

Young Adults' Contextualization of Environmental and Sustainability Issues: A Critical Issue for Environmental Education Intervention

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Abstract

As soon as decision makers are expected to make differences towards sustainable future, young adults' ability to make informed and sound decisions is considered essential towards securing our planet. This study provides an insight into young adults' knowledge of key environment and sustainability issues. To answer the key research questions, data were obtained using a qualitative phenomenographic research approach and collected through 18 face-to-face in-depth interviews with research participants. The findings of this study suggest that young adults lived experiences that play a huge role in their level of awareness of topical environmental and sustainability issues critical to humanity's future on earth.

Key words: Environmental education, sustainability

Introduction

Thirty years have passed since the landmark *Brundtland Commission Report on Sustainable Development* in 1987 (UN, 1987) and two decades more - the *Rio Earth Conference* in 1992 (UN, 1992a), yet the human race continues to grapple with the threatening problem of climate change and its likely consequences. At the same time global, unsustainable, economic production and development continue to cause anxiety, particularly regarding how far the planet can absorb its continued abuse. Tragically and fourteen years after the 2002 *World Summit of Sustainable Development* (UN Non-Governmental Liason Service, 2002) in Johannesburg and eleven years after the launch of the United Nations' *Decade of Education for Sustainable Development for 2005-2015* (UNESCO, 2006), global efforts to employ education toward sustainable development and sustainability has yet to yield major results in most contexts.

In recent years, the planet has suffered one major environmental crisis after another. Between late 2005 and 2016 environmental catastrophes, such as the Tsunami in the East Asia, Hurricane Katrina in the Gulf of the US, the earthquake in the Southern China, the cyclone disaster in Myanmar (Burma), erratic weather and climate variations

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across the globe, the continued loss of tropical forests in the Amazon further demonstrate the fragility of the planet and the need to take action. During this time period, the world's attention has been drawn to the different dimensions of environmental catastrophes and their consequences for humanity and the earth's biodiversity through communications' media, such as television, public movies, books, newspapers and the Internet.

The United Nations Framework Convention on Climate Change defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UN, 1992 b). In other words, the FCCC uses the term 'climate change' to mean only those changes that are brought about by human activities.

Global warming refers to an average increase in the earth's temperature, which in turn causes changes in climate. A warmer earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans. When scientists talk about the issue of climate change, one of their concerns is about rapid global warming caused by human activities (Pappas, 2017).

For over three decades, while environmental problems such as deforestation, loss of biodiversity, the extinction of species, ozone layer depletion as well as ongoing, human-induced, climate change and global-warming have continued, it has yet to receive concrete efforts within governments, the business and financial sectors. Environmentally, the world is under the threat of climate change, and the potential for associated disasters is very real. In terms of land, an estimated 150-300 million hectares of cropland (10-20 percent of the world total) are now degraded. The effect of humanity's actions on the planet is justifiably a matter of general concern. In addition, due to car-centered transportation, the world's fossil fuel consumption and carbon emissions have continued to rise exponentially, further worsening the incidence of climate change (Vital Signs, 2002). These data coincide with several discussions and events that have taken place around the world, on issues related to the global environmental crises. Global environmental efforts have found great support among youths who are reputed to be environmentally conscious. This intriguing phenomenon among young people in schools makes them an appropriate focus group for this research study, particularly in the context of the United Nation's *Decade of Education for Sustainable Development*.

Environmental Education

The key to creating a more sustainable future is learning (Scott & Gough, 2004). It is essential to provide both theoretical knowledge and environmental learning experiences for environment education to have an impact of young people's behaviours (Shetzer, Stackman, & Moore, 1991; Hodgkinson & Innes 2001). Bowers, Roth and Holthius (2017) analyzed 119 articles dealing with kindergarten through high school environmental education issues and found that in the majority of cases the results of such education were positive.

