**TRNC**

**NEAR EAST UNIVERSITY**

**ATATURK EDUCATION FACULTY**

**ENVIRONMENTAL EDUCATION AND MANAGEMENT**

# EFFECTS OF SUMMER HEAT WAVES (TEMPERATURE) ON UNIVERSITY STUDENTS' ACADEMIC PERFORMANCE IN SUMMER MONTHS: NORTHERN CYPRUS

**MASTERS THESIS**

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**Nicosia**

**January, 2019**

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**This study by the Environmental Education and Management Department of the jury considered as Master's Thesis.**

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**Confirmation**

**We certify that we have read this thesis and in our opinion it is fully adequate in scope and quality, as a thesis for the degree of master of Environmental Education and Management.**

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# ABSTRACT

## EFFECTS OF SUMMER HEAT WAVES (TEMPERATURE) ON UNIVERSITY STUDENTS' ACADEMIC PERFORMANCE IN SUMMER MONTHS, NORTHERN CYPRUS

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**January, 2019, 57 pages**

The study investigates the effects of summer heat waves on students' University academic performance in summer months, a case study of Near East University and Cyprus International University Northern Cyprus. Using a quantitative method of research, four research questions and four objectives guided the study.

Literature review was done under various sub-heading to give a detailed understanding of the subject matter. 150 students made up the population of the study which were sampled using the stratified random sampling technique. A well-structured item (34) modified 4-points Likert scale questionnaire to address the targeted aim of the study titled questionnaire for students view on global climate change, summer heat wave, physical, social, learning and accommodation condition and transportation system of the students to address the targeted aim of the study, it also reflected the demographic characteristics of the students in order to determine the general perception of students to climate change and summer heat wave.

General perception of the students is that global climate change is real but they didn't if trapped greenhouse gases in the atmosphere could make us experience a warmer climate. Also, data obtained from the study were analyzed using descriptive statistics to reveal relationships between the socio-demographic characteristics of the students and their views were tested using t-test and ANOVA at 0.05 level of significance.

The findings showed that heat wave, accommodation condition, social, learning and physical environment significantly affect students learning among university students in summer. Based on the findings, it was recommended that government should ensure building engineers equip each room in an apartment with air condition and solar panels to ease the payment of electricity for students. The researcher suggested among other things, that a research should be undertaken on a larger scale to cover the entire Northern Cyprus.

Therefore, the government should subsidized electricity payment in summer time for these students to stay and enroll in summer school. also, students apartments must have air-condition in every room, government should give landlords the opportunity to install solar panels at a subsidized rate in other to ease the electricity payments for students because must of these students are coming from a third country and need help.

***Key Words:*** Perception, climate change, summer heat waves, academic performance, accommodation condition, physical, social and learning environment.

# ÖZET

## KUZEY KIBRIS'TA YAZ AYLARINDA SICAK HAVANIN , ÖĞRENCİLERİN AKADEMİK PERFORMANSI ÜZERİNE ETKİLERİ

**Murna SYLVESTER**

**Yüksek Lisans, Çevre Eğitimi ve Yönetimi Anabilim Dalı**

**Tez Danışmanı: Doç. Dr. Serkan İLSEVEN**

**Ocak, 2019, 57 sayfa**

Çalışma, Kuzey Kıbrısta Yakın Doğu Üniversitesi ve Uluslararası Kıbrıs Üniversitesindeki i yaz sıcaklıklarının öğrencilerin akademik performanslarına olan etkisini araştırıyor. Bu araştırma Nicel araştırma yöntemi kullanarak, dört amaçla dört araştırma sorusu ile yapılmıştır.Konuyla ilgili detaylı bilgi vermek için çeşitli alt başlıklar altında literatür taraması yapılmıştır.

Çalışmanın nüfusunu, tabakalı rastgele örnekleme tekniği kullanılarak saptanmıştır. Örneklemde 150 öğrenci kullanılmıştır. Çalışmada hedefe ulaşabilmek için öğrencilerin küresel iklim değişikliği, sıcak yaz dalgaları, fiziksel, sosyal, öğrenme ve barınma koşulları ve ulaşım sistemi hakkındaki görüşlerini içeren sorular kullanılmıştır. Araştırmada hedeflenen amaca yönelik olarak, öğrencilerin genel iklim değişikliğine ve sıcak yaz dalgalarına karşı algılarınını belirlerken öğrencilerin demografik özellikleri dikkate alınmıştır.

Öğrencilerin genel algısı, küresel iklim değişikliğinin gerçek olduğu, ancak atmosferdeki hapsolmuş sera gazlarının bizi daha sıcak günlere taşıyıp taşıyamacağı konusunda kararsızlar. Ayrıca, araştırmadan elde edilen veriler, öğrencilerin sosyal ve demografik özellikleri arasındaki ilişkileri ortaya çıkarmak için tanımlayıcı istatistikler kullanılarak analiz edilmiş ve görüşleri t-testi ve Anova kullanılarak 0.05 anlamlılık düzeyinde test edilmiştir.

Bulgular, sıcak hava dalgaları, konaklama koşulları, sosyal, öğrenme ve fiziksel çevrenin, üniversite öğrencileri arasında yaz aylarında öğrenim gören öğrencileri önemli ölçüde etkilediğini göstermiştir.

Araştırma sonuçları ve bulgulara dayanarak, Yöneticilerin öğrencilerin elektrik faturaları ödemelerinde kolaylık sağlaması, öğrenci evlerinde her odada klima kullanılabilmesi veya güneş panelleri kullanan mal sahiplerine vergi kolaylığı sağlanması önerilmiştir. Araştırmacı, tüm Kuzey Kıbrıs'ı kapsayacak şekilde daha geniş çapta bir araştırma yapılması gerektiğini önerdi

***Anahtar Kelimeler:*** Algılama, iklim değişikliği, yaz sıcağı dalgaları, akademik performans, konaklama koşulları, fiziksel, sosyal ve öğrenme ortamı.

**ACKNOWLEDGMENT**

I also want to appreciate my head of department Assoc. Prof. Dr. Şerife GUNDUZ, thank you for always believing in us.

Many thanks to my supervisor Assoc. Prof. Dr. Serkan ILSEVEN for his patience, guidance and constructive criticism to ensure that this work is a success despite your busy schedules, I am eternally grateful sir.

To Assoc. Prof. Dr. Fidan ASLANOVA, thank you for always ready to help and assist us. Also, worthy of mention is Assoc. Prof. Dr. Mert BAŞTAŞ, and all the staffs of Environmental Education and Management thank you for your contributions to this research work. Thanks to my family and friends too.

**Murna SYLVESTER**

**January, 2019**

**Nicosia**

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NEU – Near East University

CIU - Cyprus International University

HW – Heat Wave

IPCC – Intergovernmental Panel on Climate Change

CDC – Centers For Disease Control And Prevention

AC – Air Condition

IPCC – Intergovernmental Panel on Climate Change

DiD – Difference in Difference

HWs – Heat Waves

% - Percentage

n - Number

# CHAPTER I
# INTRODUCTION

## 1.0. Background of the study

Heat waves vary greatly from place to place and region to region. Whereas some heat waves are mild, moderate, friendly and inviting others feel high, exasperating, extreme, unwelcoming, unbearable and even unsafe. Heat wave is a period characterized by abnormally uncomfortably hot and humid weather (Todd, 2000). Due to variations in regions of the world, the time duration and temperature required to be a HWs depends on the daily local average temperature in a particular place over a period of time. It could last for at least a period of a day, weeks and months depending on the severity of the heat wave. A temperature of $90^0$F ($32.2^0$C) and above consecutively for a period of 3 or more days is said to be heat wave but cannot be generalized due to the comfort criteria and temperature considered normal from place to place (Glossary of Meteorology).

Trapped air in the atmosphere due to excess greenhouse gases could be the cause of HWs. Our earth atmosphere is circulated by air that moves in large prevailing winds, when this moving air is trapped in a particular region, such regions tends to get more warmer with temperatures extremely high and could be termed HWs. (Donev et al, 2016). When air hits the lower atmosphere, the greenhouse gases act as shield or umbrella forcing the air downward preventing the air from rising or reflected back into the upper atmosphere thereby not leading to rainfall. (NOAA, 2016).

Global climate change crises deepen and the earth atmospheric temperature increases by the day. Global climate change might be the cause of the extreme heat waves. $21^{st}$century climate is very unstable and unpredictable by constantly changing. This claim is ascertain by scientist drilled down ice in Antarctica and Greenland to recover core samples and were able to estimate the earth average temperature over a period of time. Although, there are many signs or effects of global climate change temperature remains the easily parameter to measure and estimate than rainfall amongst others (IPCC, 2001b).

Although our climate has completely changed with harsh weather extremes but a next level of climate change is unavoidable because there is already a lag between greenhouse gas emissions and global warming (IPCC, 2014a; USDA, 2013). Greenhouse gases have already been trapped in the atmosphere, even if emissions are to stop, the Earth's land surfaces would continue to warm for decades and its oceans for centuries due to past emissions (USDA, 2013). Climate scientists called this phenomenon a committed warming (IPCC, 2014a). Global temperatures will continue to increase due to committed warming and future emissions if nothing is done (IPCC, 2014a).

U.N. General Assembly in 1949 came to a consensus that everyone has the right to education making education a fundamental right of any individual. Education is seen as a way of molding an inexperienced person to help them develop physically, mentally, socially, emotionally, spiritually, politically, economically and otherwise (Nwangwu, 2006). Education is one of the fundamental rights of individuals.

Effective learning cannot take place without considering the school climate, environmental factors or the living conditions around and about the learner. School climate is the entire conditions (physical and physiological)in a school system necessary for effective learning to take place. These conditions could be changed if they do not support teaching and learning (Beady & Brook O., 2003).Education is multidimensional (that is, physical, social and academic) in construct Comer (1993).

Comer (1993) Physical dimension is the complete infrastructural development of the school, (nature size of school and classroom) percentage of students assign to a teacher, how organize is the school and its orderliness.

Social dimension; do the students have good rapport among themselves? Do the staffs, teachers and students have good relationship? Degree of competition and social comparison between the students and teachers, contributions of students and staffs in making important decisions that promote effective learning.

Academic dimension; this dimension shows the quality of instruction students have received, teacher monitoring expectation from the students in terms of achievement. How prompt is the teacher in reporting results to students and parents?.

A good and conducive environment is key to safety, effective learning and development DFES (2006); because a good school climate promotes effective students' performance and comprises all the students, teachers, staffs and the entire people within the school community Therefore, a good school climate should be spacious, conducive and allow time for students' interaction during teaching and learning process.

A lot of problems seem to bedevil the students thereby affecting the students' academic performance. Students' academic performance needs to be high in order to meet the country´s goal for political, economic and social sustainable development

Nieto (1992) argues that factors affecting a child's (student) educational achievement include the culture of the school a child (student) attends, the attitude of the principal and teachers to their students motivation, the value transmitted by the school in general as well as the school climate. But Cedeno L. J. G. et al, (2016) believed that cognitive function deficit as a result of high indoor thermal conditions experienced during heat waves is one of the many health challenges associated with heat waves. Therefore, he highlighted the need for buildings to be equip with sustainable and good adaptation measures to building in this fast changing climate for the population to feel safe, achieve good educational attainment and be economically productive.

