 20 said no. The reasons given as to why

parents would not be comfortable with sleepovers are, the country's security status (n=5),

house rules due to cultural reasons or others (n=7), and the students are too young (n=2).
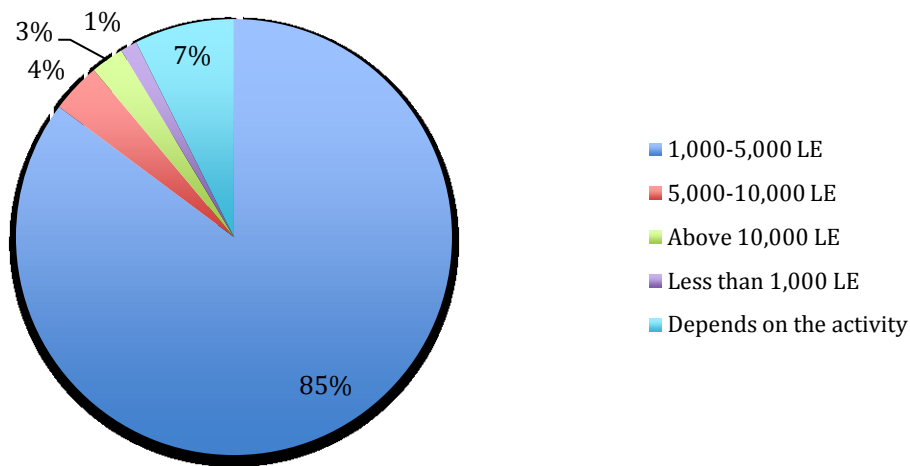
Figure 13: The amount of money parents are willing to pay for a two-week long ESD program

Parents lifestyle. The final section of the survey asked about parents' lifestyles

giving them choices from 'always' to 'rarely' and 'does not apply'. The results presented

will group always and usually and the results of those versus each question are presented

in order to get a sense which practices are not done by parents (Figure 14). There are six

practices that got the lowest number which includes volunteering for environmental

projects (n=9), taking bags to the super market (n=8), carrying flasks of water rather than

buying plastic ones (n=34), separating waste (n=25), using the fan instead of the air

conditioner (n=22), and reusing plastics for crafts or others (n=13). The high scoring

practices include donating old electronics (n=47), eating locally grown food (n=62),

switching the tap off when brushing teeth (n=58), switching the lights/ TV off when not

in use (n=70), and not littering (n=55).
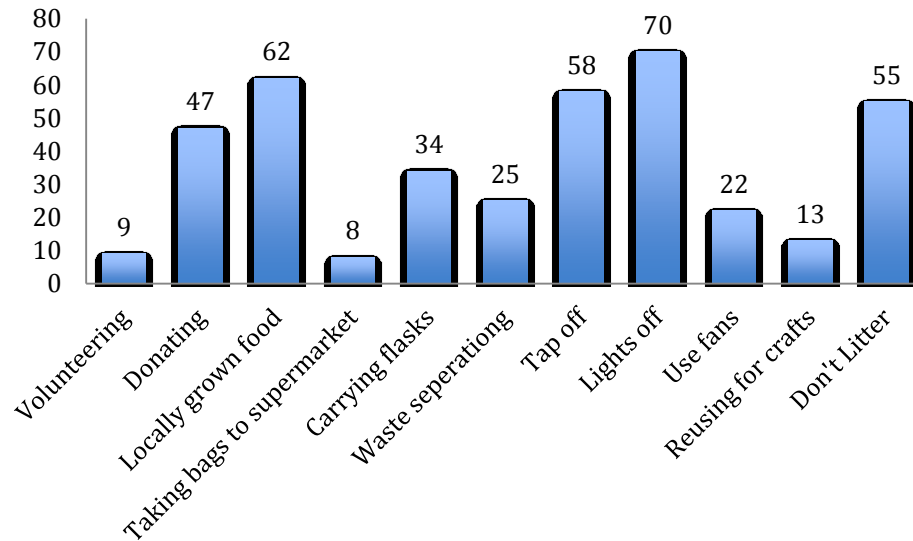
Figure 14: The SD practices adopted by parents

Parents' comments. At the end of the survey under the comments part several

parents indicated the importance of ESD to be taught at an early stage in children's' lives.

They also felt that the priority goes to specific topics such as, energy, waste, water,

consumption, and SD's global perspective. One parent felt there is a need to add SD into

the curricula because it facilitates education. Another parent indicated that summer

schools are usually associated in Egypt with poor performance of children in school.

Teachers' Results

Fifteen teachers were asked seven questions to understand their view on ESD,

current practices in their schools, and the suggestions they have for a summer program.

The qualitative answers were grouped under different themes in order to be able to

quantify emerging characteristics and concepts.

Views on ESD. The first question had a unanimous agreement among the

teachers that ESD is important. The reasons given were categorized into five sections,