Rikinson (2001) mentions that three components of environmental education are essential: environmental knowledge, environmental attitudes and behaviours, and environmental learning outcomes. For theoretical knowledge of environmental issues, textbooks are especially important. Husseyin, (2017) is discussing in his article the impact of textbooks on students' discourse dealing with water scarcity issues in Jordan. Murakami, Russel & Manfra (2017) discuss how teacher narrative held in a garden (i.e., relevant environment) can help develop student autonomy, relatedness and competence in the environmental issues. Environmental education topics are basically involved in natural science courses (biology, geography, chemistry and physics), at a certain degree issues of contemporary literature and history may also be ties with environmental questions, but the level of students' knowledge is not deep enough, which proves the need of cross-disciplinary science classes (projects) to go deeper and wider in students' understanding of the current situation.

According to Falk and Dierking (2000, p.2), natural history museums, zoos, botanical gardens are 'tried-and-true sources of understandable information'. Children and adults can leisurely (subconsciously) learn much about nature. Many contemporary museums permit hands-on experiences and involve experiments' shows, lectures, discussions, etc., this is why they cause more interest than in the past and are effective ways of environmental education (Pedretti, 2002).

The role of environmental family education cannot be denied, either. Anyasi and Atagana (2017) have investigated the behaviour of households in South Africa and revealed that, although certain progress has been achieved in people's behaviour towards recycling, 67.3% of the observed households still did not recycle the waste. The authors attribute the situation to the lack of environmental education as well as the deficiency of corresponding infrastructure and services. The conclusion is that decision makers also need to get environmental education and to develop environmental consciousness in order that family and school education dealing with maintaining the natural environment can be really effective.

Viewing education/educational programs as the key to developing interest in environmental sustainability issues underscores the importance of formal school curricula and other educational resources in environmental and sustainability learning. Besides schools, Dubos argues that issues involving the environment must be dealt within their "unique physical, climatic and cultural contexts" and "through a rich system of communications" (Eblen & Eblen, 1994, p. 702).

Hart's (1997) and Moore's (1990) studies young adults recognize that involvement in community environmental action can lead to the development of self-concept, autonomy, social competence, social responsibility and political self-determination. In addition to building knowledge about the environmental issues through experience, this form of education also encourages reflection about humanity's responsibilities as residents of the planet (Szerszynski, 2006).

Research Methodology

This study provides an understanding into the nature and scope of young-adults' knowledge of global warming and climate change. It is important to note that this is by no means an attempt to analyze the research participants' scientific understanding of climate change and /or global warming. Rather, the goal is to provide an initial understanding of the young adults' environmental learning experiences and its role (if any) in environmental action. The importance of this initial insight is hinged on the argument that once early socialization has passed, the residuals of learning are fixed within individuals, forming core orientations that are unlikely to change (Krosnick & Alwin, 1989). In this manner, according to Blewitt (2006), the learner may activate both the capacity and the capability to make connections intellectually, emotionally, imaginatively and ethically with other, perhaps unfamiliar, lifeworlds, experiences and values. In order to understand young adults' learning and actions in relation to environmental and sustainability issues, it is important to understand how their knowledge has shaped their actions as well as their understanding of the environmental issues. The guiding assumption of this article is that the young adults' learning and actions are to some extent informed by their knowledge of environmental and sustainability issues, since learning and actions are constitutive elements of any transformative processes leading to a more sustainable future.

The following analysis and discussion are based on the research participants' responses to the following interview questions:

1. a. What do you know about climate change?
 - b. What are your views regarding the global warming phenomenon?
 - c. Do you agree that humanity's actions are responsible for recent global warming?
2. a. What do you think can be done to educate people about the consequences of climate change?
 - b. Do you think that there are solutions capable of reversing climate change?

In the interviews various meanings assigned by young adults climate change and global warming and the connections they make between the two were analyzed. The research participants' responses during the interviews demonstrate that the young adults' in this study have an above average understanding of the nature and context of global warming and climate change, its causes and what can be done to reverse the trend. A composite of the meanings that emerge from their responses constitutes their understandings and educational backgrounds in relation to environmental and sustainability issues.