Therefore the need to assess the influence of summer heat wave on students' academic performance in near east university, Cyprus becomes significant.

### 1.1. Problem

Discussing with many international students in North Cyprus about the high heat waves in the summer months of July, August and September, and how many students

prefer to travel back to their home countries, others prefer to stay back indoors and reluctant to apply or enroll in summer school, seated in a school bus for almost an hour without the air-condition their inability to identify if these high heat waves are likely to be connected with the two weather extremes. Realizing that the problem of global warming, global climate change, and high mortality rate due to heat wave to some extend have received attention. However, one area that has not received attention in recent time is the effect of heat wave on cognitive function of students, nature of school climate that exist in schools and the accommodation condition of students which influences students' academic performance. The physical environment is vital to the achievement of educational objectives. The learning and living environment is integral in ensuring a permanent change in behavior. Many students accommodation condition are not motivating students toward learning as well. The social environment creates an opportunity for learning to take place, there exist a wide gap in relationship between students living environment and students learning environment in most schools. It is based on this premise that it becomes imperative to investigate the influence of summer heat waves on students' academic performance in near east university, Cyprus.

### 1.1.1. Sub Problem

The research attempts to find answers to the perception of students' on the following:

- Global warming and how it effect on academic performance
- Summer heat waves and it influence on academic performance?
- What is the perception of students' on physical, social, learning (school climate) and accommodation environment in summer as it influences academic performance.
- What is the perception of students on students' transportation system during summer and its influence students' academic performance?

## 1.2. Aims and objectives of the research

The purpose of this research is to ascertain the effect of summer heat waves on students' academic performance in NEU and CIU Cyprus. The objective is to find a relationship between the demographic the students:

i. Find out if there is a relationship between view of students on global climate change and gender as it influences students' academic performance.

ii. Ascertain the relationship between view of students on summer heat waves and Nationality.

iii. Determine the relationship between view of students on physical, social, learning (school climate) and living (accommodation) and level of education on students' academic performance.

iv. Determine the relationship between view on students transport system and school

## 1.3. The Importance of the Study

The study examined the effect of high summer heat waves on students' academic performance, hence the findings might be useful in identifying a well air-conditioned accommodation during summer as a factor influencing students' academic performance. This could offer empirical evidence for the difference in students' academic performance in the different weather seasons. Hence, recommendations there from if implemented would enhance students' performance in July, August and September, thus improving overall educational system.

It will guide students towards the right choice of study environment and accommodation to rent in other to achieve better academic output.

The study would also add to the body of knowledge in the subject thereby availing other researchers a pedestal for further studies on the subject.

The findings of the study would also reveal to building engineers on the need to equip buildings with adequate windows for cross ventilation and each room with air-condition or cooling appliances.

The need for government to ensure the installation of cooling appliances in buildings, for a conducive living accommodation and learning environment during high summer months.

The study will help government to ensure the installation of solar panels on houses that are meant to be rented out to student to ease their payment of electricity.

Nevertheless, the outcome of this study would avail policy-makers in the education and other sectors with information on the need for the review of policies necessary to ensure positive school climate, effective teaching and learning, well air-conditioned accommodation and transport systems.

Summarily, the study would provide research on summer heat wave and its overall impact on students' performance and offer strategies that could help support student achieved in their academics in NEU and CIU, Cyprus.

**1.4. Assumptions**

The following assumptions formed the basic assumptions of the study;

- Student's perception on the effects of summer heat wave on students' academic performance.

- The thought of getting into the school bus without air condition in summer affects the phycology of the student, hence affecting students' performance.

- The accommodation conditions of students during high summer heat waves affect the performance of students.

- Physical environment of the school affect the academic performance of students.

### 1.5. Limitations

- This study was limited to 150students participants
- Questionnaire were limited to its aims and objectives
- Participants were limited to Africa students, selected from NEU and CIU in Northern Cyprus.

### 1.6. Definition of Terms

These terms should be read and understand as defined below:

**Summer:** summer as the hottest seasons of the year, starting after spring and before autumn with shortest nights and longest days (Zhang, F. et al, 2017).

**Heat wave (HW):**Centers for Disease Control and Prevention (C.D.C.) defined heat wave as ‘‘ high temperatures of 10 degrees and above average temperature considered high in a particular region, it could last from days, weeks to months.’’ Which can invariably be seen as a period of hot weather normally two or more days consecutively, exceeding the average temperature of a particular place or region (Görmez, 2010).

**Student academic performance:** This refers to an outcome of all academic tasks or rigors of a student which could be poorly or successfully stated. (Ilıya, 2014).

**Learning environment:** An environment for learning is the influence and condition a learner comes in contact with, resulting in a series of interactions (which could be complex) to ensure a permanent change in behavior in such students (Garipağaoğlu,

2011). Examples, the teachers' ability to help the students when they don't understand, commending excellent performances, testing students based on what they learnt, the teachers teaching methodology etc. (Ilıya, 2015).

**Physical environment:** This is the environment where student feel safe, cared for and relaxed, with support of adequate and relevant infrastructural facilities such as buildings, comfortable furniture, well ventilated classrooms and staffroom, well maintained rest room, clean school environment and necessary equipment (Ilıya, 2015).

# CHAPTER II

# REVIEW OF RELATED LITRATURE

## 2.0. Overview

An age-old phenomenon, climate change can happen due to rise in population levels, expansion of land for agricultural purposes, innovations, housing and road construction leading to reduction in forest and trees, high cost of living, technological advancements and industrialization amongst others. According to the results of IPCC, (2013), the level of Greenhouse Gases has surpassed the highest levels of concentrations on earth over the last 800,000 years. This greenhouse effect, in turn, is causing increased rainfall, hot weather extremes, flooding, droughts, cyclones and reduction in level of glaciers. Rise in precipitation levels has been observed in Northern Europe, eastern parts of North America, South America, Northern Asia as well as Central Asia. Tropics and Sub tropics have been facing severe and long lasting droughts since 1970s whereas places like Sahel, Southern Africa and Central Asia have parched lands (Aggarwal, 2008). IPCC in its 4th Assessment Reported that vigorous activities performed by humans since 1750 has resulted in atmospheric concentrations of Carbon-dioxide, Methane and Nitrous Oxide around the world. The level of greenhouse gases has now exceeded the preindustrial values that existed thousands of years ago.

We are yet to experience extreme global temperatures. Temperatures continue to get warmer, temperatures that seems high today will become common in few years to come (Meehl, G.A., 2004), and there are public health implications associated with this fast emerging change in climate, has recorded the warmest year in the last 200 years with records of deaths, more deaths running into thousands in a year is expected in the United States by year 2100 (Sarofim, et al, 2016). Heat waves will keep increasing in intensity, duration, frequency as average surface temperatures increases due to climate change (Solomon, S. 2007).

The health effect of extreme heat waves has been focused on the elderly and children but in reality these effects affects the general population. Some these health effects on the general population include subclinical symptoms e.g. cognitive function deficit (Dai L. et al, 2016, Zhang F, 2017. Zanobetti, A. et al, 2013).

### 2.1. Climate and Climate Change

Intergovernmental Panel on Climate Change in its fourth assessment report, climate change is ascertained by using statistical tests which shows changes in statistical properties and persists for a period of time. Although, there are natural causes of climate change but anthropogenic activities e.g. land use, agriculture, industries, burning of fossil fuel etc., has been major contributors to the concentration of greenhouse gases in the atmosphere thereby increasing the average surface temperature (Blondel, Bodiou & Boeur, 2010),

Increase in average surface temperature results in changes in frequency, intensity, spatial extent, duration and timing of extreme weather, climate events and unprecedented extreme weather and climate events (IPCC, 2012).

Available data revealed there has been dramatic decrease in the number of cold days with increase in the number of warm days (IPCC, 2014).

#### 2.1.1. Recent Work on Heat Waves on Cognitive Function

Cedeno Laurent Jose Guillerno of Harvard School of Public Health carried out a research in 2016on the effects of heat waves on students' cognitive thinking on university students in U.S. He said hot living condition could affect students' memory, their way of thinking and daily activities. In their methodology, 44 students were sampled with an average age of 20 years. 24 students were kept in an air-condition apartment and 20 students under non-air-condition apartment to live during heat waves. Two cognitive tests were administered to the sampled students on a daily basis for 12 consecutive days. The test was to assess selective attention and at the same time processing speed, another test was a 2-digit visual addition/ subtraction test to evaluate their cognitive speed and working

memory. After which the effect of the heat waves was evaluated by the use of difference-in-difference modeling method. The found out individuals in non-air-condition apartments experienced a low cognitive function with respect to the air-condition group. The research also revealed these low-cognitive function might be as a result of high thermal load with other environmental influences such as ventilation, acoustics and other behavioral factors such as hydration and sleep amongst others that reflect heat exposure in real life.

The research therefore highlighted the need for mandatory incorporation of sustainable adaptation of measures to buildings in this fast changing climate in order to enhance and preserve educational attainments, economic productivity and safety. Some experimental evidences, epidemiological and econometric studies also revealed high effects of heat exposure in productivity, learning ability and morbidity and mortality in humans.

**2.2. Climate in Cyprus**

North Cyprus is within the temperate zone lying between latitudes 34º34ʾ and 35º51ʾN. (Ilseven, S., Hıdırer, G. & Tümer, A. 2014). The prevailing climate is classified as Mediterranean, with the summers hot and dry and the winters mild with low rainfall. Depressions in the Mediterranean basin generally travel form west to east. Lying in its eastern part, North Cyprus is thus usually shielded from their influence and being in any case at a more southerly latitude than most of the west Mediterranean region it enjoys an eastern Mediterranean type of climate (Ilseven 2004). In summer, the angle of incidence of the sun's rays is such as to produce a subtropical climate extremely hot and dry. The country is characterized by the Kyrenia range, coastal areas and the central plain. The country's Central Plain is shielded from the influence of the sea and because of its consequent low humidity daily and annual temperature variations greater here than elsewhere. This is the driest part of the island with average annual rainfall measuring 318mm in the eastern part and as a little as 290mm in the western. It also has the sparest

vegetation, conditioned by low humidity, temperatures reaching the forties and the occurrence of winter frost (Ilseven 2004).

## 2.3. Ecological Conditions in Cyprus

### 2.3.1. Geographical Position

Cyprus lies at the easternmost end of the Mediterranean basin and is the third largest island of the Mediterranean after Sicily and Sardinia. The longitude of Cyprus is 33º20' and the latitude is 35º12' north. Its area is 9251 square kilometers.