skills and development, knowledge and awareness, citizenship, environment, and

resources. As Figure 15 illustrates, teachers mentioned resources the most and their answers varied. One teacher said, "We need to take care of our resources because they are depleting fast". Another teacher said, "The next period we will be running out of resources, and children need to take part in conserving these resources". Others indicated the importance of resources to maintain the production cycle. The second most common theme mentioned was related to citizenship. One of the teachers said, "ESD is very crucial so we wouldn't get from the children comments like who cares?" Another teacher indicated the importance of thinking of others by saying, "Children need to understand that their actions affect others now and in the future|". Others indicated that children need to be more civically engaged, socially responsible, better human beings, and taking care of the country. Also, two themes were mentioned equally (n=6 for each), knowledge and awareness, which is, linked to general knowledge of the current situation locally and globally. One of the teachers said, "Children need to know that there are existing problems they know nothing about". Others mentioned that ESD would increase children's awareness level, and to know and change their behaviors towards alternative methods to our existing problems. The other equally theme mentioned was skills and development which is linked to practical solutions and gaining skills in order to solve the problems. For the skills and development section, specifics were articulated by the teachers such as children would improve their abilities in order to apply SD on a general or a personal level. Finally, the least mentioned theme was the environment only one teacher specifically mentioned the importance of the environment.
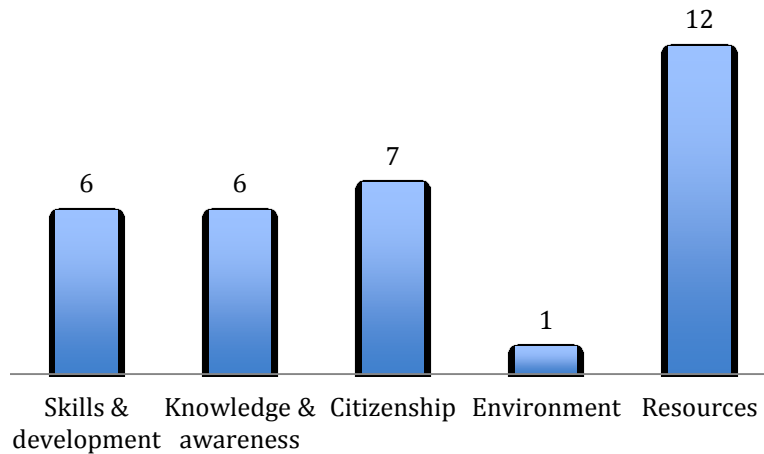
Figure 15: Reasons why teachers thought ESD is important

Current school practices. The majority of teachers (n=11) indicated that their schools have sustainable development activities while four said no. These activities were then specified (Figure 16), activities related to waste were mentioned 18 times such as, separation of waste, recycling, visiting Manshiet Nasser area to learn about waste recycling, minimizing waste, calculating the amount of waste produced, neighborhood cleaning, agricultural waste, and global related waste. Non-formal educational trips were also mentioned eight times, such as travel to the Wadi environmental science center, Ain el Sokhna to learn about marine biology, and Wadi Hetan camps to learn about the desert ecology. Water related activities were mentioned three times and included investigating water pollution, building a water desalination unit, and encouraging water conservation. Also, green clubs and celebrating earth day were mentioned five times, while charitable activities were mentioned three times, air pollution and renewable energy activities were each mentioned two times, and planting trees was mentioned once.
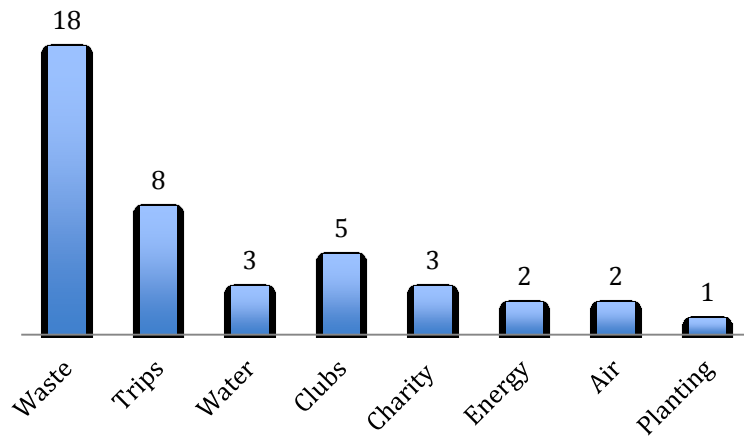
Figure 16: SD activities found in schools

The next question asked was to learn about teachers' experiences with children, and what kind of activities children liked to do. As Figure 17 illustrates, teachers thought the activities enjoyed the most by children are hands-on ones (n=11), followed by activities that have an impact that children could see (n=5), followed by field trips (n=4), followed by experiments (n=2), and finally group work, videos and projects were each mentioned once.
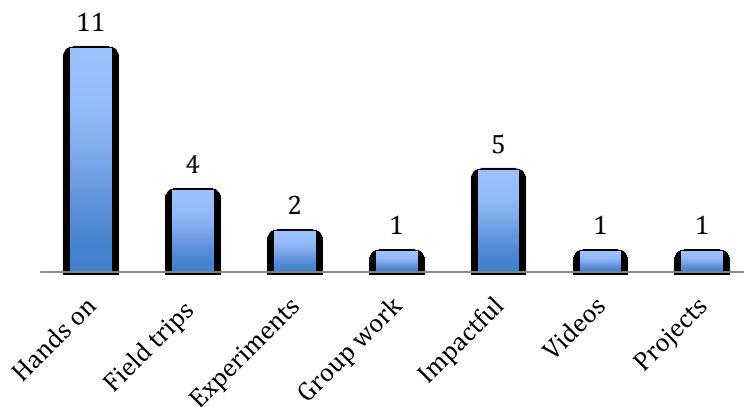
Figure 17: Teachers' opinions regarding activities children liked

The next question focused on gaps and opportunities regarding ESD, four teachers said that there were no gaps and 11 indicated there were gaps. The gaps mentioned fell

under two main themes, cultural barriers (n=4), and educational system barriers (n=5). The cultural barriers mentioned were mainly highlighting that Egyptians have lack of conservation culture and hence parents and students don't support such practices, and the limited appreciation for natural resources. One teacher said, "Students are spoiled, they do not get to experience scarcity or shortages". The educational systems barriers mentioned were mainly focusing on the lack of ESD in curricula, lack of incorporation of ESD in school activities, that curricula do not link ideas of SD to SD, and the curricula is huge and there is no opportunity to linger more on lessons that include SD. As one teacher stated, "The educational system does not include SD in the curricula so such values are not taught from a young age and hence its not embedded in our Egyptian nature". Other gaps were mentioned such as the difficulty of teaching SD to young ages, lack of community outreach, and the unsustainability of ESD when applied by international educators due to the short period of their employment in Egypt. Opportunities mentioned for the above gaps also fall under the same two themes. Under the cultural theme, opportunities mentioned (n=2) were for the country to adopt SD and mainstream all its activities, and to prioritize it to the extent of a crisis so Egyptians would adopt SD and change. Furthermore, opportunities mentioned under the educational system theme (n=13) were, decision makers need to take a lead in order to mainstream ESD in school curricula in order to be taught from a young age and to change the current culture, ESD need to be adopted throughout school activities including staff behavior to change the students' behavior, effective monitoring and evaluation system, teachers' capacity building, add more practical application including field trips, include citizenship

lessons, and for schools to open channels of communication with the ministry to publicize students' projects and innovations.