This research follows a qualitative research design to address the research questions. Through semi-structured interviews the participants were asked to engage in conversation to understand how their actions and thoughts have been shaped by the knowledge of global warming and climate change. As Clarke (2002) observes, "one of the key problems with qualitative research is organizing the data in such a way that they facilitate systemic analysis" (p.178). Recognizing this problem, Glesne's (1999) analysis process was followed, which involves organizing what

one has seen, heard and read so that s/he can make sense of what they have learned. Working with the data, the article describes, explains, poses hypotheses, develops theories and links their story to other stories. To do so, these nodes are organized and categorized into a hierarchical system and finally into a common structure, or an overarching framework "by which to understand and later speak about the data as a whole" (Kahn 1999, p.86). According to Ely et al. (1991), making categories means reading, thinking, trying out tentative categories, changing them when others do a better job, checking them until the very last piece of meaningful information is categorized and, even at the point, being open to revising the categories (Tsouluhas, 2005).

Results and Discussions

This section presents the results of this study and their discussion. To view the answers, pseudonyms are used to depict the research participants throughout the study in order to maintain their anonymity. The young adults in this research study were asked to rank their level of information about environmental sustainability issues. They ranked their knowledge on a scale of one to ten (1-10), with one being the lowest rank and 10 - the highest. The median point was about five (5) or five and a half (5.5). Overall, the young adults were sharply divided in their responses: 65% believe that their level of information is either "too low" or "low"; 30% rank themselves at "about average" or "fairly average", while 5% described themselves as being "very informed."

Climate Change

The young adults generally agreed that the term "climate change" refers to an increase in temperature, resulting from the trapping of carbon dioxide and atmospheric pollution that poses a great danger to the continuation of life and the survival of planetary functions. Some of the young adults also referred to climate change as the consequence of humanity's care-free attitudes and lifestyle since the industrial revolution. Other responses pointed to strong connections between climate change and the melting ice at the North Pole and extreme weather scenarios, such as tsunamis, hurricanes, typhoons, cyclones and tornados that have become regular and yearly occurrences.

For example, Ava (an 18 year old female, first year undergraduate university student) spoke about the melting and thinning of ice covers and glaciers in the context of climate change. "I read about the ice caps and the core samples...and how they have been reducing over time [at the North Pole], especially...since the industrial revolution. I guess it started to pick up over the past thirty years" [File YA03: Text Units: 11 - 65]. Taegan (an 18 year old male, first year undergraduate university student) also cited a connection between climate change and human activities:

Essentially the main reasons the climate change is occurring is because we're putting so much artificial carbon dioxide (CO²) into the atmosphere right now through things such

as the driving of cars, pollution due to factories' work; and deforestation. I think these are the most significant reasons as to why there are increased volumes of CO². On average I think it is supposed to rise by about 1.5 to 5.5 degrees, so it's going to completely disrupt the entire farming system, it's going to have a bigger impact on food and things like that, which obviously affects everyone in the world. [File YA10: Text Units 9 - 55]

Ava and Taegan establish a link between climate change and global increases in temperature, which have been found to be responsible for the decreasing sizes of glaciers and ice caps at the North Pole. Although they did not provide any scientific explanations for the rise in global temperature, they were able to connect climate change to the industrial revolution, which introduced large-scale use of fossil fuels for industrial activities and caused atmospheric pollution.