Although the climate of Cyprus is related to its geographical position, overall it may be described as typically Mediterranean. Its main characteristics are the prolonged and hot summer and the short, rainy and mild winter. The Troodos mountain range and, to a lesser degree, the Pentadakylos mountain range play an importance role in the meteorological conditions and the formation of natural phenomena. The surrounding sea also contributes to the creation of natural phenomena along the coasts (İlseven, 2017).

The average annual rainfall is about 480 mm, but its distribution is greatly determined by the island's pattern of relief. Annual rainfall in the Chionistra area can be as high as 1100 mm, while on the central plain it averages only 300 mm. Rainfall on the Pentadakytlos mountain range averages 55o mm annually. Snow-fall is usually restricted to altitudes above 1000 m and rarely reaches 3 m at Chionistra peak (1952 m).

Like rainfall, temperature is also influenced by the island's relief and the surrounding sea. The mean daily temperatures in July and August range between 29ºC on the central plain and 22ºC at the higher altitudes of the Troodos mountain range, while the respective mean daily temperatures in January are 10ºC and 3ºC. The average daily sunshine is 5.5 hours in winter and 11.5 hours in summer. Also, the average relative humidity fluctuates between 60-80% in winter and 40-60% in summer; at mid-day in the summer it is about 30% and occasionally as low as 15% (İlseven&Bastaş, 2018).

## 2.4. Concept of the Environment

It is known that the environmental concerns did not showed up suddenly but is due to course and has become the key it is today. After World War II, human effects on nature have increased intensely because of the technological change in manufacturing. It was 1940s when the synthetic products, which are one of the important reasons of environmental destruction and which were used also in 2009, were first manufactured. Especially, it was after World War II when the problem of destroying wastes of the plastic substance was arisen Clark (2001). Presentation of nuclear energy as an alternative during the usage of the atom bomb also happened after the war. Moreover, the synthetic products of which usage was increased after the war started to be used also in daily life. Meanwhile, consumption has also been increasing together with the increase in population. Many factors like the usage of fertilizer in agriculture, increasing usage of chemicals to destroy pests and plants and increasing usage of motor vehicles in transportation technology has expedited the destruction of the environment. Therefore, coming up against the environmental concerns/problems for humans was majorly started with manufacturing technologies and its products which were developed by humans themselves again after World War II (Foster, 2002)

Due to the fact that the nature is able to regenerate itself, the relationship between humans and their environment kept going in a certain and harmonious way from the first ages to the Industrial Revolution. After the Industrial Revolution, the harmony between humans and the nature started to go bad, a challenge which humanity with the nature has been going on since its existence. This challenge which was at first just about needs of housing, eating and wearing continued in a balanced way until the middle age. Yet, after the middle age, humans started to win much more in this challenge. Humans 'effort to take all the control of the nature became a kind of ambition to the nature after the Industrial Revolution. With the development of the technology and thus, the industry, humans ignored the harm they caused to the environment from 1800s to the end of the 20$^{th}$ century (Görmez, 2003).

The nature responds to what it gets. As the desire of humans for taking control of all the nature and using it much more increased, the nature started to show reaction prominently to this situation-especially, after the second half of 20th century. Because its reaction was just regional and small-scale at first, it didn't draw much attention. But, because of the fact that problems such as the global warming which increases day by day; changes in the climate; the ozone layer being depleted; and, as a results of all these, drought, famine and hunger, the interest in environmental concerns also increased.

The reason why the concept of environment has gained importance and become the main topic of mankind is not totally but partly pollution and global climate change. After the Industrial Revolution, the nature has been damaged and rapidly by over using its self-regeneration capability by humans. The environmental pollution has become visible together with the wave of economic growth and industrialization gaining speed, the environmental pollution has increased as well. Just for improving and maintaining their industries, especially developed countries polluted their environments in and from which they produce their products and supply their raw materials. Furthermore, just to supply raw materials, those countries polluted not only their own countries but also most of the countries for which they use the resources; so, the extent of the pollution becomes greater. Besides, all this, with the desires for scientific and technological development and economic growth, the environmental pollution influencing all over the world has become a kind of threat to the living beings (Yücel, 2006).

### 2.4.1. The Factors Causing Environmental Concerns

It is known that the environmental concerns did not show up suddenly but in due course and it has become the way it is today (Keleş ve Ertan, 2002)

The main factor which caused and developed the environmental problems is the rapid technological development occurring in the last 40-50 years and correspondingly developing economical change. Both of these processes adherents to each other have led people to use natural resources excessively by increasing human necessities in an

enormous rate. Furthermore, population quantity and variety of industrial products, technical tools and social equipment's also increased; and therefore, consumption human desire to consume also increased incredibly. As the result of this, developments started to shake, and destruct the life of all living beings; and made the World unlivable (Çepel, 2003)

It is known that there are various reasons causing environmental problems and all those reasons have been revealed in different ways by different experts. But in general terms, when taking the subject in hand we see that the main reasons are; unawareness of people about how the destruction of the nature they cause will affect them; the wrong idea that the nature can regenerate itself whatever happens; and population increase at the present time in large numbers.

The assumption that all the environmental problems are just because of science and technology means not to see the other reasons of the problems and so not to be able to find solutions.

There are two kinds of approaches to environmental problems. The first one is that degeneration of ecology's and social system's balance might foreshadow of a new balance. The problem should be incrementally analyzed in system and the system integrity should not be disrupted. The second one is to claim that environmental problems cannot be solved unless there is revolution in mentality and the attitude and reform suggestions will just delay the solution. The common thread to both of these approaches is to accept that the roots of the environment problems are the problems in mentality. This mentality is the idea is to enlighten which makes the human mind the only power to effect contributing the development of modern science and technology and which enables unlimited right to humans to change the nature. It is inevitable that the mentality with these features which put human in the center of everything causes disturbance of the natural balance (Demir, 2007).

## 2.5. Economic Impacts of International Students in North Cyprus

Cyprus is an island in the Eastern Mediterranean with area coverage of 9,251square kilometers, with TRNC 3,355 square kilometers. It borders Turkey to the north, Syria and Israel to the east, Egypt to the south and Greece to the west. Like many island states, North Cyprus based its development on the services sector. Tourism and higher education were chosen as the leading sectors which have been contributing to the economic development of the island significantly (Katricioglu et..al, 1996). According to the TRNC Public Relations Department 2014 Higher education is a rapidly growing sector in the TRNC. The TRNC Universities, except the Anatolia University offer instruction in English. The number of students pursuing higher education in the above-mentioned universities is 73,894 from 110 different countries in the 2014 -2015 academic year. Out of this amount, 17,440 are Turkish Cypriots, 36,823 are Turkish and 19,631 foreign students.Ilseven, S. (2017) said the number of students pursuing higher education in the 2016 -2017 academic year is 13,573 which are Turkish Cypriots, 52,112 are Turkish and 27,538 foreign students.

**Table1.** 2016-2017 Number Of Students Registered In The TRNC Universities According To Nationality.

| N | LOCATION | SCHOOL NAME | NORTH CYPRUS | TURKISH | 3rd COUNTRIES | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Lefkosa | Near east university | 5469 | 14250 | 6358 | 26077 |
| 2 | Lefkosa | Cyprus International University | 1103 | 7991 | 5944 | 15038 |
| 3 | Lefkosa | Akadeniz Karpaz University | 206 | 103 | 382 | 691 |
| 4 | Lefkosa | Cyprus American University | 1 | 99 | 6 | 106 |
| 5 | Lefkosa | Cyprus Social Science University | 9 | 388 | 0 | 397 |
| 6 | Gazimagusa | Eastern Mediterranean University | 3149 | 8507 | 7910 | 19566 |
| 7 | Gazimagusa | Istanbul Technical University | 3 | 323 | 18 | 344 |
| 8 | Girne | Girne American University | 2497 | 10079 | 4675 | 17251 |
| 9 | Girne | Cyprus Science University | 60 | 129 | 112 | 301 |
| 10 | Girne | Girne University | 73 | 879 | 266 | 1218 |
| 11 | Girne | International Final University | 23 | 0 | 44 | 67 |
| 12 | Guzelyurt | Lefke European University | 743 | 7186 | 1238 | 9167 |
| 13 | Guzelyurt | Middle East Technical University | 178 | 2178 | 562 | 2918 |
| 14 | Guzelyurt | Cyprus Health and Social Sciences university | 59 | 0 | 23 | 82 |
| | | | 13573 | 52112 | 27538 | 93223 |
| | | | 14.6 | 55.9 | 29.5 | |

Source: (Ilseven, 2017)

From the table above, the importance of international students in the economic growth of TRNC cannot be over emphasized. Bicak and Katircioglu (1996) in their research on the economic impacts of the overseas students (both Turkish from the mainland Turkey and non-Turkish) on North Cyprus economy. In another research using the 1990 input-output tables and the input-output technique, the impacts of Turkish and overseas students spending's in EMU and their relatives visiting North Cyprus in the year 1994/1995 was also calculated. 180 questionnaires were given at the Eastern Mediterranean University in order to find out the expenditure patterns of 4,007 overseas students (OS) and their relatives that visit north Cyprus. Survey results found out that the average annual expenditure of overseas students and their relatives is higher than the average annual expenditure of the Turkish students which is due to longer stay of the overseas students than the Turkish students in north Cyprus within a year. The total expenditure of the overseas students and their relatives constitute 5.66% of the GNP of

North Cyprus. It is calculated the expenditure of the TS, the OSS studying at EMU and their relatives visiting North Cyprus added 227.38 to the income per head of the North Cyprus.

With the increase in the inflow of overseas students to study in the universities in North Cyprus, it is expected that the number of international students has increase which also increased their role in the growth of the Cyprus economy.

In 1991 a survey was carried out in 5 universities in Cyprus in order to generalize the results on the impacts of the overseas students in Cyprus. They found out that the spending of the overseas students and their relatives generated $31.0m of the gross output and 22.8m income and resulted in $2.8m imports. Also, the output, income and imports generated by the total overseas students were 9.3%, 6.9% and 0.9% respectively of the GNP of that year. The increase in the share of the impact in the GNP from 1991 through to 1994 can be accounted mainly to the increase in the total number of the overseas students from 4,004 in 1991 to 8,099 in 1994 (Katircioglu S. T., 1994, Ilseven 2017)They concluded that the average output, income and imports generation in the two studies were almost the same, indicating that there has not been any significant change in the pattern of expenditures of the overseas students in the concern years.

Therefore, (Katircioglu, 1995) noted it is important to meet the expectations of the international students in Cyprus and provide them with a good environment, he recommended that the living expenses can be reduced by building dormitories and shopping centers for the students. Besides, the government can provide incentives to the private sector to build flats at the university sights by exempting them from various taxes.

# CHAPTER III
# RESEARCH METHOD

This chapter describes how data relating to students attitude and adaptation to heat waves during summer months in near east and Cyprus international university, northern Cyprus were collected and analyzed. It is focused on research model, research design, area, population of the study, sample and sampling technique, instrumentation, validation and reliability of instruments, method of data collection, and data analysis.