The fifth question focused on whether schools encourage SD inclusion in activities and education and how. The majority of teachers said that schools encourage inclusion of SD (n=11), three said that their school didn't, and one said that the school neither encourages nor discourages since initiatives come from teachers. The majority of activities mentioned that indicate that schools encourage ESD were activities including clubs, tips, projects, and science fairs (n=7), field trips (n=4), charity related activities were mentioned twice, and waste related projects were mentioned twice.

The next question dealt with non-formal education offered by schools in the summer, and eight teachers said yes, and seven teachers said no. The non-formal education programs mentioned by the teachers were categorized as SD related topics (n=7) and SD non-related topics (n=7). The SD related topics were mainly WESC, going to preserved areas such as Wadi el Hetan, scuba diving, and green team. The unrelated topics were trips abroad to learn about the stock market or drama, athletics, and other clubs.

Suggestions for non-formal education program. The final question was concerned with the suggestions teachers could give for a non-formal education program. These suggestions fell under five different themes. The first theme was concerned with the topics to start with which was mentioned by six teachers; these topics included waste, water (the Nile), renewable energies, rural areas, and sewage treatment. The second theme was planning which six teachers mentioned, which included having a set of objectives for the program because SD is broad, teaching a concept at a time, managing

lack of security, asking existing programs, starting small, and applying the program in the

winter break rather than the summer break. The third theme was concerned with the

format of the programs' components, which was mentioned by seven teachers, they

indicated the importance of engaging the children through performance-based activities,

fun activities, hands on activities, changing behavior and life style activities and effective

activities. Four teachers mentioned the importance of establishing follow up activities for

sustainability such as applying projects in schools in order to change the environment to

suit what they learnt, and establishing clubs in schools in order to keep these groups

communicating together about SD and to establish projects with different communities.

Two teachers mentioned the fifth theme, which highlights the importance of tying the

non-formal program with the formal curriculum.

Discussion

The results provided in the previous section help us answer the thesis question,

what is the best-suited structure for an experiential learning based ESD non-formal

education program designed for private middle-school students? The results give a

general understanding of a topic that is not commonly researched, including important

aspects of Egyptian culture that should be considered, and recommendations to design the

program. This section will be divided into three main parts, the general awareness and

practices of schools regarding SD, the different components for designing the non-formal

ESD program, and recommendations.

General Trends

Awareness. The general awareness regarding SD among students is low since

only two groups of students in two different schools were able to tell what SD was before

introducing the concept to them. The two schools where students knew about SD were

American and British; hence there is no distinct difference between the two international

curricula in regards to their inclusion of the SD concept. It could also be the case because

both schools had the highest rate of educational field trips, and research has indicated that

non-formal educational field trips are a bigger contributor to people's understanding of

environmental conservation and SD than formal schooling (Ballantyne & Packer, 2005).

These field trips did not necessarily have a SD theme, yet they taught students about

different resources in Egypt, which is also a common practice in schools (McKeoun et al,

2008). While the surveys conducted with parents did not indicate whether parents already

knew the term or not, 99% of parents thought ESD was important. The most common

reason given for their opinion was related to conserving resources, a topic especially

relevant in Egypt due to the current resource shortages (Handoussa, 2010b). The second

most common reason parents gave was related to raising awareness and knowledge of

their children due to the lack of ESD in schools and in Egypt. The Egyptian Ministry of

Education report supports this where it was found that Egypt has not mainstreamed ESD

in schools or in governmental practices (MOE, 2014). Only 1% of the parents said that it

is not important because students at that age are too young to learn about SD. One of the

teachers mentioned as a gap, that teachers are not equipped to teach SD to such a young

age group, which is also one of the main challenges facing ESD worldwide due to lack of

training and capacity building (Buckler & Heather, 2014). Furthermore, teachers too, saw

ESD as important, with 100 % in agreement that it should be taught. Their most common

reason for supporting education in ESD was, as the parents also said, to conserve

resources. The second most common reason was for children to be active citizens, a

practice that is challenging in Egypt due to the current political situation and lack of citizenship education (Baraka, 2008).

Hence parents' and teachers' are aware that there is a need for a non-formal education program for ESD in order to increase the awareness of SD as students do not appear to be getting this information from their formal schooling. These non-formal ESD field programs would introduce SD to students and expose them to different current resource management practices and introduce them to the values of living sustainably. Also, non-formal education program is one way to overcome the lack of teachers' capacity to teach SD.