Ava and Taegan's comments correspond to the 19th century scientist Svante Arrhenius' postulations on climate change, which established a linkage between temperature and human activities (Duncan, 2006). Her position also tallies with the conclusions of the Intergovernmental Panel on Climate Change in early 2007 that the climatic changes seen around the world are very likely to be the result of the accumulation of carbon dioxide in the atmosphere rather than natural variations of warming the planet's surface (Nuccitelli, 2013). The increases in the emission of carbon dioxide are the results of the changes in land use patterns, deforestation, land clearing, agriculture and other human activities, such the use of coal, oil and natural gas as fuel. Other participants describe the phenomenon of climate change from a generational perspective, in terms of intergenerational challenges regarding global climatic changes and sustainability. For instance, Brooklyn (a 22 year old female, fourth-year undergraduate university student) provides an explanation of the greenhouse effect, global warming and climate change as parts of the same phenomenon.

The greenhouse effect...is one of the main causes of climate change; it occurs where the sun's rays can't get through the blanket of pollutants, but when they bounce off the earth, they can't get back into the atmosphere, thereby creating a really warm layer around the earth, which is causing ice caps to melt. [File: YA05: Text Units 8 - 16]

Brooklyn's response demonstrates knowledge of the process of climate change, which starts with human activities upsetting the natural balance, and producing the "natural greenhouse effect." She understands that the consequence of the greenhouse effect is what is commonly referred to as global warming or climate change. Mia (an 18 year old female, first-year undergraduate university student) also discusses the issue of climate change in relation to consequent extreme weather conditions being experienced globally:

Because of that the earth is warming up and also we are getting more rain because the water evaporates faster and it comes down as well. So it's not just the earth is getting warmer, climate change also means there is heavier rainfall. I don't know too much about

the science...I just know that there is carbon in the air, basically, and also I've heard that the [ice] layers around the earth are getting thinner; the holes in the ozone layer are allowing more sun to come in, which is dangerous as well. [File: YA02: Text Units10 - 45]

Brooklyn and Mia's responses present a clear understanding of the meaning of climate change as well as its likely impacts on humankind. These young women not only identify the causes of climate change, they also present climate change as a threat to humankind by drawing on real-life examples, such as the impact of climate change on weather patterns. Their responses point to the fact that the increasing warming of the planet causes changes in rainfall and snowfall patterns, as well leads to increased droughts and floods, causing the melting of glaciers and polar ice sheets, and results in accelerated sea-level rise. Some of the young adults spoke about human attitudes and behaviours (i.e., the *laissez faire* approach and our actions) that are responsible for climate change and global warming. For example, Scarlet (a 23 year-old female, fifth-year undergraduate university student), and Brooklyn, (a 22 year-old female, fourth-year undergraduate university student) state as follows:

Look at how many cars people have nowadays. All the things that are happening...maybe it would have been inevitable anyway, but it wouldn't be as fast as it is happening right now; it wouldn't be as quick, from what I understand anyway, because of the developments that have been happening lately.

Interviewer: So do you think the scientists are right?

I do. Yes; that we are contributing greatly to it because of our development. [File YA04: Text Units 56 - 67]

We live such a consumerist lifestyle. I think we're selfish. People choose to live in big houses...use air conditioning...drive SUV's and...there is no doubt to my mind that we are destroying our environment [through our lifestyles]. [File YA05: Text Units 74 - 89]

Here Scarlet and Brooklyn demonstrate their understanding of the "manifold and complex connections that characterize the modern world" (Renner, 2002, p. 16), as they connect driving cars to exacerbating climate change. It is not uncommon these days for an individual to own at least two cars; an average family may own up to three or four cars, without being aware that the simple act of driving is contributing to the unravelling of the climate system (Renner, 2002). Scarlet and Brooklyn's responses also speak to "social value", which is often measured in terms of affluence and social acceptance. This unfortunately is often a measure of the number or type of vehicles one owns and drives. Similarly, Chris Winter, Executive Director of Conservation Council of Ontario, notes: "Look all around us, you see Hummers, SUVs and everybody with their lights on at all hours of the night" (Cook, 2007). Furthermore a poll conducted by Angus Reid in 2007 suggests that while wealthier Canadians are worried about global warming, they are reluctant to change their lifestyles in order to fight it. Most were unwilling to give up their SUVs or other gas guzzling vehicles, or lower the thermostats in their homes (Cook, 2007).