## 3.1. Research model

The descriptive survey research design was employed in this study. Survey research design is a data collection technique in which information is gathered from individual called respondents (Otuka, Azare and Ogunsala, 2004). The study is cross-sectional survey because it will require data to be collected at a particular time from a large sample, for the purpose of describing the population to be presented by the sample at that particular time. Cross sectional design involve the collection of data within a short span of time from a simple random sample of the targeted population Anikweze (2009). This design is considered suitable because it will assist in establishing the relationship in university students' perception, attitude and adaptation to heat waves during summer months in, northern Cyprus.

## 3.2. Population and participants of the Study

The population of the study consists of students from NEU and CIU northern Cyprus. The participant of the study consists of 150 respondents that would voluntarily complete the questionnaire. All the samples would be in the two institutions which makes the research more convenient and flexible.

## 3.3. Instrumentation

The instruments for the study were questionnaires structured by the researcher. One questionnaire was developed, consisting of two sections i.e section A and B, section

A comprises of personal data (demographic) of respondent while section B comprises of views of respondent on attitude and adaptation to summer heat waves. The questionnaire is made up of thirty four (34) items centered on the three elements of global warming, attitude and adaption to heat waves. The questionnaire was design on a modified LIKERT scale of four (4) points of rating as follows: Strongly Agreed (SA)(4), Agreed (A)(3), Disagree (DA)(2),and Strongly disagreed (SD)(1).

### 3.4. Validity and Reliability of the Instrument

In order to determine the validity of the instrument, sample of the structured questionnaire was given to the researcher's supervisor for face and content validity of the instrument. Also the instrument was subjected to the critical appraisal of experts in Measurement and Evaluation which fielded a validity index of 0.67students instruments.

Furthermore, the instruments were pilot tested on a small portion of the target population who are not part of the sampled respondents. The instruments were pilot tested on ten (10) students from Cyprus international university. This was to determine the reliability of the instruments. Split Half Method of estimating reliability was employed to compute coefficient of internal consistency. The reliability coefficient was 0.86 for student attitude and adaption questionnaire.

# CHAPTER IV
# PRESENTATION OF DATA AND ANALYSIS RESULT

This chapter is divided into three sections. The first is the characteristics of the respondents' where the demographic section is examined. Secondly is the characteristics of the measurement scale used employed in the study and thirdly, discussion of the analysis of the research.

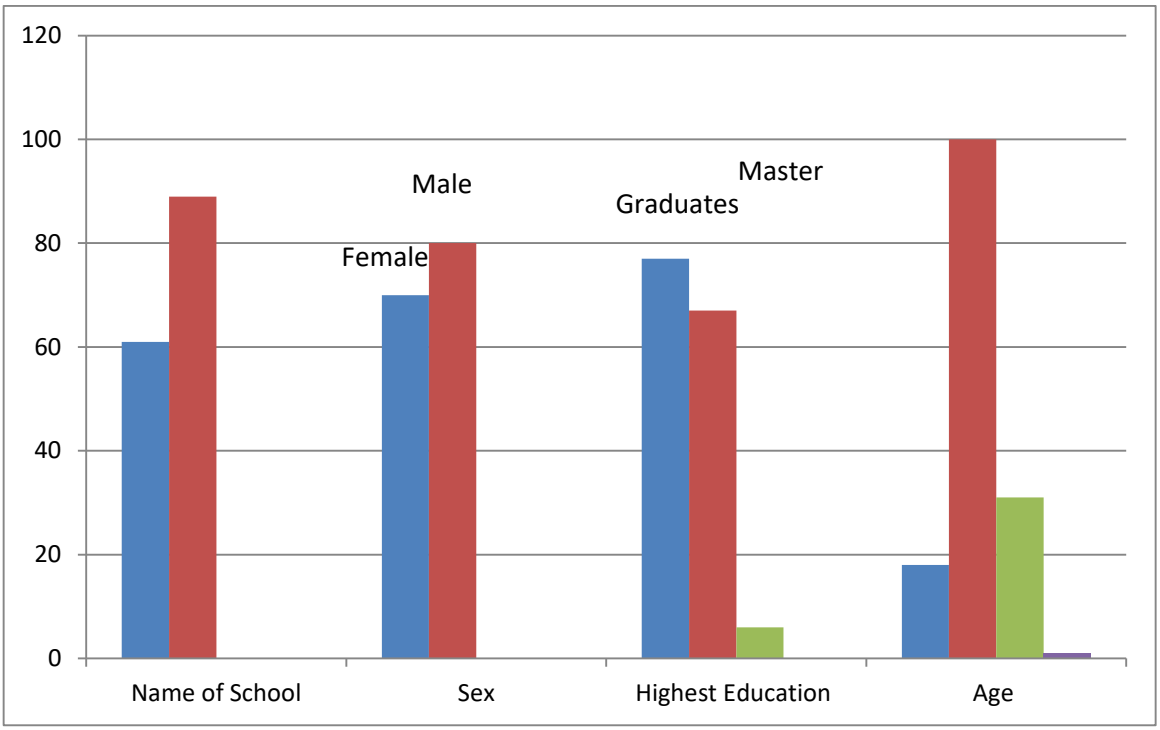
## 4.1. Respondents' characteristics

The profile of the respondents' with respects to school, sex, education, age and country is shown below:

**Table2.** Socio-demographic Variables of the Sample

| | | **n (%)** |
|---|---|---|
| **Institution** | NEU | 89 (59.3) |
| | CIU | 61 (40.7) |
| **Gender** | Female | 70 (46.7) |
| | Male | 80 (53.3) |
| **Age** | Below 20 | 18 (12.0) |
| | 21-30 | 100 (66.7) |
| | 31-40 | 31 (20.7) |
| | 41-above | 1 (0.7) |
| **Education Qualification** | Undergraduate | 77 (51.3) |
| | Masters | 67 (44.7) |
| | PhD | 6 (4.0) |

**Figure1.** A histogram showing the socio-demographic characteristics of respondents




From table 2 and figure 2 above, majority of the respondents were from NEU represented by 59.3% which were mostly male with 53.3%, age range between 21-30 represented by 66.7% and mostly undergraduate 51.3%.

### 4.2. Presentation and analysis of data.

Data are presented according to the research questions that were stated to guide the study.

#### 4.2.1. Research question 1.

What is the perception of students on global climate change?

**Table3.** Descriptive statistics of students' perception on global climate change

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 1 | Global Climate change is a major problem facing the world today. | 132 (88) | 18 (12) | 150 100 | 3.31 | 0.786 |
| 2 | Increase in the amount of greenhouse in the atmosphere can alter the atmosphere. | 12 (8) | 138 (92) | 150 100 | 1.69 | 0.655 |
| 3 | Trapped greenhouse gases in the atmosphere make us experience warmer climate. | 12 (8) | 138 (92) | 150 100 | 1.67 | 0.680 |
| 4 | The high summer heat waves during summer months in Cyprus have to with global warming. | 105 (70) | 45 (30) | 150 100 | 2.92 | 1.078 |
| 5 | Environmental problems should be government top priority. | 42 (28) | 108 (72) | 150 100 | 2.12 | 1.022 |
| 6 | Global Climate Change has been established as a serious problem and immediate action is needed. | 148 (98.6) | 2 (1.3) | 150 100 | 3.47 | 0.575 |
| 7 | I believe we will have to live with and adapt to a warmer climate. | 132 (89.3) | 16 (10.7) | 150 100 | 3.22 | 0.812 |
| 8 | Do you believe that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off? | 49 (32.7) | 101 (67.4) | 150 100 | 2.12 | 1.080 |
| 9 | High summer heat waves we experience might have a connection with global warming. | 120 (80) | 30 (20) | 150 100 | 3.01 | 0.905 |

To provide a clearer position of respondents on each issue considering that there can be only two positions of agree or disagree, therefore, the two agree columns and disagree columns were added together for the purpose of interpretation (Nkom, 1982 cited in Kukwi, 2003).

Therefore, from table 3 item 1 shows that 88% of the respondents strongly agree that global climate change is a major problem facing the world today. However, only 12% of the respondent selected for the study disagree that global climate change is a major problem facing the world today.

From item 2, minority of the respondents represented 8% of the students agree that increase in the amount of greenhouse gases in the atmosphere can alter the climate. However, 92% of the respondents used for the study disagree that increase in the amount of greenhouse gases in the atmosphere can alter the climate.

From item 3, minority of the respondents represented by 8% of the students agree that trapped greenhouse gases in the atmosphere make us experience more warmer climate. However, 92% of the respondents used for the study disagree that trapped greenhouse gases in the atmosphere make us experience warmer climate.

From item 4, majority of the respondents represented by 70% agree that the high heat waves during summer months in Cyprus has to do with global warming. On the contrary, 30% of the respondents disagree that the high summer heat waves during experience in summer months in has to do with global climate change.

Again, from item 5, minority of respondents represented by only 28% agree that environmental problems should be government top priority. However, 72% which are majority of the respondents disagree that environmental problems should be government top priority.

From item 6, majority of the respondents represented by 98.6% agree that global climate change has been agreed to be a serious problem and immediate action is necessary.

However, 1.4 of the respondents disagree that climate change has been established as a serious problem and immediate action is necessary.

Also, from item 7, majority of the respondents which are 89.3% of the respondents agree that they believe we will learn to live with and adapt to a warmer climate. However, 10.7 % of the respondents used for the study disagree that we will learn to live with and adapt to a warmer climate.

Furthermore, from item 8, 32.7% of the respondents agree that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off. However, 67% of the respondents disagree that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off.

Finally, from item 9, majority of the respondents represented by 80% agree that high summer heat wave might have a connection with global warming.

**Table4.Comparison of view of students on global climate change and gender**

| Variable | N | Mean | S.d | DF | T | P |
|---|---|---|---|---|---|---|
| Female | 70 | 23.91 | 2.98 | | | |
| | | | | 148 | 1.562 | 0.120 |
| Male | 80 | 23.23 | 2.42 | | | |

Show the comparison of gender and view of students on global climate change. From the t-test result presented in table 4 above, there is no statistically significant relationship between view of the participant on global climate change and their gender ($t=1.562$, $p>0.05$)

### 4.2.2. Research question 2.

What is student perception on summer heat waves as it influences academic performance?

