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Environmental Awareness and Knowledge among Architecture Students in North Cyprus

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ABSTRACT In recent years due to environmental concerns, the significance of ecological living has increased worldwide. Environmental awareness is a significant determinant of ecologically based lifestyles. Additionally, it is an important aspect among younger generations to adopt an environmentally responsible lifestyle. Therefore, this study aimed to understand the dynamics of environmental awareness and its' relation with environmental attitudes among undergraduate students of architecture department in Near East University, Nicosia. A user survey was conducted for measuring environmental awareness and knowledge about both 'biodiversity and nature conservation' and 'global warming and climate change'. A total number of 111 undergraduate students were chosen for the user survey. Within this framework, a review of the relevant literature and the analyses of our survey results are provided. The results have implications regarding the significance of environmental education in order to raise the level of students' environmental awareness.

INTRODUCTION

Nowadays the world is facing serious environmental catastrophes. This process containing unpredicted circumstances for the future of the planet earth dates back to the 1750s, with the beginning of the Industrial Revolution activities such as large scale mining, land drainage and forest clearance. As a result of these ongoing processes, deforestation, depletion of natural resources, habitat loss, species extinction, pollution and global climate change as crucial issues emerged (Beckerman 1992). During this period, not only have there been changes to the physical environment but also mankind's perception, trends, activities, values, attitudes, behaviors regarding nature and environment have altered and evolved. In a sense, during modern times individuals' relation with nature has severe deficiencies and failures with humans striving for technical, industrial and later technological domination over nature. In summary, humans have been on an unsustainable path regarding their relationship with nature. At this point it is appropriate to suggest that many environmental problems are rooted in human behavior (Steg and Vlek 2009). Therefore, one of the main challenges of 21st century is to bring about more sustainable human communities; it can be argued that the nucleus of sustainable communities is the ecologically responsive lifestyles achieved via environmental behaviors (Kollmuss and Agyeman 2002).

One of the significant determinants of ecologically responsive living is environmental awareness. In other words, without individuals who are aware of the environmental consequences both within local and global scale, the process of creating sustainable communities and making cities more green would have crucial deficiencies. Therefore, all individuals experiencing current consequences need to adopt ecologically responsive lifestyle based on an ecological worldview, no matter what their demographic grouping or political view is.

For the above mentioned reasons it has become imperative for the younger generations to adopt an ecologically responsive worldview (Boeve-de Pauw et al. 2011). These younger generations will be creating future communities and will be responsible for initiating the required change that is needed to preserve nature and realign the current imbalance.

Being aware of environmental issues and having a worldview that subsequently leads to environmental behaviors are all significant topics for architecture students. Besides being the citizens of their communities they are also the professionals and decision makers of the near future who will be able to directly deal with the planning processes for urban environments (including buildings, neighbourhoods etc.). Urban environments are the place where most harm and pressures to the natural environment are generated (Inoguchi et al. 1999; Wheeler 2004).

One of the core issues of current environmentalism agenda is biodiversity and nature conservation as we are experiencing a hazardous process of habitat loss, species extinction and deficiency of biological variability on a global scale (Gamfeldt et al. 2008; Ceballos et al. 2015). Another phenomenon on today's environmental agenda is the environmental issues related to global warming and climate change (Cox et al. 2000).

Theoretical Background

Within this perspective first, a theoretical evaluation is done with the help of a relevant literature review. Then, the results of a user survey are evaluated. The survey was conducted for measuring environmental awareness and knowledge about both 'biodiversity and nature conservation' and 'global warming and climate change' among undergraduate students of architecture department in Near East University, Nicosia. Environmental attitudes as value orientations that have the potential to construct environmental worldview are also measured and examined. Finally conclusion and discussion are made based on the related review and the analysis of our survey findings.

Here the researchers provide a review of the relevant literature including 'biodiversity and nature conservation', 'global warming and climate change' and 'environmental awareness' together with the analysis of the researchers' survey results.