School trends. While 43% of students agreed or strongly agreed that their schools provide ESD, the majority did not agree, did not know, or were neutral. These wide variations in answers could be explained by the inclusion of topics that are related to SD, but that do not mention SD in curricula (McKeoun et al, 2008). So for example, science curricula might include lessons about water in general, but it would not be linked to conservation practices, or alternative methods that could replenish water supply, or the effect of water scarcity on the economic and social issues. Furthermore, while the majority of parents said that schools did not include any SD activities, those who indicated that their school did mainly listed activities such as recycling, science fair related projects, and charity related activities. The teachers also tended to list these kinds of activities, and it is likely that the focus on such activities is due to the fact that waste management is one of the top issues facing Egypt so activities are targeted to tackle this problem (Handoussa, 2010b). However, it is worth noting that some of the teachers felt that these activities are not fully understood by students since they have not fully learned

the science behind it, and the process that takes place outside the school walls. So

students do not know the impact of those activities, hence they are not maintained nor

mainstreamed in their houses. A final general trend in schools was a lack of outreach to

the larger community, which was criticized by teachers. This is also in line with the

general Egyptian culture due to lack of citizenship education, so students do not play a

healthy role in the political and social life (Baraka, 2008). Given these general trends the

program design should be built upon school activities to include the knowledge that

students lack and further develop those school practices. This would help increase the

awareness of students, which would help sustain the activities because students would be

implementing those activities with knowledge regarding their impact. Further, the

inclusion of relevant communities would help students understand different issues and

challenges the society is facing which would increase their civic engagement as well as

their understanding of SD.

Expected challenges. There are many challenges that were mentioned by

teachers and parents, the most common one was the security status that hinders most of

the field trips conducted by schools and would complicate the implementation of a

program. The security challenge will need to be taken into consideration while designing

the program, and this could include implementing shorter programs that are not based on

camping. Another solution would be to engage students in a one-day trip and continue

with the other research related activities on school's campus using their labs or in the

local community. This technique was used by STC, the Italian non-formal program that

was part of the program review. Other challenges that were mentioned by teachers such

as the existing cultural barrier towards conservation or SD in general, which could be due

to the lack of cultural resources (Ramzy & Wahieb, 2012). Furthermore, other challenges were mentioned such as, the curriculum does not include activities or room and time to linger on SD related lessons, and SD activities are teacher-dependent so that when teachers leave the school the activities cease. These challenges demonstrate again why a non-formal ESD program should be implemented in order to develop a source of ESD that is sustainable, activity-based, and independent of the limits of the school curriculum and therefore able to inject ESD whenever possible.

Program Design

Time of the program. The students' results showed that 43% agreed or strongly agreed to learn about SD in the summer. There are several why others were not interested, which can also be drawn from the parents and teachers answers. It was obvious during the data collection phase that there is no culture of education-related activities in the summer. For the students, summer education was not preferred because they want to take time off for traveling or leisure (n=27), for their parents, summer classes are for students who have performed poorly in the regular school year or for non-educational activities (n=12). Furthermore, both the parents' and the teachers' answers show that the majority of schools do not provide summer education activities, and schools that do have summer programs are offering more non-educational activities such as athletics, scouts, and camping. Given these responses, it may be important to design the program so that it will not be based solely in the summer, and will include time slots such as in the middle of the school year as part of schools curricula, and during the spring and winter breaks. Since these vary from one school to another, collaboration between the program and schools will be necessary in order to customize the programs to the

schools' and students' timing preferences. This strategy is used in all five of the non-formal ESD programs that were reviewed (see Table 3).

Length. The length of the courses would vary according to the time preferences since it will be shorter if the courses will be conducted in the middle of school year or during breaks, and will be longer if in the summer. According to the results obtained from students, the majority indicated that one week is the length preferred, the second choice was two weeks, and the third was four weeks. As discussed earlier, these answers could be based on the fact that students do not want to spend long periods in educational activities in the summer. However, it was also indicated by the majority of parents that two weeks is their preferred length, followed by four weeks, and followed by one week. Some parents suggested that packages should be offered in short periods and offering several packages so that children would be able to attend more than one course to learn as much as possible. It should be noted that these length preferences were based on conducting the program in the summer, so it may not be relevant to the design of programs that occur during the school year or in the breaks. Therefore, different packages of the program need to be offered, first based on the timing of the program and second on the length. This could also be customized according to different student groups requests, which is also a technique used by some of the non-formal ESD programs reviewed. For example, in the UK program, the packages of the courses vary in length from a single day field trip to a multiple week camp.

Camping. Another aspect that needs to be considered is whether the program should be based on camping or should be short field trips and students would go back home afterwards. According to students results, the majority of students (76%) indicated

that they would prefer the program to be based on a camp rather than going back home.
This percentage is even higher than those who agreed to attend an ESD program in the
summer, which indicates that this is their general preference for any program.
Nevertheless, the majority of parents indicated that they would like their children to go
back home rather than camping for the whole period. However, the majority also
indicated that they would accept camping for longer trips, and those who were reluctant
because of security concerns, are likely to be willing if security ceases to be an issue. Or
one-way to address the security issue have the camping portion to take place in school or
the local community.

   These results show the potential impact of cultural and political differences. Most
of the non-formal ESD programs reviewed were based on camping and made other
customizations based on requests from different schools regarding the length of the camp.
Camping is considered beneficial for students, because it is an opportunity where
students are given the value to belong to a community of their own, and it offers them the
experience to satisfy their need for physical activity, creative expression, and a true
participation in a community. All these aspects cannot be satisfied within schools
(American Camp Association, 2015). Due to the various benefits of camping, the
program will be designed as a part of the courses, however it could be customized based
on requests.

   Topics. The program will offer topics depending on students' preferences and
teachers' and parents' suggestions. Students' survey results indicate that the majority
would like to learn more about energy, followed by water, and then followed by waste.
These results are the same as the teachers' suggestions. Also, one of the teachers

indicated that the program should offer courses based on one topic so it would be simpler for the children to understand and in order not to overwhelm them. Parents also suggested the same three topics; however they also felt that it was important for children to understand SD in general, its importance, the global perspective, and reducing consumption. Thus, taking the above into consideration the topics that will first be developed would be the three top topics Egypt has been suffering from, energy, water and waste (Handoussa, 2010b). Each topic should address at first SD in general and the global perspective and then be applied more specifically to the Egyptian context. None of the programs reviewed include in their courses a general introduction of SD; this is likely because there is more integration of SD in the formal education curricula in these countries. This is not the case in Egypt however, so a non-formal education program here should include the general introduction.