**Table5.Descriptive Statistics of student's perception on influence of summer heat waves to academic performance**

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 10 | Cyprus summers are unbearable | 146 (97.3) | 4 (2.6) | 150 100 | 3.50 | 0.59 |
| 11 | All the rooms in my apartment are fully equipped with air conditions. | 24 (16) | 126 (84) | 150 100 | 1.85 | 0.59 |
| 12 | I enjoy studying in my room without air condition in summer months. | 108 (72) | 42 (28) | 150 100 | 3.04 | 0.91 |
| 13 | The high heat waves do not allow me to sleep well at night. Hence, I get weak in the morning and have difficulty assimilating while studying. | 87 (58) | 63 (42) | 150 100 | 2.7 | 1.13 |
| 14 | Despite I have air-condition, I prefer using fan to minimize payment of electricity bill. | 148 (98) | 2 (1.3) | 150 100 | 3.36 | 0.91 |
| 15 | Generally, I have problem studying in summer due to the high heat waves. | 120 (80) | 30 (20) | 150 100 | 3.12 | 0.91 |
| 16 | I have solar panel connected to my apartment. | 23 (18.3) | 127 (84.7) | 150 100 | 1.71 | 0.91 |
| 17 | The solar panel in my apartment is connected to my air condition. | 29 (19.3) | 121 (81.4) | 150 100 | 1.83 | 0.91 |
| 18 | Due to the high heat waves, I don't take summer school. | 88 (58.7) | 62 (41.3) | 150 100 | 2.67 | 1.96 |
| 19 | Global warming might be the reason for this hot summer in Cyprus. | 135 (90) | 15 (10) | 150 100 | 3.27 | 0.96 |
| 20 | My academic performance always improves in summer. | 35 (23.3) | 115 (76.6) | 150 100 | 1.93 | 0.95 |
| 21 | I do not have air condition in my room. Hence I use fan. | 141 (94) | 9 (8) | 150 100 | 3.43 | 0.67 |
| 22 | The noise of my fan does not allow me to study and sleep well. | 132 (88) | 18 (12) | 150 100 | 3.26 | 0.83 |

This research question seeks to determine the perception of students on the influence of summer heat waves to academic performance. Descriptive statistics were used to determine mean scores, standard deviations, frequencies and percentages which were used in this analysis. In the analysis, strongly agree and agree were categorized as agree while strongly disagree and disagree are categorized as disagree. The result of the analysis is presented in table 5 mean score above or below 2.5 was considered positive and negative respectively. The minimum and maximum frequencies were 2 and 148 respectively and the mean score ranged from minimum of 1.79 (SD=0.91) to maximum of 3.50 (SD= 0.59). Generally, the students have positive perception about the influence of high summer heat waves on their academic performance.

**Table6.**Comparison of view of summer heat waves according to nationality of the participants

| | **N** | **Mean** | **S.d** | **F** | **P** |
|---|---|---|---|---|---|
| Nigeria | 65 | 35.5 | 3.11 | 1.36 | 0.182 |
| Cameroon | 17 | 34.9 | 2.12 | | |
| Zimbabwe | 19 | 37.8 | 3.43 | | |
| Kenya | 6 | 36.1 | 3.66 | | |
| Zambia | 5 | 35.2 | 2.05 | | |
| Congo | 5 | 34.4 | 4.28 | | |
| Lebanon | 3 | 36.3 | 3.06 | | |
| Botswana | 7 | 37.4 | 0.53 | | |
| Rwanda | 6 | 36.8 | 2.56 | | |
| S/ Africa | 2 | 35.0 | 1.41 | | |
| Gambia | 3 | 36.0 | 1.73 | | |
| Ghana | 6 | 37.0 | 2.79 | | |
| Tanzania | 2 | 34.0 | 2.83 | | |
| Uganda | 4 | 34.0 | 3.56 | | |

From the ANOVA result presented in table 6 in above, there is no statistical relationship between summer heat waves and nationalities of the participants (F=1.369, P>0.005). Therefore, irrespective of the nationality of these African students, the heat wave is affects their academics.

### 4.2.3. Research question 3

What is student perception to physical, social and learning environment to students' academic performance?

**Table7**. Descriptive Statistics on perception of students on the influence of physical, social and learning environment on academic performance?

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 23 | I always want to be in school in summer. | 15 (10) | 135 (90) | 150 100 | 1.7 | 0.73 |
| 24 | I feel comfortable with the learning environment in my school. | 100 (66) | 50 (33) | 150 100 | 2.87 | 0.95 |
| 25 | Good school ecology enhances students' performance. | 114 (76) | 36 (24) | 150 100 | 2.96 | 0.97 |
| 26 | I have gardens in my school where I usually sit and study in summer month after library and classroom. | 30 (20) | 120 (80) | 150 100 | 2.01 | 0.85 |
| 27 | I feel comfortable with the learning environment in my school. | 73 (48.7) | 77 (51.3) | 150 100 | 2.51 | 0.91 |
| 28 | My academic performance is always high in summer. | 46 (30.6) | 104 (69.4) | 150 100 | 2.18 | 1.04 |
| 29 | School climate is a major factor that affects students' performance | 112 (74.7) | 38 (25.3) | 150 100 | 2.98 | 1.04 |

This research question was to find out the perception of the students on the influence of physical, social and learning environment to students' academic performance. The result of the analysis is presented in table 7 the minimum and maximum frequencies of the students responses to the questionnaire were 135 and 15 respectively. And the mean scores ranged from 1.7 (SD = 0.73) to 2.98 (SD = 1.04). Therefore, there is a positive perception on physical, social and learning environment to students' academic performance.

**Table8.** Comparison of view of students on Physical, social living environment with education status of the students.

| | N | Mean | S.d | F | P |
|---|---|---|---|---|---|
| Undergraduate | 77 | 18 | 2.49 | | |
| | | | | 3.261 | 0.041 |
| Masters | 67 | 17 | 2.75 | | |
| PhD | 6 | 18 | 2.67 | | |

From the table above, there is a statistically significant relationship between the view of students' on physical environment and education. ($f=3.261$, $p<0.05$)

### 4.2.4. Research question 4.

What is student perception on transportation system?

**Table9.** Descriptive Statistics on perception on the influence of good transport system in summer on students' academic performance.

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 30 | I always look forward to joining the school bus. | 41 (27.3) | 109 (72.6) | 150 100 | 2.19 | 1.05 |
| 31 | I always feel safe and comfortable in my school bus. | 102 (68) | 48 (32) | 150 100 | 2.85 | 1.08 |
| 32 | My school bus is usually fully air conditioned in summer months. | 39 (26) | 111 (74) | 150 100 | 1.92 | 0.09 |
| 33 | I wish I can join another school bus. | 99 (66) | 51 (34) | 150 100 | 3.00 | 1.06 |
| 34 | I wish I can join another school bus not my school bus. | 88 (58.6) | 62 (41.3) | 150 100 | 2.62 | 1.38 |

This research question seeks the perception of students on good transportation system. The result of the analysis is presented in table 9 in above, the minimum and maximum frequencies of the students responses to the questionnaire were 39 and 150

respectively. And the mean scores ranged from 1.92 (SD = 1.05) to 3.00 (SD = 1.06). Therefore, there is a negative perception on the transportation system of students

**Table10.**Comparison of view of respondents on students on transport and school of studies

| | **N** | **Mean** | **S.d** | **T** | **P** |
|---|---|---|---|---|---|
| Ciu | 61 | 10.93 | 2.26 | | |
| | | | | -7.604 | 0.00 |
| Neu | 89 | 13.67 | 2.10 | | |

From the t-test result above, there is a statistical significant relationship between view on students transport and school.

# CHAPTER V
# CONCLUSION AND RECOMMENDATIONS

In this chapter, we will see; Restatement of the Problem, Description of the Problem, summary of findings and Recommendations.

## 5.1. Restatement of the Problem

Complains from African students on the high heat waves experienced in North Cyprus during summer months (July, August, September), lack of gardens in school to sit and study, lack of air condition in students transportation buses, lack of air condition in students accommodation, lack of solar panels in students accommodation, high electricity bill associated with using air condition all these constituted effects of summer heat waves which amount to poor academic performance of students enrolling in summer school in NEU and CIU. Therefore, the thrust of the study is to assess the influence of summer heat waves on students' academic performance in North Cyprus.

## 5.2. Description of Procedures

The study made use of cross-sectional correlation survey research design as a plan for data collection. The population of the study consisted of 150 students of near east and Cyprus international university. A questionnaire was developed consisting of 34 items that revealed the components of summer heat waves were based on four (4) points Likert type scale and were administered to 150. The questionnaire was first pilot tested to determine reliability. Finally, the questionnaires were administered to the students and scores were obtained for analysis.

## 5.3. Summary of Major Findings

The study seeks to assess the influence of summer heat waves on students' performance. To achieve the set objectives, four research questions were raised. To solve this research questions, descriptive statistics were computed using SPSS 21.0.

Perception of the students on global climate change reveals that most of the students know of global climate change but do not know the cause. This is revealed in research question 1 ‘perception of students on global climate change’

Analysis of the data revealed that there is a positive relationship between summer heat waves and students’ academic performance. That school climate influences students’ academic performance in a direct manner whenever school climate improves, students’ performance also improve and vice versa. Senge (1994) defines school climate in terms of four components of school environment which include: physical environment that is welcoming and conducive to learning, social environment that promotes communication and interaction, effective environment that promotes a sense of belonging and self-esteem and academic environment that promotes learning and self-fulfillment. In addition, Cotton, (1996) identified some areas as component of school climate to include: appearance and physical plant, student interactions, leadership, learning environment, attitude and culture and school community relations. But Cedeno L. et al, (2016) believed unfriendly heat waves experienced by the populace resulting in subclinical system like but not limited to cognitive function deficits. This Cognitive function deficits according to him results from indoor thermal conditions experienced during the period of high and extremely hot Heat Waves as experienced in Cyprus it extend beyond vulnerable populations.

He also added that sustainable adaptation measures in buildings to preserve educational attainment, economic productivity, and safety in a fast evolving climate should be an integral part of every building. Therefore, research question 2-4 relate learning environment, physical environment and social environment of the school to students’ performance which are all components of school climate. All of these components influence students’ performance in a direct manner. This findings implies that students need a conducive accommodation and school climate in summer to explore their potentials to the fullest. Therefore, research question 2-4 relate learning environment, physical environment and social environment of the school to students’ performance which are all components of school climate. All of these components influence students’

performance in a direct manner. This findings implies that students need a conducive accommodation and school climate in summer to explore their potentials to the fullest.

Generally, table 4.1 shows the mean score range between 1.67 – 3.47.The highest mean is for global climate change is generally agreed to be a serious problem and immediate action is needed (3.47), while the lowest is for 'trapped greenhouse gases in the atmosphere makes us experience more warmer climate' (1.67). In view of this, it shows the average level of perception and awareness on issues related to the environment. The respondents are aware of global climate change but do not know the causes of climate change.

Table 4.2 shows that the mean scores range between1.71-3.50. the highest is for Cyprus summers are unbearable (3.50) with the lowest for my academic performance always improve in summer (1.71), which indicate that the respondents find Cyprus summer very unbearable which make them not to perform well during summer school.

Table 4.3 shows the mean scores range between 1.7 – 2.98, the highest is for school climate is a major factor that affects students' performance (2.98) while the lowest is I always want to be in school in summer, which implies that the nature of school climate affects students' academic performance, the students don't like coming to school in summer months. Now, if you attend classes during summer school how do you pass?

Table 4.4, the mean score range between1.92 - 3.00, the highest is for 'I wish I can join another school bus in summer. This shows that the heat wave is unfriendly and the students' transportation system to school is not motivating students to be in school during summer months.

General conclusion according to the research is that heat waves make students lazy and unable to perform at their maximum capability, thereby affecting their academic performance.