Some of the young adults focussed on the impacts of climate change on our health. For instance, Brooklyn and Chloe (an 18 year-old female, first-year undergraduate university student) state that:

Climate change has been responsible for large losses of human lives. ... A lot of human lives have been devastated because of climate change that is in part our fault. Our emissions are being raised to the point where human health is being affected, our local environment is being affected, people are dying, we're losing species; we are losing our natural resources, things of that sort. So I definitely think it's something to be concerned about. [File YA08: Text Units18 - 88]

I think the hot summers... are a strong proof that global warming/climate change is a reality.... They are hotter than they have ever been; we've hit record heights ... We're facing smoggy days unlike we've ever had before, which is detrimental to the health of adults, the elderly and children, which is worrisome. [File YA05: Text Units 54 - 68]

These young adults also address the powerful effect of the health consequences of climate change on humankind. Brooklyn and Chloe demonstrated a clear understanding of the complexities of the increasing changes in global climate patterns, in terms of how our actions cause diseases and death. Due to muggy weather, there has been an increase in the habitat areas of disease-spreading insects, thereby causing an increase in the transmission of infection. For example, hot summers, warm winters and especially dry springs make ideal breeding conditions for mosquitoes (Porter, 2007) and other disease vectors.

Dylan (a 30 year-old, male, doctoral student) agrees with Chloe and Brooklyn in recognizing a link between climate change and the hazardous consequences of pollution.

On top of greenhouse effects is the pollution that we create with all the energy that we are using to live in the Western world.... This pollution is actually creating a lot of particles that are very hazardous to human health, which end up polluting...the ecosystems... endanger biodiversity and humans in general. This pollution has an acute effect on human beings, animals and plants. [File YA18: Text Units 6 - 62]

Dylan demonstrates the overwhelming nature of global warming and climate change and their irreversibly disastrous consequences. His response also speaks to the predatory approach of humankind to the planet and its resources as well as the issue of pollution and the declining quality of the environment as an accumulation of the impact of human activity. According to the IPCC, as a result of global warming hundreds of people will be without water within a couple of decades, while tropical diseases like malaria will spread (Nuccitelli, 2013).

Connecting Global Warming to Climate Change

According to the IPCC, all regions of the world will be affected by climate warming and a third of the earth's species will vanish if global temperatures continue to rise until they are 3.6 degrees above the average temperatures in the 1980s and '90s (Alley et al., 2007). The young adults in this study consistently viewed global warming as directly associated with climate change. Cadence (a 24 year-old female doctoral student) stated:

Global warming...is, I believe, directly attributed to the human component of the planet, and it's this global warming that is causing a climate change that is not natural. It is not just normal fluctuations that are happening.... It's global warming that is causing...climate change. [File YA12: Text Units 27 - 37]

Cadence's response affirms the scientific claims that the current warming of the planet is traceable to human activity, and that the above warming is responsible for climate change. Cadence's explanation also points to the fact that the planet naturally experiences some level of warming needed to maintain its thermal balance for life forms to sustain.

Mia (an 18 year-old female, undergraduate university student) shares Cadence's view, but notes, "I know that there's a connection between those, but I don't know the scientific connection between them." [File YA02: Text Units 46 - 52]

Chloe also discusses the relationship between global warming and climate change, but names global warming as an offset of climate change:

Global warming from my knowledge is caused by the harmful UV rays getting trapped inside the earth.... So by trapping that heat, the earth is getting warmer, our ice caps are melting, there is drought because land is drying up, things of that sort. So climate change definitely has a direct connection with global warming. I think global warming is just an offset and just one of the effects of climate change. [File YA08: Text Units 89 - 103]

Dakota (a 23 year-old female, graduate student in a Master's degree program) disagrees with Chloe's explanation. Dakota describes the connection between the two environmental problems by differentiating one from the other:

Global warming is an aspect of climate change, the way I see it. I wouldn't say one is the consequence. I would say one is an expression of the other. Like climate change could include more than just global warming ... Climate change is a particular manifestation of global warming. [File YA09: Text Units 41 - 50]

Dakota's understanding points to climate change as a consequence of climate warming that is exacerbated by the increase in carbon dioxide and other heat trapping gases in the atmosphere. Few of the young adults in the study disagreed that global warming is directly related to climate change. Those with dissenting views argued that climate change and global warming are two different environmental phenomena. For example, Ava states:

There is distinction between the two. They are not the same thing...because climate change doesn't necessarily mean global, if you take the words global warming literally. I think what I researched was that most of the climate change that will be taking place will be a general warming. Some places will potentially get colder...and the weather is supposed to become more extreme, which could go either way; but global warming has to do with something else. [File YA03: Text Units 93 - 106]

Comments such as Ava's are not new; they are in fact in keeping with the climate change and global warming debate. Her response amplifies the question among scientists, politicians, academics and activists regarding the warming of the planet. Ava's response implies an understanding of climate change as occurring naturally as a result of a change in the sun's energy or earth's orbital cycle (natural climate forcing), which contributes to the natural warming of the planet. Global warming, on the other hand, is the result of persistent anthropogenic forces, such as the addition of greenhouse gases, sulphate, aerosols or black carbon to the atmosphere, or through land-use change. Making distinctions are not uncommon in environmental debates; however, there is a scientific consensus that concentrations of greenhouse gases in the atmosphere are increasing, and that this is causing global climate change (Kropp & Scholtze, 2009).

Awareness of Climate Change

UNESCO (2006) notes that education is the key instrument in bringing about changes in values and attitudes, behaviours and lifestyles, particularly in relation to environmental protection and consumption patterns as they intersect with sustainability. For the most part, the young adults in the study recognized school as playing an important role in educating people about the consequences of climate / global warming. While school-based education was the response most frequently provided, the young adults also spoke about informal settings, such as mass media, the Internet, popular education, hype and non-governmental agencies. They also recommended that all forms of education be built around *real life experiences* so that people can connect them with environmental problems. According to Maddox (a 20 year-old male, fourth-year undergraduate university student), school is the best medium for building awareness about climate change:

Education holds the power to knowledge and understanding, since being aware of the problem is the key before you can have a solution; education through schools is the best medium to make people aware. [File YA14: Text Units 52 - 61]

Layla, (a 22 year-old female, fourth year undergraduate university student) agrees:

The classroom is a good way; it is the best time to reach to a person and involve them in an interactive way, and just teach them from a young age ways to reduce their ecological impact on the earth.... So I think outreach with kids is the best.... They need a lot of evidence and explanations behind why they should change their ways, and both visual and...scientific backing would convince them. Science at school always involves a bit of environmental studies, I think learning environmental foundations will actually improve them as citizens. [File YA06: Text Units 62 - 118]

Furthermore, the responses of the research participants also highlight the importance of education in motivating and involving young adults in environmental sustainability. They would like to see more opportunities created through the development of educational programs within and outside school, as well as young adults to take a stand by engaging in self-directed education. These narratives can be linked to the notion of education as indispensable in changing people's attitudes towards environmental sustainability. This notion is articulated in the UNCED (1992) *Agenda 21*:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues. While basic education provides the underpinning for any environmental and development education, the latter needs to be incorporated as an essential part of learning. Both formal and non-formal education is indispensable to changing people's attitudes so that they have the capacity to assess and address their sustainable development concerns. It is also critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making. (UNCED, 1992, article 36.3)

Scholars who share these views strongly emphasize school-based instruction and learning about environmental patterns, processes and problems (Fien, 1993). They argue that increasing environmental studies content (with real life examples) in the curriculum, rather than relying on the initiatives of individual teachers, may lead to an improved understanding of environmental problems (Huckle, 1983).