Biodiversity and Nature Conservation

Biodiversity defines the existence of many different kinds of plants and animals in an environment. Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems.

There have been considerable discussions within the scientific community about biodiversity conservation, as currently there is a scientific and public concern about an extinction crisis on global scale (Brooks et al. 2002; Benayas and Montana 2003; Gaston 2005). Biodiversity and nature conservation together with global warming and climate change are among crucial concerns of 21st century's environmental agenda worldwide as species loss and habitat extinction is accelerating and mean globe temperature is increasing (Ceballos et al. 2015; Cox et al. 2000).

Recent studies illuminate where the most vulnerable species live, where and how humanity changes the planet, and how this cause extinctions (Pimm et al. 2014). Undoubtedly human knowledge on biodiversity has a very important role on nature conservation. Specifically with regard to public knowledge of biodiversity and wildlife, researches generally suggest that while public retains some general wildlife knowledge, individuals are unaware of scientific detail. Variations in knowledge of wildlife and biodiversity issues are apparent along several socio-demographic dimensions. For example, wildlife knowledge appears among those participating in nature-wildlife oriented activities and jobs. It is known that individual environmental perspectives are associated with species level knowledge in order to conserve biodiversity for a long period of time (Hunter and Rinner 2010).

Global Warming and Climate Change

Global warming, as a significant global threat, is the increase in the average measured global air temperature near the Earth's surface. It is caused by the increasing amount of greenhouse gases since the late 1800's, mostly because of consequences occurred after the Industrial Revolution. Among these consequences causing greenhouse effect, there are urbanization, industrialization and human population increase. Therefore it is also called as the 'greenhouse effect'. Among these greenhouse gases, the most commonly occurring are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). Such that, solar radiation passes through the clear atmosphere; most radiation (the necessary amount to warm it) is absorbed by the earth surface and

the rest is reflected by the earth, through the layers of the atmosphere back to the space. However as a result of the increasing amount of mainly carbon dioxide, methane and nitrogen oxide gases covering the Earth atmospheric surface as a layer that makes a greenhouse effect, the reflected infrared radiation is inhibited; because some of the infrared radiation is emitted by the layer of greenhouse gas molecules. In other words the heat is trapped in the atmosphere. Therefore, mean surface temperature of the Earth has increased about 0.8^{o}C since the early 20th century, with about the two thirds of the increase occurring since 1980 (Akodere et al. 2012).

Environmental Awareness

Ecologically oriented way of living has gained attention within the scientific world since the late 1970s, as its' significance has been understood within modern environmentalism era. In this regard, the term ecological citizenship (Dobson 2003; Barry 2006; Seyfang 2006; Jagers and Matti 2010; Kennedy 2011; Asilsoy and Oktay 2016) is further introduced as a developing concept. Current scientific literature regarding ecologically oriented behavior constituting ecological citizenship is multi-dimensional. There are psychological, socio-cultural and situational dynamics shaping the environmental behavior. For instance according to the recent studies, values, attitudes as value orientations, behavioral intension, perceived behavioral control, positive and negative anticipated emotions, situational variables are all among the determinants affecting the environmental behavior.

Additionally, research suggests that environmental awareness has the potential to be one of the significant determinants affecting ecologically responsive lifestyle. In other words, environmental awareness seems to be the catalyzer of environmental behavior achieving ecologically based living. Lucas et al. (2008) suggests that the provision of environmental information can have a negligible effect in changing people's behavior. It can be suggested that environmental education can play a key role in equipping the individuals with the knowledge for making meaningful environmental changes (Hungerford and Volk 1990 cited in Tucker and Izadpanahi 2017). Additionally in another study it is suggested that reading environmental literature can increase environmentally sensitive behavior (Mobley et al. 2010).