**5.4. Recommendations**

i. School administrators and stakeholders and government should adopt school climate as a priority and put in more innovations to enhance students learning.

ii. It is seen that the students' knowledge on the danger of climate change is relatively not low, but the causes of this climate change is yet unknown to so many students. It is important for teachers, environmental education students, non-governmental organizations to develop projects or set up groups such as peer sensitization groups to enlighten the students on the causes of this global climate change.

iii. Building engineers should equip all the rooms in the apartment with air condition.

iv. Government should build a fully equipped air condition hostels for students, students in such hostels should be exempted from paying high tax on electricity especially during summer months (July, August and September) which will enable students to use the air condition and at the same time will encourage more student to enroll in summer school.

v. Some students faint in school buses in summer. Some of the students feel discourage going to school during summer months due to the heat waves. School bus of the institutions should be fully air conditioned for the summer period. To motivate the students.

vi. Because the summer heat wave is a major concern to a lot of students, it could play a role in realizing the general objectives of environmental education. By using it to sensitize the students about environmental education.

vii. Education is the bedrock of every society and university education is seen as the apex level of education, elective environmental causes should be made mandatory for students studying all courses, because if knowledge about the environment is lacking, how can we collectively take care of our climate?

viii. There should be more gardens for students to relax and study in schools outside the physical structures of the library and the classroom.

ix. Most of the respondents are from third world countries and cannot afford to use the electricity air condition. Government should ensure solar panels are mounted in all buildings and connected to the air condition to enable students enjoy air condition in summer months and solar is environment friendly.

x. All the students school buses should be equipped with air condition especially during the months of July, August and September so that the buses are comfortable to join.

xi. Further research should be carried out in the whole of Northern Cyprus so results can be generalized.

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*Appendix-1.*

**Research Topic:** THE EFFECT OF SUMMER HEAT WAVES (TEMPERATURE) ON STUDENTS' ACADEMIC PERFORMANCE IN NEAR EAST AND CYPRUS INTERNATIONAL UNIVERSITY, CYPRUS.

Dear Respondent,

I am a master's student from Near East University, Cyprus undertaking a research on the above mentioned topic in order to ascertain your perception on global warming, summer heat waves, physical, social and learning environment, accommodation condition, of student's apartment in Cyprus during summer months.

Your information will be kept confidential and will be used only for the purpose of this research.

Please kindly respond to the questions.

Thanks for your maximum co-operation.

**Murna SYLVESTER**

**January, 2019**

**Nicosia**

*Appendix-2.*

## QUESTIONNAIRE

### SECTION A: Personal Data of Respondent

Introduction: Kindly tick (√) or fill in the spaces provided in the question below

1. Name of School_____

2. Sex ☐ M ☐ F

3. Country_____

4. Highest education qualification

☐ ☐ ☐ ☐ ☐ ☐

5. Age range 10-20 21-30 31-40 41-50 51-60 61- above

### SECTION B: View of Respondent on summer heat wave.

The following statements described various aspects of high summer heat wave kindly tick one of the options (SA, A, DA, SD, ) which most closely describe your view.

Key: SA = STRONGLY AGREED

A = AGREED

DA = DISAGREED

SD = STRONGLY DISAGREED

**VIEW OF RESPONDENT ON GLOBAL WARMING**

| S/N | STATEMENT | SA | A | SD | D |
|---|---|---|---|---|---|
| 1 | Global climate change is a major problem facing the world today | | | | |
| 2 | Increase in the amount of greenhouse gases in the atmosphere can alter the climate | | | | |
| 3 | Trapped greenhouse gases in the atmosphere make us experience more warmer climate | | | | |
| 4 | The high summer heat waves during summer has nothing do with global warming | | | | |
| 5 | Environmental problems should be government top priority | | | | |
| 6 | Global climate change has been established as a serious problem and immediate action is necessary | | | | |
| 7 | I believe we will learn to live with and adapt to a warmer climate | | | | |
| 8 | Do you believe that we have a responsibility to look out for the environment in the interests of future generations even if it means ourselves worse off? | | | | |
| 9 | High summer heat wave we experience might have a connection with global warming | | | | |

**SECTION C: THE VIEW OF STUDENTS ON SUMMER.**

| S/N | STATEMENT | SA | A | SD | D |
|---|---|---|---|---|---|
| 10 | Cyprus summers are unbearable | | | | |
| 11 | All the rooms in my apartment are fully equipped with air-conditions. | | | | |
| 12 | I enjoy studying in my room without air condition in summer months | | | | |
| 13 | The high heat waves do not allow me to sleep well at night. Hence, I get weak in the morning and have difficulty assimilating while studying | | | | |
| 14 | Despite I have an air-condition I refer using fan to minimize payment of electricity bill | | | | |
| 15 | Generally, I have problem studying in summer due to the high heat waves | | | | |
| 16 | I have solar panel connected to my apartment | | | | |
| 17 | The solar panel in my apartment is connected to my air condition | | | | |
| 18 | Due to the high heat waves, I don't take summer school, I prefer to travel back to my home country | | | | |
| 19 | Global warming might be the reason for this hot summer in Cyprus. | | | | |
| 20 | My academic performance always improve in summer | | | | |
| 21 | I do not have air condition in my room. Hence I use fan | | | | |
| 22 | The noise from my fan do not allow me to sleep well | | | | |

**SECTION D: The View of Students on Physical Environment.**

| S/N | STATEMENT | SA | A | SD | D |
|---|---|---|---|---|---|
| 23 | I always want to be in school in summer | | | | |
| 24 | I feel comfortable with the learning environment in my school | | | | |
| 25 | Good school ecology enhances students' performance | | | | |
| 26 | I have gardens in my school where I usually sit and study in summer month after library and classroom | | | | |
| 27 | I always want to be in school because the environment is summer friendly | | | | |
| 28 | My academic performance is always high in summer | | | | |
| 29 | School climate is a major factor that affects students' performance | | | | |

**SECTION D: The View of Students on Transport System.**

| S/N | STATEMENT | SA | A | SD | D |
|---|---|---|---|---|---|
| 30 | I always look forward to joining the school bus | | | | |
| 31 | I always feel safe and comfortable in my school bus | | | | |
| 32 | My school bus is fully air conditioned in summer months | | | | |
| 33 | I wish I can join another school bus in summer | | | | |
| 34 | My school buses do not motivate me to go to school or go out in summer. | | | | |

*Appendix-3.*

## CURRICULUM VITAE

I am Murna SYLVESTER was born on 30/12/1989 in Nigeria. I started my studies from 1993-1999 and obtained my first school leaving certificate, 2000-2006 I attended high school and obtained my Secondary School Leaving Certificate (SSCE), 2006-2010, I attended Nasarawa State University, Nigeria and obtained a B.Sc (Hons.) in Geology and Mining with a second class Upper Division. 2014 – 2015 I attended Ahmadu Bello University, Zaria Nigeria where I obtained a Postgraduate Diploma in Education with an Upper Credit. 2016 – 2018 I attended Near East University, Northern Cyprus and obtained a Master's degree in Environmental Education and Management.

# Thesis

*by* Murna Selvester

**Submission date:** 01-May-2019 04:05PM (UTC+0300)
**Submission ID:** 1122816582
**File name:** 3._Introduction_01.04.2019.docx (108.1K)
**Word count:** 8957
**Character count:** 47790

# CHAPTER I
# INTRODUCTION

## 1.0. Background of the study

Heat waves vary greatly from place to place and region to region. Whereas some heat waves are mild, moderate, friendly and inviting others feel high, exasperating, extreme, unwelcoming, unbearable and even unsafe. Heat wave is a period characterized by abnormally uncomfortably hot and humid weather (Todd, 2000). Due to variations in regions of the world, the time duration and temperature required to be a HWs depends on the daily local average temperature in a particular place over a period of time. It could last for at least a period of a day, weeks and months depending on the severity of the heat wave. A temperature of $90^0$F ($32.2^0$C) and above consecutively for a period of 3 or more days is said to be heat wave but cannot be generalized due to the comfort criteria and temperature considered normal from place to place (Glossary of Meteorology).

Trapped air in the atmosphere due to excess greenhouse gases could be the cause of HWs. Our earth atmosphere is circulated by air that moves in large prevailing winds, when this moving air is trapped in a particular region, such regions tends to get more warmer with temperatures extremely high and could be termed HWs. (Donev et al, 2016). When air hits the lower atmosphere, the greenhouse gases act as shield or umbrella forcing the air downward preventing the air from rising or reflected back into the upper atmosphere thereby not leading to rainfall. (NOAA, 2016).

Global climate change crises deepen and the earth atmospheric temperature increases by the day. Global climate change might be the cause of the extreme heat waves. 21$^{st}$century climate is very unstable and unpredictable by constantly changing. This claim is ascertain by scientist drilled down ice in Antarctica and Greenland to recover core samples and were able to estimate the earth average temperature over a period of time. Although, there are many signs or effects of global climate change temperature remains the easily parameter to measure and estimate than rainfall amongst others (IPCC, 2001b).

Although our climate has completely changed with harsh weather extremes but a next level of climate change is unavoidable because there is already a lag between greenhouse gas emissions and global warming (IPCC, 2014a; USDA, 2013). Greenhouse gases have already been trapped in the atmosphere, even if emissions are to stop, the Earth's land surfaces would continue to warm for decades and its oceans for centuries due to past emissions (USDA, 2013). Climate scientists called this phenomenon a committed warming (IPCC, 2014a). Global temperatures will continue to increase due to committed warming and future emissions if nothing is done (IPCC, 2014a).

U.N. General Assembly in 1949 came to a consensus that everyone has the right to education making education a fundamental right of any individual. Education is seen as a way of molding an inexperienced person to help them develop physically, mentally, socially, emotionally, spiritually, politically, economically and otherwise (Nwangwu, 2006). Education is one of the fundamental rights of individuals.

Effective learning cannot take place without considering the school climate, environmental factors or the living conditions around and about the learner. School climate is the entire conditions (physical and physiological)in a school system necessary for effective learning to take place. These conditions could be changed if they do not support teaching and learning (Beady & Brook O., 2003).Education is multidimensional (that is, physical, social and academic) in construct Comer (1993).

Comer (1993) Physical dimension is the complete infrastructural development of the school, (nature size of school and classroom) percentage of students assign to a teacher, how organize is the school and its orderliness.

Social dimension; do the students have good rapport among themselves? Do the staffs, teachers and students have good relationship? Degree of competition and social comparison between the students and teachers, contributions of students and staffs in making important decisions that promote effective learning.

Academic dimension; this dimension shows the quality of instruction students have received, teacher monitoring expectation from the students in terms of achievement. How prompt is the teacher in reporting results to students and parents?.

A good and conducive environment is key to safety, effective learning and development DFES (2006); because a good school climate promotes effective students' performance and comprises all the students, teachers, staffs and the entire people within the school community Therefore, a good school climate should be spacious, conducive and allow time for students' interaction during teaching and learning process.