Another important point that was mentioned by teachers several times was that the courses should relate to the formal curriculum. This strategy is used in general with non-formal education in order to serve as a compliment to formal education (Earth Charter Initiative, 2009). This strategy also is used in the five non-formal education programs that have been reviewed to formulate the research methodology questions (Table 3). Implementing this approach would entail reviewing curricula in order to formulate a course that would be complimentary. Also, it would be essential to have strong communication channels with teachers prior to course implementation in order to understand what they want their students to learn.

Program implementation approach. The assessment offered information on how to design the program in terms of learning styles, what content to include based

on gaps in students' sustainable behaviors, interactions with different communities and decentralization of the program.

Styles of learning. According to students' survey results, the majority preferred to learn through activities, followed by watching videos, followed by group work, followed by expert speakers, and then reading. Also, the majority of students indicated that they would like to go to as many field trips as possible. These answers were supported by teachers' interview responses in which they indicated that the most enjoyed activities students liked were hands-on activities, followed by activities where they could see the impact or effect quickly, followed by field trips, experiments, group work, videos, and projects. The program design should include the five different learning styles, because it will help ensure that the knowledge will address the preferences of the maximum number of students (Cheminais, 2002). However this strategy should be used along with respecting students' preferences by giving different weights to each style. Hence, the bigger weight should be on activities and field trips while applying a lesser weight to videos, expert speakers, and group work and very little weight to reading.

Learning sustainable personal behaviors. The majority (67%) of students indicated their interest in learning sustainable personal behaviors. Parents and teachers also highlighted personal behaviors in the question referring to the importance of ESD asked, they indicated the importance of children's own development, gaining of skills, and acting as active citizens. Also, some parents wrote in the comments part that children should learn how to behave sustainably specifying waste and consumption related behaviors. Teachers also indicated that personal behavior should be included in the program. Hence, the program should promote changing personal behaviors to be more

sustainable. This strategy is used in three out of five of the reviewed non-formal

programs, which ensures that the knowledge and information provided by the courses are

integrated into the students' life styles. The priority in this matter will be based on the

section of students' and parents' surveys that asked about their personal behavior. In this

section, the students' results indicated that the low scoring practices were volunteering,

donating, being plastic conscious when it comes to bags or water bottles, reusing plastics,

and being energy conscious. In parents' results indicated that the low scoring practices

are the same but adding other practices such as waste separation, and littering.

   Interacting with different communities & decentralization. The majority of

students indicated an interest in collaborating on projects with communities visited

during the program implementation. Also, two teachers highlighted this as they felt it

would be impactful to include work with communities as a component in the program.

Also, another teacher mentioned the importance of contacting existing educational

programs for collaboration. These strategies have been applied in the non-formal

programs that were reviewed. The first approach that has been used is to help

communities with the obstacles they are facing through research and implementation, the

second is to engage communities by being the source of information (experts) when it

comes to the topic at hand, and the third is by engaging youth from these communities

and offering them to take the courses of the program.

   These three approaches should be implemented through the program design. The

first approach to collaborate with communities on projects related to the obstacles they

face, would make it possible to incorporate hands on projects, and would give students

the opportunity to see the impact of working with communities, help them become active

citizens and problem solvers, and enable them to better understand SD's social aspect. All of these were things that parents and teachers felt a SD program should include. The second approach should be used in the program so that children can learn the full story from community members who are "experts", rather than from a reading or a teacher. This would enhance learning by giving students an understanding of different community perspectives, and would decentralize the knowledge source so that they see that the program is not the only knowledge provider. The third approach should also be used to include community youth in the program so they too would get more knowledge and capabilities. All of these approaches would help enhance the current lack of active citizenship in Egypt (Baraka, 2008), because students will get to engage with different communities, they would be introduced to the different issues communities face, and they would become part of the society.

Pricing. Parents were asked about the amount of Egyptian pounds they would pay for a two weeklong program. The majority of parents felt that the appropriate amount would be something in between 1,000 LE - 5,000 LE, a few (4%) said they will be willing to pay from 5,000 LE – 10,000 LE, and others (3%) said they will be willing to pay above 10,000 LE. In this regard for a two weeklong courses it should be priced between 1,000 LE – 5,000 LE while taking into consideration the different time length packages that will be offered and adjusting the prices accordingly. It is difficult to know if this price range is workable in Cairo. Hence, a feasibility plan will need to be developed and in case the range suggested by parents proved to be less than what a program needs to be sustained, a sliding scale could be used. This technique would allow

the program to offer all students the same services but for varying prices depending on the purchasing power of participating families.

Sustainability practices. In order to ensure the program has an impact on students and to ensure the sustainability of the program's learning objectives, evaluation and post-program activities should be implemented.

Evaluation. Especially since a program will be implemented for the first time, evaluation will be a necessity. Evaluation tools should be developed in order to gather information about activities, characteristics, and outcomes of the program and to make judgments about the project, improve effectiveness, and to ensure the objectives are met (NOAA, 2009). Pre and post behavior and knowledge assessments should be used in order to understand whether students have gained knowledge during the program and whether this knowledge has translated into action. Also, post program evaluation should be conducted with parents and teachers in order to understand whether they see a difference in the students' behaviors and if they have any suggestions or feedback regarding the program or the components of the program. According to data gathered and its analysis the program should be changed to improve upon negative feedback, or to accommodate any suggestions made, or to improve the impact on students.