Therefore it can further be argued that an individuals' knowledge regarding the particular environmental issues such as global warming and climate change, biodiversity and nature conservation etc., has the potential to make an impact on their environmental behavior. Besides the environmental awareness on a global scale, individuals' knowledge about environmental aspects within their local physical boundaries, such as being aware of the existing endemic species or local flora and fauna and so forth, have the potential to have a direct impact on adopting environmentally responsive behaviors.

Research Objectives

Within this framework, this study aims to obtain scientific data on undergraduate university students' existing environmental awareness and knowledge related to current significant environmental issues and its' relation with environmental attitudes.

Research Questions

For the fulfilment of the research aim, the following research questions are asked: 1) What are the definitions of 'global warming and climate change' and 'biodiversity and nature conservation' as the two of the most significant environmental issues? 2) What is the level of participants' environmental awareness and knowledge in relation to particular environmental issues? 3) What kind of environmental attitudes do the participants hold? 4) What is the influence of environmental education on environmental awareness?

METHODOLOGY

Research Design

The questionnaire contains four following sections: environmental awareness; environmental attitudes; environmental behaviors; socio-demographic data. The first section of the questionnaire involved seven items. Four of these items were qualitatively designed. With the help of these items, at the aim was to obtain data about the respondents' awareness regarding environmental issues such as 'biodiversity

and nature conservation' and 'global warming and climate change'. Ecocentric and anthropocentric attitudes were examined in the second section in order to provide data for the existing value orientations. Likert type five-point scale (strongly disagree to strongly agree) was used to record the responses for each item. In the third section, environmental behavior was examined with the help of six items. Five-point Likert type scale (always to never) was used for recording answers of this third section. In the fourth section, socio-demographic data was collected in order to obtain information about age, gender etc. of the respondents. The findings from the questionnaire's second and third section were evaluated in a previous study of the same authors (Asilsoy et al. 2016).

The Sample

A random sample of 111 undergraduate students were selected. These participants had three distinct nationality profiles (Turkish Cypriot, Turkish and International). Each respondent group contained 37 individuals. At least nine participants of each nationality category from the first, second, third and fourth academic year of the Near East University Department of Architecture students were randomly chosen. The details are shown below.

Gender Profile

Of the 111 respondents in the research 25.2 percent were female and 74.8 percent were male (Table 1).

Table 1: Participants' gender profile (%)

Participants	*Female (%)*	*Male (%)*
Foreign students	27.03	72.97
TR students	16.22	83.78
TRNC students	32.43	67.57
Total	25.20	74.80

Age Profile

The majority of the respondents (71.17%) were between the ages of 16-25, with a further of them (27.03%) between the ages of 26-40. The rest (1.8%) were 41-55 years old. See Table 2 for details.

Table 2: Participants' age profile (%)

Participants	*16-25 (%)*	*26-40 (%)*	*41-55 (%)*
Foreign students	67.57	32.43	-
TR students	56.76	37.84	5.4
TRNC students	89.19	10.81	-
Total	71.17	27.03	1.8

Household Income Profile

9.43 percent of the respondents' parents had a monthly household income of 600-1199TL. 30.19 percent had a monthly household income of 1200-2499TL. 21.70 percent of the students had a monthly household income of 2500-3999TL. 17.93 percent had a monthly household income of 4000-5999TL. And 20.75 percent had a monthly household income of 6000 TL+. A breakdown of the three groups' monthly income can be seen in Table 3.

The user surveys were given to the students during the spring term of the 2015-2016 academic year and data collection was completed within two weeks. Firstly, students were briefly informed about the research. In the questionnaire's first section environmental awareness were measured with seven items. Revised NEP scale consisting of 15 items, were used in the second section of the questionnaire. With the help of the NEP scale, ecocentric and anthropocentric attitudes were examined. Later, in the third section, six items were used for examining the participants' environmental behaviors. Several environmental behavior categories such as energy saving, water conservation and green consumption etc. were examined in third section. In the final part, five items were used for socio-demographic data. The last section collected information about the issues such as age, gender etc.