A lot of problems seem to bedevil the students thereby affecting the students' academic performance. Students' academic performance needs to be high in order to meet the country´s goal for political, economic and social sustainable development

Nieto (1992) argues that factors affecting a child's (student) educational achievement include the culture of the school a child (student) attends, the attitude of the principal and teachers to their students motivation, the value transmitted by the school in general as well as the school climate. But Cedeno L. et al, 2016) believed that cognitive function deficit as a result of high indoor thermal conditions experienced during heat waves is one of the many health challenges associated with heat waves. Therefore, he highlighted the need for buildings to be equip with sustainable and good adaptation measures to building in this fast changing climate for the population to feel safe, achieve good educational attainment and be economically productive.

Therefore the need to assess the influence of summer heat wave on students' academic performance in near east university, Cyprus becomes significant.

### 1.1. Problem

Discussing with many international students in North Cyprus about the high heat waves in the summer months of July, August and September, and how many students prefer to travel back to their home countries, others prefer to stay back indoors and

reluctant to apply or enroll in summer school, seated in a school bus for almost an hour without the air-condition their inability to identify if these high heat waves are likely to be connected with the two weather extremes. Realizing that the problem of global warming, global climate change, and high mortality rate due to heat wave to some extend have received attention. However, one area that has not received attention in recent time is the effect of heat wave on cognitive function of students, nature of school climate that exist in schools and the accommodation condition of students which influences students' academic performance. The physical environment is vital to the achievement of educational objectives. The learning and living environment is integral in ensuring a permanent change in behavior. Many students accommodation condition are not motivating students toward learning as well. The social environment creates an opportunity for learning to take place, there exist a wide gap in relationship between students living environment and students learning environment in most schools. It is based on this premise that it becomes imperative to investigate the influence of summer heat waves on students' academic performance in near east university, Cyprus.

### 1.1.1. Sub Problem

The research attempts to find answers to the perception of students' on the following:

- Global warming and how it effect on academic performance
- Summer heat waves and it influence on academic performance?
- What is the perception of students' on physical, social, learning (school climate) and accommodation environment in summer as it influences academic performance.
- What is the perception of students on students' transportation system during summer and its influence students' academic performance?

## 1.2. Aims and objectives of the research

The purpose of this research is to ascertain the effect of summer heat waves on students' academic performance in NEU and CIU Cyprus. The objective is to find a relationship between the demographic the students:

i. Find out if there is a relationship between view of students on global climate change and gender as it influences students' academic performance.

ii. Ascertain the relationship between view of students on summer heat waves and Nationality.

iii. Determine the relationship between view of students on physical, social, learning (school climate) and living (accommodation) and level of education on students' academic performance.

iv. Determine the relationship between view on students transport system and school

**1.3. The Importance of the Study**

The study examined the effect of high summer heat waves on students' academic performance, hence the findings might be useful in identifying a well air-conditioned accommodation during summer as a factor influencing students' academic performance. This could offer empirical evidence for the difference in students' academic performance in the different weather seasons. Hence, recommendations there from if implemented would enhance students' performance in July, August and September, thus improving overall educational system.

It will guide students towards the right choice of study environment and accommodation to rent in other to achieve better academic output.

The study would also add to the body of knowledge in the subject thereby availing other researchers a pedestal for further studies on the subject.

The findings of the study would also reveal to building engineers on the need to equip buildings with adequate windows for cross ventilation and each room with air-condition or cooling appliances.

The need for government to ensure the installation of cooling appliances in buildings, for a conducive living accommodation and learning environment during high summer months.

The study will help government to ensure the installation of solar panels on houses that are meant to be rented out to student to ease their payment of electricity.

Nevertheless, the outcome of this study would avail policy-makers in the education and other sectors with information on the need for the review of policies necessary to ensure positive school climate, effective teaching and learning, well air-conditioned accommodation and transport systems.

Summarily, the study would provide research on summer heat wave and its overall impact on students' performance and offer strategies that could help support student achieved in their academics in NEU and CIU, Cyprus.

**1.4. Assumptions**

The following assumptions formed the basic assumptions of the study;

- Student's perception on the effects of summer heat wave on students' academic performance.
- The thought of getting into the school bus without air condition in summer affects the physcology of the student, hence affecting students' performance.
- The accommodation conditions of students during high summer heat waves affect the performance of students.
- Physical environment of the school affect the academic performance of students.

## 1.5. Limitations

- This study was limited to 150students participants
- Questionnaire were limited to its aims and objectives
- Participants were limited to Africa students, selected from NEU and CIU in Northern Cyprus.

## 1.6. Definition of Terms

These terms should be read and understand as defined below:

**Summer:** summer as the hottest seasons of the year, starting after spring and before autumn with shortest nights and longest days (Zhang, F. et al, 2017).

**Heat wave (HW):**Centers for Disease Control and Prevention (C.D.C.) defined heat wave as '' high temperatures of 10 degrees and above average temperature considered high in a particular region, it could last from days, weeks to months.'' Which can invariably be seen as a period of hot weather normally two or more days consecutively, exceeding the average temperature of a particular place or region (Görmez, 2010).

**Student academic performance:** This refers to an outcome of all academic tasks or rigors of a student which could be poorly or successfully stated. (Ilıya, 2014).

**Learning environment:** An environment for learning is the influence and condition a learner comes in contact with, resulting in a series of interactions (which could be complex) to ensure a permanent change in behavior in such students (Garipağaoğlu, 2011). Examples, the teachers' ability to help the students when they don't understand, commending excellent performances, testing students based on what they learnt, the teachers teaching methodology etc. (Ilıya, 2015)

**Physical environment:** This is the environment where student feel safe, cared for and relaxed, with support of adequate and relevant infrastructural facilities such as buildings, comfortable furniture, well ventilated classrooms and staffroom, well maintained rest room, clean school environment and necessary equipment (Ilıya, 2015).

# CHAPTER II

# REVIEW OF RELATED LITRATURE

## 2.0. Overview

An age-old phenomenon, climate change can happen due to rise in population levels, expansion of land for agricultural purposes, innovations, housing and road construction leading to reduction in forest and trees, high cost of living, technological advancements and industrialization amongst others. According to the results of IPCC, (2013), the level of Greenhouse Gases has surpassed the highest levels of concentrations on earth over the last 800,000 years. This greenhouse effect, in turn, is causing increased rainfall, hot weather extremes, flooding, droughts, cyclones and reduction in level of glaciers. Rise in precipitation levels has been observed in Northern Europe, eastern parts of North America, South America, Northern Asia as well as Central Asia. Tropics and Sub tropics have been facing severe and long lasting droughts since 1970s whereas places like Sahel, Southern Africa and Central Asia have parched lands (Aggarwal, 2008). IPCC in its 4th Assessment Reported that vigorous activities performed by humans since 1750 has resulted in atmospheric concentrations of Carbon-dioxide, Methane and Nitrous Oxide around the world. The level of greenhouse gases has now exceeded the preindustrial values that existed thousands of years ago.

We are yet to experience extreme global temperatures. Temperatures continue to get warmer, temperatures that seems high today will become common in few years to come (Meehl, G.A., 2004), and there are public health implications associated with this fast emerging change in climate. (NASA, 2016) was recorded the warmest year in the last 200 years with records of deaths, more deaths running into thousands in a year is expected in the United States by year 2100 (Sarofim, et al, 2016).Heat waves will keep increasing in intensity, duration, frequency as average surface temperatures increases due to climate change(Solomon, S. 2007).

The health effect of extreme heat waves has been focused on the elderly and children but in reality these effects affects the general population. Some these health effects on the

general population include subclinical symptoms e.g. cognitive function deficit. (Dai L. et al, 2016, Zhang F, 2017. Zanobetti, A. et al, 2013).

## 2.1. Climate and Climate Change

Intergovernmental Panel on Climate Change in its fourth assessment report, climate change is ascertained by using statistical tests which shows changes in statistical properties and persists for a period of time. Although, there are natural causes of climate change but anthropogenic activities e.g. land use, agriculture, industries, burning of fossil fuel etc., has been major contributors to the concentration of greenhouse gases in the atmosphere thereby increasing the average surface temperature. (Blondel, Bodiou & Boeur, 2010),

Increase in average surface temperature results in changes in frequency, intensity, spatial extent, duration and timing of extreme weather, climate events and unprecedented extreme weather and climate events (IPCC, 2012).

Available data revealed there has been dramatic decrease in the number of cold days with increase in the number of warm days (IPCC, 2014).

### 2.1.1. Recent Work on Heat Waves on Cognitive Function

Jose Guillerno Cedeno Laurent of Harvard School of Public Health carried out a research in 2016on the effects of heat waves on students' cognitive thinking on university students in U.S. He said hot living condition could affect students' memory, their way of thinking and daily activities. In their methodology, 44 students were sampled with an average age of 20 years. 24 students were kept in an air-condition apartment and 20 students under non-air-condition apartment to live during heat waves. Two cognitive tests were administered to the sampled students on a daily basis for 12 consecutive days. The test was to assess selective attention and at the same time processing speed, another test was a 2-digit visual addition/ subtraction test to evaluate their cognitive speed and working memory. After which the effect of the heat waves was evaluated by the use of difference-in-difference modeling method. The found out individuals in non-air-condition apartments experienced a low cognitive function with respect to the air-condition group.

The research also revealed these low-cognitive function might be as a result of high thermal load with other environmental influences such as ventilation, acoustics and other behavioral factors such as hydration and sleep amongst others that reflect heat exposure in real life.

The research therefore highlighted the need for mandatory incorporation of sustainable adaptation of measures to buildings in this fast changing climate in order to enhance and preserve educational attainments, economic productivity and safety. Some experimental evidences, epidemiological and econometric studies also revealed high effects of heat exposure in productivity, learning ability and morbidity and mortality in humans.

## 2.2. Climate in Cyprus

North Cyprus is within the temperate zone lying between latitudes 34º34ˈand 35º51ˈN.(İlseven-Hıdırer-Tümer, 2014). The prevailing climate is classified as Mediterranean, with the summers hot and dry and the winters mild with low rainfall. Depressions in the Mediterranean basin generally travel form west to east. Lying in its eastern part, North Cyprus is thus usually shielded from their influence and being in any case at a more southerly latitude than most of the west Mediterranean region it enjoys an eastern Mediterranean type of climate (Ilseven 2004). In summer, the angle of incidence of the sun's rays is such as to produce a subtropical climate extremely hot and dry. The country is characterized by the Kyrenia range, coastal areas and the central plain. The country's Central Plain is shielded from the influence of the sea and because of its consequent low humidity daily and annual temperature variations greater here than elsewhere. This is the driest part of the island with average annual rainfall measuring 318mm in the eastern part and as a little as 290mm in the western. It also has the sparest vegetation, conditioned by low humidity, temperatures reaching the forties and the occurrence of winter frost (Ilseven 2004).