Global environmental problems can turn into action only by considering the ecological, economic and cultural differences of our local surroundings (Grillon, 1994). Some of the young adults in the study were strongly in favour of using mass media sources, such as the Internet and television, as a means for educating about the consequences of climate change.

Brooklyn: Internet is a big source. You can always put up ads there; and television, because the majority of young people do watch television and use the Internet; try and put up many ads... [File YA07: Text Units 33 - 60]

The recommendation to place advertisements and stories about environmental problems in the mass media, particularly on the Internet, corresponds to the fact that many young adults these days often spend the bulk of their online time on social networking sites, such as Windows live spaces, Yahoo 360, Nexopia, hi5, Facebook, twitter, whatsapp, facetime and MySpace. Their preference for television and the Internet over newspapers and other print media could be linked to the “zero-waste” generation (a policy by many corporate organizations to reduce their ecological footprints) as well as the fact that television and the Internet provide easy access to targeted audiences. According to Blewitt (2006), these media sources certainly hold a great capacity to shape our actions and interactions, because they have become major vehicles of our cultural participation. Reflecting on the power, potential and possibilities of television and the Internet, Moores (2000) notes that these media have rapidly integrated into the fabric of our daily lives, and our understanding of our lives is becoming increasingly “mediated” through them (Thompson, 1996; de Zengotita, 2005; Blewitt, 2006).

Most importantly, these young adults understand that in order to achieve sustainable development, environmental protection must constitute an integral part of the development process and cannot be considered in isolation from it. Young adults in the study also believed that incorporating environmental messages in media advertisements will have a positive impact on young adults, “because adverts appeal to our emotion more than rational minds their messages communicate to us at the level of individual psychologies” (Corbett, 2006, p. 163). According to the young adults in this study, projecting environmental messages through the combination of diverse media, such as music, radio shows and television will help in reinforcing the interest of young people in environmental issues and sustainability.

Conclusion

The young adults in this study have an above-average understanding of climate change when compared with young adults in previous studies (Akerlof et al., 2010; Henry, 2000; Kempton, 1991), which reveals that the awareness level of climate changes and their reasons is growing. At times undergraduate students provide compelling views that are not much different from scientific positions. Contrary to the findings in Kempton’s (1991) ethnographic study, the young adults in this research did not conceptualize climate change as plant photosynthesis or troposphere pollution. They were able to link global warming and their personal experiences of temperature variation with climate change. Furthermore, climate change was recognized as the consequence of burning fossil fuels and cars that require lot of gas. The participants in this study also recognize the connection between climate change and human health and the loss of species and natural resources.

Addressing the threats of climate and global warming, as well other environmental problems, requires the building of awareness through all forms of education, informal, non-formal and formal. All respondents confirmed that. According to the contents of their answers, they are well aware about the existing problem, however, their knowledge is not too deep or scientific. It reveals that informal and non-formal education (whose nature is more political and popular than scientific) does not provide a sufficient base for deep understanding of the existing problems.

The young adults in this study recognize the importance of environmental education in the development of a strong commitment and environmental conscience for effective action against climate change to take place and to ensure a sustainable future. They also recognize that education enhances environmental protection and also motivates people to lead an environmentally sustainable life, as previous studies testify (see, for example, Hopkins, Damlamian et al., 1996). Most importantly, these young adults understand that education is vital for helping young people to appreciate first-hand experiences and develop possible solutions so that they can take action and help achieve a sustainable future (UNESCO, 2002). As Heimlich (2004) noted, both social structures and educational systems must work towards the same end, which is at the heart of the challenges we face. This research study shows that young people are an important segment of society and a generation who hold the key to the future of a sustainable planet, environmentally and socially. In this sense, this research implies that the young adults' educational and social needs must be addressed and the ways in which we help them to become socially responsible citizens of the earth must be further developed.

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