Measures

Environmental Awareness

Environmental awareness of the participants was measured in the first section of the questionnaire with four in depth items. One of these four items was examining their knowledge about global warming and climate change. The other three items were about biodiversity and nature conservation. Additionally one other item asked

Table 3: Participants' household financial situation profile (%)

Participants	*600-1199TL (%)*	*1200-2499TL (%)*	*2500-3999TL (%)*	*4000-5999TL (%)*	*6000 TL+ (%)*
Foreign students	5.41	13.51	21.62	21.62	37.84
TR students	13.51	37.85	27.02	10.81	10.81
TRNC students	9.36	40.63	15.63	21.88	12.5
Total	9.43	30.19	21.70	17.93	20.75

if they had any environmental course throughout their life.

Environmental Attitudes

Attitudes can be explained as value orientations of an individual. In relation to environmental value orientations, New Environmental Paradigm scale (Dunlop and Van Liere 1978; Dunlop et al. 2000) defines two sorts of attitudes: Ecocentric (biocentric) and anthropocentric. Ecocentric individuals value the environment regarding all living things of nature including plants, animals etc. Anthropocentric individuals evaluate the environment in relation to himself and other humans. In this study revised New Environmental Paradigm (NEP) items (Dunlop et al. 2000) were used in order to measure the ecocentric and anthropocentric attitudes. The revised NEP scale contains Likert type five point 15 items.

RESULTS

In this study, as explained above, the findings of the questionnaire's first, second and fourth sections were evaluated. When the researchers evaluated the results of the students' responses to the item '*Have you taken any course on environmental education throughout your life*', almost one fourth of both Turkish (24.32%) and Turkish Cypriot (24.30%) students had not taken any environmental course during their life. Almost all (97.30%) of the foreign students had taken at least one environmental course (Table 4).

Table 4: Participants' responses to the item '*Have you taken any course on environmental education throughout your life?*' (%)

Participants	*Yes (%)*	*No (%)*
Foreign students	97.30	2.70
TR students	75.68	24.32
TRNC students	75.70	24.30

When the researchers evaluated the results of the students' responses to the item '*Can you briefly describe the global warming and climate change*', most of the foreign students (91.89%) had the ability to answer. However approximately one- third (32.43%) of the Turkish students and more than half (54.05%) of the Turkish Cypriot students could not answer to the item examining the knowledge of 'global warming and climate change' (Table 5).

Table 5: Participants' responses to the item '*Can you briefly describe the global warming and climate change?*' (%)

Participants	*Successful to answer (%)*	*Unsuccessful to answer (%)*
Foreign students	91.89	8.11
TR students	67.57	32.43
TRNC students	45.95	54.05

When the researchers evaluated the results of the students' responses to the item '*Can you briefly describe biodiversity*', most of the foreign students (89.19%) had the ability to answer. However approximately half of the Turkish students (45.95%) and most of the Turkish Cypriot students (86.50%) could not answer to the item examining the knowledge of biodiversity (Table 6).

Table 6: Participants' responses to the item '*Can you briefly describe biodiversity?*' (%)

Participants	*Successful to answer (%)*	*Unsuccessful to answer (%)*
Foreign students	89.19	10.81
TR students	54.05	45.95
TRNC students	13.50	86.50

When the researchers evaluated the results of the responses to the item '*What is the definition of endemic species, can you explain*', 75.68 percent of the foreign students managed to answer. However more than half (59.46%) of Turk-

ish students and most (70.27%) of the Turkish Cypriot students could not answer to this in-depth item (Table 7).

Table 7: Participants' responses to the item *'What is the definition of 'endemic species', can you explain?'* (%)

Participants	*Successful to answer (%)*	*Unsuccessful to answer (%)*
Foreign students	75.68	24.32
TR students	40.54	59.46
TRNC students	29.73	70.27

When the researchers evaluated the results of the students' responses to the item '*Do you have any information about the status of biodiversity in your country*', a respectable amount of both Turkish (67.57%) and Turkish Cypriot (81.08%) students could not manage to answer. Merely 62.16 percent of the foreign students answered to the item (Table 8).