Projects and clubs. The majority of students indicated their interest in implementing what they have learned during the program as projects in their schools. This was also mentioned in teachers' interviews highlighting the importance of changing the practices in schools to be more sustainable. This would enable a program to have a bigger impact on students because they would get used to sustainable practices starting from the school, and this could also lead to changing their parents' behaviors. It was also

mentioned by teachers that establishing clubs in schools after the program

implementation would help ensure the sustainability of the program. Different

suggestions were made regarding the activities of these clubs such as maintaining the

projects implemented in schools, coming up with new sustainable practices to be

implemented in the school, keeping a communication channel between the program and

alumni, and continuing to work with communities they have visited before, or to initiate

new connections and projects with new communities. Therefore, the design of the

program should include projects and clubs in order to maintain relationships with alumni,

to ensure further progress of alumni, and also to be able to evaluate the program's impact

on alumni. These activities could also be a way to change schools' practices into more

sustainable ones, mainstreaming sustainable practices, and widening the impact of the

program to students who did not attend the program. In fact, several non-formal programs

used these techniques such as those run in Georgia and Costa Rica (Buckler and Heather,

2014), and in four out of the five programs reviewed (see Table 3).

Recommendations for ESD non-formal program

Several recommendations emerged from this assessment. These recommendations

have been categorized according to culture-specific needs and program structure, while

giving the culture category the priority so that the program would be an appropriate fit for

Egypt (see Table 7 for a summary).

Culture recommendations. According to results obtained, there is a need for

non-formal ESD program to fill the gap existing due to lack of ESD in formal education

in Egypt. A feasibility plan will need to be developed in order to make sure that the

program could operate with the price range suggested by parents, and if not, other

techniques should be used such as a sliding scale where higher income families could pay more and lower income families could pay less. Furthermore, the security challenge in Egypt will need to be taken into consideration while designing the program, and this could include implementing shorter programs and conducting activities close to home. In addition, the program should begin with three top topics relevant to Egypt; energy, water and waste. Because Egyptian children are unlikely to have a background in sustainable development, it will be important to address general SD concepts within each of these topics using both a global perspective, and a local perspective. In order to expand SD beyond the program into the broader Egyptian context, relevant communities should be integrated within the program by: 1. engaging communities to be the source of information (experts) when it comes to the topic at hand 2. conducting projects with communities to help them overcome their obstacles 3. engaging youth from these communities and offering them to take the courses of the program. Furthermore, in order to contribute to cultural change, the program should promote changing personal behaviors to be more sustainable, and the priority in this matter will be to volunteering, donating, being plastic conscious when it comes to bags or water bottles, reusing plastics, and being energy conscious.

Structure recommendations. Given the responses, collaboration between the program and schools will be necessary in order to customize the programs to the schools' and students' timing and length preferences. Also, the program design should be built upon school activities and formal curricula to include the knowledge that students lack and further develop the schools' sustainable practices. These approaches would entail reviewing curricula in order to formulate a course that would be complimentary, as well

as building strong communication channels with teachers prior to course implementation in order to understand what they want their students to learn. The program design should include the five different learning styles, but give priority to activities and field trips while less priority to videos, expert speakers, and group work and the least priority to reading. Furthermore, due to the various benefits of camping, the program will include camping as part of the courses, however it should be customizable based on parent and children preferences. Conducting evaluations such as pre and post behavior and knowledge assessments for students, and post program evaluation for parents and science teachers is crucial to improve upon negative feedback, to accommodate any suggestions made, and to improve the impact on students. Also, the program should maintain relationships with alumni through post program activities and projects in order to sustain learning.

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1. Cultural recommendations:

- A non-formal ESD program should be implemented.

- Conduct a feasibility plan.

- Work within security circumstances.

- Start by pressing topics: water, energy and waste.

- Include community members in activities and projects.

- Focus on changing personal behaviors.

2. Structural recommendations:

- Customize length and timing according to different groups.

- Build on existing school based activities and school curriculum.

- Use inclusive learning (activities, videos, group work, use of experts, and

  reading).

- Build the program around camping.

- The program should be evaluated

- Post program activities should be implemented such as projects, and clubs.

Table 8: Summary of recommendations according to culture and structure

Limitations

The research conducted had its limitations especially when it comes to the student

surveys. These limitations were primarily caused by the tight academic school days that

do not have time to allow a researcher to conduct a study. There was also some variation

in the delivery of the study that might have contributed to differences between schools.

Sometimes students were happy about the survey because it interrupted a class they

didn't like, and other times they were unhappy because it interrupted a class they did like.

Additionally, in some schools, students answered the questions in groups so that peer

influence may have been a factor. Also, there was a limitation for choosing close-ended

questionnaire with students, that it did not provide further explanation for students'

responses. Finally, although generally representative of private schools in Cairo, the

sampling of classes was based on convenience, and so caution must be used in

generalizing beyond the selected schools (Creswell, 2002).

Finally, there were some limitations faced with parents and teachers. Probably due to

busy lives, many parents did not fill out the survey, and those who did may have done so

because they had an interest in SD. Also, for those who did answer the survey there is no

guarantee that they understood the topic of SD or the idea behind non-formal education.

Teachers' interviews were conducted at varying times in school days, and those conducted in the middle of the school day were busy and on a hurry so they did not elaborate their answers.

Conclusion

Several researchers have argued for the use of non-formal education to teach children about ESD. However, in Egypt there are few ESD non-formal education programs for children. The aim of this study was to assess the need in Cairo for ESD non-formal program, and to understand what middle school students and their parents would prefer in such a program. This research also sought to understand the current general trends in Egyptian private schools, and the challenges that might be faced by such a program in Egypt.