Table 8: Participants' responses to the item *'Do you have any information about the status of biodiversity in your country?'* (%)

Participants	*Successful to answer (%)*	*Unsuccessful to answer (%)*
Foreign students	62.16	37.84
TR students	32.43	67.57
TRNC students	18.92	81.08

Additionally environmental worldview of the participants were also measured via revised NEP scale. The total mean score of the NEP scale was measured at 3.06. The mean score of the foreign students was measured as 2.83. The mean score of the students from Turkish Republic was measured as 3.21 and the mean score of the students from Turkish Republic of Northern Cyprus was calculated as 3.15 (Table 9).

Table 9: Participants' NEP scores

Participants	*Mean score*
Foreign students	2.83
TR students	3.21
TRNC students	3.15
Total	3.06

As it is accepted that a NEP mean score of 3 is the boundary between an anthropocentric and ecocentric worldview (Rideout et al. 2005; Van Petegam and Blieck 2006), the results showed that the respondents attained a medium level of ecological worldview. These results imply that the sample have an indecisive stance regarding an ecological worldview. The students holding relatively stronger ecological views than the others are from Turkish Republic. The students holding the least ecological views are from the foreign countries (Asilsoy et al. 2016).

According to the results of the respondents, foreign students have relatively higher level of environmental awareness than Turkish and Turkish Cypriot students. However, when the respondents' NEP scores which indicate their environmental worldview are evaluated, the results are contradictory. Such that although the foreign students' level of awareness are measured to be higher than the others, their NEP scores lower (Mean=2.83) when compared to Turkish (Mean=3.21) and Turkish Cypriot (Mean=3.15) students.

Additionally, the results to the question '*Have you taken any course on environmental education throughout your life?*' were meaningful either. Such that although most of the foreign students had an environmental course during their lives, they achieved the least NEP score.

DISCUSSION

Individuals with sustainable lifestyles are significant for paving the way towards an ecologically based, sustainable community (Dobson 2007). Particularly, it is crucial for younger generations of urban communities to adopt environmentally based lifestyles via their behaviors, daily activities and actions based on a sufficient level of awareness and environmental worldview (Mont et al. 2014). Environmental education has potential to be an efficient tool for increasing individuals' environmental awareness and concern, including the younger ones. For instance Major et al. (2017) argues that education has a crucial role in order to create environmental awareness and a worldview for younger generations. Additionally, Kopnina (2017) further suggests that educating future generations in the ways of fostering positive change in respect to environment seems increasingly significant.

CONCLUSION

However it must be remembered that, as a complex topic, environmental behavior leading an individual towards ecologically based living

has several other determinants. In other words, merely an awareness or environmental attitudes constituting environmental worldview for instance, would not be sufficient for the process making the individuals more committed to act environmentally. It can further be argued that merely environmental education may not be effective to make the individuals more environmentally responsive. Hence beside the efficacy of environmental education itself, several other dimensions such as residents' socio-cultural, socio-psychological characteristics including values, beliefs, worldviews, motivations and even physical properties within the individuals' surrounding, must be evaluated.

RECOMMENDATIONS

Therefore it is clear that further research is needed to fully understand the dynamics of environmental awareness, attitudes, beliefs, values and behaviors within different social groups and particularly within the younger generations. Furthermore, it can be argued that environmental education needs to be more intense and repeated at different periods of young persons' life. Current curriculums of environmental education should be updated both with local and global environmental examples. For instance every young individual needs to be aware of the existence of endemic or endangered species in his/her own country. Beside the awareness of local environmental issues, it is urgent for them to be aware of the environmental tendencies happening on global scale such as climate change or the trend of using renewable energy sources for construction or sustainable urbanism concerns such as green buildings etc. Hence, raising individuals who can be defined as ecological citizens is not an option but it is almost a must for the future health of our planet.

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