The results indicate that respondents acknowledge that there is a need for non-formal ESD program in Egypt that stresses three main topics; energy, water, and waste. These are the top three developmental issues Egypt is facing. Also, a program should build on existing formal curricula, school-based activities, and should tie those activities to local communities. Respondents indicated activities as their preferable learning style among others, so a program should be inclusive giving more weight to activities. Besides, a program should be focusing on changing personal behaviors to support sustainable initiatives. Furthermore, results indicated that the design of the program should be customized according to different students' needs in terms of the length, and timing. These findings were similar to international programs' approach in the design of their courses. However, there were also challenges mentioned that were specific to the situation in Egypt. One challenge is the security status of the country, hence a program

should provide shorter courses or provide activities that are based in schools or local communities. Another challenge is the existing cultural barriers found in the Egyptian society towards conservation and SD. In order to sustain such a program many techniques should be implemented such as post program evaluations, projects, and clubs.

The limitations of this study were using close-ended questions, which resulted in getting a general rather than a deep understanding of students' and parents' current practices. For future research, in depth interviews or focus groups could be implemented with students and parents in order to understand more about their views regarding ESD or SD. Also, this gap could be tackled by conducting evaluation when implementing the program. Furthermore, interviewing different stakeholders, such as already existing NFE programs in Egypt, would help validate the results of this research. In addition, this research study should be implemented with public schools in order to develop another ESD non-formal education program that is customized to this population.

In conclusion, Egypt has been facing a number of problems that need to be tackled in a sustainable manner. However, in order to make a smooth transition towards SD, education and awareness need to include SD skills, principles, and values. One way is to implement ESD through the design of a non-formal education program that takes into account the recommendations of the current study's program review and needs assessment. This research also has provided evidence that non-formal education has the potential to be an effective tool for moving sustainable development forward in Egypt.

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Appendix 1
Approval of the International Review Board

CASE #2014-2015-47

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

This is to inform you that I reviewed your revised research proposal entitled "
" and determined that it
required consultation with the IRB under the "expedited" heading. As you are aware, the
members of the IRB suggested certain revisions to the original proposal, but your new
version addresses these concerns successfully. The revised proposal used appropriate
procedures to minimize risks to human subjects and that adequate provision was made for
confidentiality and data anonymity of participants in any published record. I believe you will
also make adequate provision for obtaining informed consent of the participants.

Please note that IRB approval does not automatically ensure approval by CAPMAS, an
Egyptian government agency responsible for approving some types of off-campus research.
CAPMAS issues are handled at AUC by the office of the University Counsellor, Dr. Amr
Salama. The IRB is not in a position to offer any opinion on CAPMAS issues, and takes no
responsibility for obtaining CAPMAS approval.

This approval is valid for only one year. In case you have not finished data collection within a
year, you need to apply for an extension.

Appendix 2
Student's consent form

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Needs assessment for a non-formal education for sustainable development program

Principal Investigator: Mennatallah Sabry - 01022697788

* You are being asked to participate in a research study. The purpose of the research is to understand the needs for summer non-formal education programs while also obtaining knowledge that would help with the design of the program and the findings may be published and presented. The expected duration of your participation is 15 minutes.

The procedures of the research will be as follows I will give you a survey asking questions about your interests in a field study summer school program, and get your suggestions regarding designing this program.

*There will not be certain risks or discomforts associated with this research.

*There will not be benefits to you from this research.

*The information you provide for purposes of this research *is* anonymous and confidential.

**Questions about the research, my rights, or research-related injuries should be directed to* Menntallah Sabry at 01022697788.

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature   _____

Printed Name   _____

Date   _____

Appendix 3
Parents consent form

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Needs assessment for a non-formal education for sustainable development program

Principal Investigator: Mennatallah Sabry - 01022697788

*You are being asked to participate in a research study. The purpose of the research is to understand the needs for summer non-formal education programs while also obtaining knowledge that would help with the design of the program and the findings may be published and presented. The expected duration of your participation is 20 minutes.

The procedures of the research will be as follows I will give you a survey asking you questions about the educational system at your child's school regarding sustainable development, and get your suggestions regarding designing a non-formal education summer program.

*There will not be certain risks or discomforts associated with this research.

*There will not be benefits to you from this research.

*The information you provide for purposes of this research *is* anonymous and confidential.

*_Questions about the research, my rights, or research-related injuries should be directed to_ Menntallah Sabry at 01022697788.

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature   _____

Printed Name   _____

Date   _____

Appendix 4
Teachers consent form

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Needs assessment for a non-formal education for sustainable development program

Principal Investigator: Mennatallah Sabry - 01022697788

*You are being asked to participate in a research study. The purpose of the research is to understand the needs for summer non-formal education programs while also obtaining knowledge that would help with the design of the program and the findings may be published and presented. The expected duration of your participation is 30 minutes.

The procedures of the research will be as follows I will ask you questions about the educational system at your school regarding sustainable development, how do you think it could be improved, and get your suggestions regarding designing a non-formal education summer program. I will audiotape this interview just for reference while writing my results and it will be deleted as soon as I am done writing.

*There will not be certain risks or discomforts associated with this research.

*There will not be benefits to you from this research.

*The information you provide for purposes of this research *is* confidential. The information that is collected for the study will be kept in a locked and secure area by the researcher for months. Only the researcher will be allowed to look at your records

**Questions about the research, my rights, or research-related injuries should be directed to* Menntallah Sabry at 01022697788.

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature   _____

Printed Name   _____

Date   _____

Appendix 5
Children's consent form to be signed by parents

THE AMERICAN UNIVERSITY IN CAIRO
INSTITUTIONAL REVIEW BOARD

Documentation of Informed Consent for Participation in Research Study

Project Title: Needs assessment for a non-formal education for sustainable development program

Principal Investigator: Mennatallah Sabry - 01022697788

*You are being asked your permission for your child to complete a survey being administered to middle class students at school. The purpose of the research is to understand the needs for summer non-formal education programs while also obtaining knowledge that would help with the design of the program and the findings may be published and presented. The expected duration of their participation is 15 minutes.

The procedures of the research will be as follows I will give students a survey asking them questions about their interests in a field study summer school program, and get their suggestions regarding designing this program.

*There will not be certain risks or discomforts associated with this research.

*There will not be benefits to them from this research.

*The information they provide for purposes of this research is anonymous and confidential.

**Questions about the research, my rights, or research-related injuries should be directed to* Menntallah Sabry at 01022697788.

*Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue participation at any time without penalty or the loss of benefits to which you are otherwise entitled.

Signature   _____

Printed Name   _____

Date   _____

Appendix 6

Dear students, your answers to this survey will help me understand your needs to design a field studies summer program. Please be honest and carefully choose your answers.

For each of the following statements, please check your level of agreement.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Don't Know
1) I would like to attend a sustainable development program in the summer.	○	○	○	○	○	○
2) I have had previous experience with sustainable development projects (in school or extra curricular activity or as a hobby)	○	○	○	○	○	○
3) My school provides sustainable development education	○	○	○	○	○	○
4) I would be interested in implementing what I learned during the summer as a school project.	○	○	○	○	○	○
5) I would like to collaborate on sustainable development projects with the people who live in the communities we visit.	○	○	○	○	○	○
6) I would like to get to know how to live sustainably for the period of the program	○	○	○	○	○	○
7) I would like to sleep over at the camp	○	○	○	○	○	○

Please rank these activities based on how often do you do it and provide comments for further details:

These are some activities I do	Always	Usually	Sometimes	Rarely	Never	Other
8) I volunteer for environmental projects	○	○	○	○	○	………….
13) I donate my old electronic gadgets	○	○	○	○	○	………….
14) I eat locally grown food	○	○	○	○	○	…………
15) I take my own bags to the supermarket	○	○	○	○	○	…………
16) I carry my own flask instead of buying bottled water	○	○	○	○	○	………….
17) I ride my bicycle on a regular basis	○	○	○	○	○	………….
18) I turn off the tap while brushing my teeth	○	○	○	○	○	………….
19) I turn off unused lights or electronic equipment	○	○	○	○	○	………….
20) I use the fan instead of the air conditioner	○	○	○	○	○	………….
21) I use my old plastics and other used items for crafts/decoration	○	○	○	○	○	………….
22) I try not to litter	○	○	○	○	○	………….

Appendix 7
Parents survey Introduction

Dear parents, I am a student in the Sustainable Development masters program in the American University in Cairo. This survey will contribute to my completion of my research, thesis, and the implementation of the program. The research question of the thesis is "what type of non-formal education for sustainable development program would interest middle-school students in international schools in Egypt".

> Non-formal education is: any organized, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children.

> Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behavior and take action for sustainable development

Your answers to this survey will help me understand your needs in order to design a field studies summer program for your children. Thank you for your time and please choose your answers carefully.

Parents survey questions

Please choose and provide comments for further details:

1) Do you think educating children about sustainable development is important?

  o Yes
  o No

Why?
…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………

2) Do you know of any sustainable development activities done at school with your children?

  o Yes
  o No

If yes, what are these activities?

…………………………………………………………………………………………
……………………………….………………………………………………………………
…………………………………………………..

3) Does the school provide non-formal education programs in the summer?

  o Yes
  o No

If yes, where and what do they learn?

…………………………………………………………………………………………
…………………………………………………………………………………………
……………………………………….…………………………………………………
………………………………………………………………………..…………………

4) Would you send your children to a summer school?

  o Yes
  o No

If no, why?

…………………………………………………………………………………………
…………………………….…………………………………………………………………

…………………………………………………………..……………………………………
………………………………………………………………………………..……………

5) How long should this summer school be?

- o A week
- o 2 weeks
- o 3 weeks
- o 4 weeks
- o 2 months
- o Other:

…………………………………………………………………………………
……………………………………………………………………………………..

6) What do you see as a reasonable price for 2 week-long summer course?

- o 1,000 – 5,000 LE
- o 5,000 – 10,000 LE
- o Above 10,000 LE
- o Other…………………………………………………………………………
……………………………………………………………………………………
……

7) Would it be better if your children:

- o Spend that period as a sleep over
- o or would you rather they come back home

a) If they come back home, would it be ok if they sleep over for longer trips?
   - o Yes
   - o No

If not, why?

…………………………………………………………………………………
…………………………………………………………………………………

How often do you do each of the following activities? Please check the appropriate space.

These are some activities I do	Always	Usually	Sometimes	Rarely	Never	Does Not Apply
8) I volunteer for environmental projects	○	○	○	○	○	○
9) I donate my old electronic gadgets	○	○	○	○	○	○
10) I eat locally grown food	○	○	○	○	○	○
11) I take my own bags to the supermarket	○	○	○	○	○	○
12) I carry my own flask instead of buying bottled water	○	○	○	○	○	○
13) I separate my waste at home	○	○	○	○	○	○
14) I turn off the tap while brushing my teeth	○	○	○	○	○	○
15) I always turn off unused lights or electronic equipment	○	○	○	○	○	○
16) I use the fan instead of the air conditioner	○	○	○	○	○	○
17) I use my old plastics for crafts/decoration	○	○	○	○	○	○
18) I try not to litter	○	○	○	○	○	○

Comments:

Appendix 8
Teachers Interview questions

1) Do you think Education for Sustainable Development is important? Why?

2) Do you have any sustainable development activities in your school?

3) Which activities do students like to implement?

4) What is the gap between the current education system and awareness about Sustainable Development? And what are the opportunities?

5) Does the school encourage inclusion of Sustainable Development activities/education?

6) Does the school provide non-formal education programs in the summer?

7) Do you have any suggestions for a non-formal Sustainable Development education program?