## 2.3. Ecological Conditions in Cyprus

### 2.3.1. Geographical Position

Cyprus lies at the easternmost end of the Mediterranean basin and is the third largest island of the Mediterranean after Sicily and Sardinia. The longitude of Cyprus is 33°20' and the latitude is 35°12' north. Its area is 9251 square kilometers.

Although the climate of Cyprus is related to its geographical position, overall it may be described as typically Mediterranean. Its main characteristics are the prolonged and hot summer and the short, rainy and mild winter. The Troodos mountain range and, to a lesser degree, the Pentadakylos mountain range play an importance role in the meteorological conditions and the formation of natural phenomena. The surrounding sea also contributes to the creation of natural phenomena along the coasts (İlseven, 2017).

The average annual rainfall is about 480 mm, but its distribution is greatly determined by the island's pattern of relief. Annual rainfall in the Chionistra area can be as high as 1100 mm, while on the central plain it averages only 300 mm. Rainfall on the Pentadakytlos mountain range averages 55o mm annually. Snow-fall is usually restricted to altitudes above 1000 m and rarely reaches 3 m at Chionistra peak (1952 m).

Like rainfall, temperature is also influenced by the island's relief and the surrounding sea. The mean daily temperatures in July and August range between 29°C on the central plain and 22°C at the higher altitudes of the Troodos mountain range, while the respective mean daily temperatures in January are 10°C and 3°C. The average daily sunshine is 5.5 hours in winter and 11.5 hours in summer. Also, the average relative humidity fluctuatesbetween 60-80% in winter and 40-60% in summer; at mid-day in the summer it is about 30% and occasionally as low as 15% (İlseven & Bastaş, 2018).

### 2.4. Concept of the Environment

It is known that the environmental concerns did not showed up suddenly but is due to course and has become the key it is today. After World War II, human effects on nature have increased intensely because of the technological change in manufacturing. It was 1940s when the synthetic products, which are one of the important reasons of environmental destruction and which were used also in 2009, were first manufactured. Especially, it was after World War II when the problem of destroying wastes of the plastic substance was arisen Clark (2001). Presentation of nuclear energy as an alternative

during the usage of the atom bomb also happened after the war. Moreover, the synthetic products of which usage was increased after the war started to be used also in daily life. Meanwhile, consumption has also been increasing together with the increase in population. Many factors like the usage of fertilizer in agriculture, increasing usage of chemicals to destroy pests and plants and increasing usage of motor vehicles in transportation technology has expedited the destruction of the environment. Therefore, coming up against the environmental concerns/problems for humans was majorly started with manufacturing technologies and its products which were developed by humans themselves again after World War II (Foster, 2002)

Due to the fact that the nature is able to regenerate itself, the relationship between humans and their environment kept going in a certain and harmonious way from the first ages to the Industrial Revolution. After the Industrial Revolution, the harmony between humans and the nature started to go bad, a challenge which humanity with the nature has been going on since its existence. This challenge which was at first just about needs of housing, eating and wearing continued in a balanced way until the middle age. Yet, after the middle age, humans started to win much more in this challenge. Humans 'effort to take all the control of the nature became a kind of ambition to the nature after the Industrial Revolution. With the development of the technology and thus, the industry, humans ignored the harm they caused to the environment from 1800s to the end of the 20$^{th}$ century (Görmez, 2003).

The nature responds to what it gets. As the desire of humans for taking control of all the nature and using it much more increased, the nature started to show reaction prominently to this situation-especially, after the second half of 20$^{th}$ century. Because its reaction was just regional and small-scale at first, it didn't draw much attention. But, because of the fact that problems such as the global warming which increases day by day; changes in the climate; the ozone layer being depleted; and, as a results of all these, drought, famine and hunger, the interest in environmental concerns also increased.

The reason why the concept of environment has gained importance and become the main topic of mankind is not totally but partly pollution and global climate change.

After the Industrial Revolution, the nature has been damaged and rapidly by over using its self-regeneration capability by humans. The environmental pollution has become visible together with the wave of economic growth and industrialization gaining speed, the environmental pollution has increased as well. Just for improving and maintaining their industries, especially developed countries polluted their environments in and from which they produce their products and supply their raw materials. Furthermore, just to supply raw materials, those countries polluted not only their own countries but also most of the countries for which they use the resources; so, the extent of the pollution becomes greater. Besides, all this, with the desires for scientific and technological development and economic growth, the environmental pollution influencing all over the world has become a kind of threat to the living beings (Yücel, 2006).

### 2.4.1. The Factors Causing Environmental Concerns

It is known that the environmental concerns did not show up suddenly but in due course and it has become the way it is today (Keleş ve Ertan, 2002)

The main factor which caused and developed the environmental problems is the rapid technological development occurring in the last 40-50 years and correspondingly developing economical change. Both of these processes adherents to each other have led people to use natural resources excessively by increasing human necessities in an enormous rate. Furthermore, population quantity and variety of industrial products, technical tools and social equipment's also increased; and therefore, consumption human desire to consume also increased incredibly. As the result of this, developments started to shake, and destruct the life of all living beings; and made the World unlivable (Çepel, 2003)

It is known that there are various reasons causing environmental problems and all those reasons have been revealed in different ways by different experts. But in general terms, when taking the subject in hand we see that the main reasons are; unawareness of people about how the destruction of the nature they cause will affect them; the wrong

idea that the nature can regenerate itself whatever happens; and population increase at the present time in large numbers.

The assumption that all the environmental problems are just because of science and technology means not to see the other reasons of the problems and so not to be able to find solutions.

There are two kinds of approaches to environmental problems. The first one is that degeneration of ecology's and social system's balance might foreshadow of a new balance. The problem should be incrementally analyzed in system and the system integrity should not be disrupted. The second one is to claim that environmental problems cannot be solved unless there is revolution in mentality and the attitude and reform suggestions will just delay the solution. The common thread to both of these approaches is to accept that the roots of the environment problems are the problems in mentality. This mentality is the idea is to enlighten which makes the human mind the only power to effect contributing the development of modern science and technology and which enables unlimited right to humans to change the nature. It is inevitable that the mentality with these features which put human in the center of everything causes disturbance of the natural balance (Demir, 2007).

## 2.5. Economic Impacts of International Students in North Cyprus

Cyprus is an island in the Eastern Mediterranean with area coverage of 9,251square kilometers with TRNC 3,355 square kilometers. It borders Turkey to the north, Syria and Israel to the east, Egypt to the south and Greece to the west. Like many island states, North Cyprus based its development on the services sector. Tourism and higher education were chosen as the leading sectors which have been contributing to the economic development of the island significantly (Katricioglu et..al, 1996). According to the TRNC Public Relations Department 2014 Higher education is a rapidly growing sector in the TRNC. The TRNC Universities, except the Anatolia University offer instruction in English. The number of students pursuing higher education in the above-mentioned universities is 73,894 from 110 different countries in the 2014 -2015 academic

year. Out of this amount, 17,440 are Turkish Cypriots, 36,823 are Turkish and 19,631 foreign students.Ilseven, S. (2017) said the number of students pursuing higher education in the 2016 -2017 academic year is 13,573 which are Turkish Cypriots, 52,112 are Turkish and 27,538 foreign students.

**Table1.** 2016-2017 Number Of Students Registered In The TRNC Universities According To Nationality.

| N | LOCATION | SCHOOL NAME | NORTH CYPRUS | TURKISH | 3rd COUNTRIES | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Lefkosa | Near east university | 5469 | 14250 | 6358 | 26077 |
| 2 | Lefkosa | Cyprus International University | 1103 | 7991 | 5944 | 15038 |
| 3 | Lefkosa | Akadeniz Karpaz University | 206 | 103 | 382 | 691 |
| 4 | Lefkosa | Cyprus American University | 1 | 99 | 6 | 106 |
| 5 | Lefkosa | Cyprus Social Science University | 9 | 388 | 0 | 397 |
| 6 | Gazimagusa | Eastern Mediterranean University | 3149 | 8507 | 7910 | 19566 |
| 7 | Gazimagusa | Istanbul Technical University | 3 | 323 | 18 | 344 |
| 8 | Girne | Girne American University | 2497 | 10079 | 4675 | 17251 |
| 9 | Girne | Cyprus Science University | 60 | 129 | 112 | 301 |
| 10 | Girne | Girne University | 73 | 879 | 266 | 1218 |
| 11 | Girne | International Final University | 23 | 0 | 44 | 67 |
| 12 | Guzelyurt | Lefke European University | 743 | 7186 | 1238 | 9167 |
| 13 | Guzelyurt | Middle East Technical University | 178 | 2178 | 562 | 2918 |
| 14 | Guzelyurt | Cyprus Health and Social Sciences university | 59 | 0 | 23 | 82 |
| | | | 13573 | 52112 | 27538 | 93223 |
| | | | 14.6 | 55.9 | 29.5 | |

Source: (Ilseven, 2017)

From the table above, the importance of international students in the economic growth of TRNC cannot be over emphasized. Bicak and Katircioglu (1996)in their research on the economic impacts of the overseas students (both Turkish from the mainland Turkey and non-Turkish) on North Cyprus economy. In another research using the 1990 input-output tables and the input-output technique, the impacts of Turkish and overseas students spending's in EMU and their relatives visiting North Cyprus in the year 1994/1995 was also calculated. 180 questionnaires were given at the Eastern Mediterranean University in order to find out the expenditure patterns of 4,007 overseas students (OS) and their relatives that visit north Cyprus. Survey results found out that the

average annual expenditure of overseas students and their relatives is higher than the average annual expenditure of the Turkish students which is due to longer stay of the overseas students than the Turkish students in north Cyprus within a year. The total expenditure of the overseas students and their relatives constitute 5.66% of the GNP of North Cyprus. It is calculated the expenditure of the TS, the OSS studying at EMU and their relatives visiting North Cyprus added 227.38 to the income per head of the North Cyprus.

With the increase in the inflow of overseas students to study in the universities in North Cyprus, it is expected that the number of international students has increase which also increased their role in the growth of the Cyprus economy.

In 1991 a survey was carried out in 5 universities in Cyprus in order to generalize the results on the impacts of the overseas students in Cyprus. They found out that the spending of the overseas students and their relatives generated $31.0m of the gross output and 22.8m income and resulted in $2.8m imports. Also, the output, income and imports generated by the total overseas students were 9.3%, 6.9% and 0.9% respectively of the GNP of that year. The increase in the share of the impact in the GNP from 1991 through to 1994 can be accounted mainly to the increase in the total number of the overseas students from 4,004 in 1991 to 8,099 in 1994 (salihturan, 1994,İlseven 2017)They concluded that the average output, income and imports generation in the two studies were almost the same, indicating that there has not been any significant change in the pattern of expenditures of the overseas students in the concern years.

Therefore, it is important to meet the expectations of the international students in Cyprus and provide them with a good environment (Salih 2006). Salih recommended that the living expenses can be reduced by building dormitories and shopping centers for the students. Besides, the government can provide incentives to the private sector to build flats at the university sights by exempting them from various taxes.

# CHAPTER III
# RESEARCH METHOD

This chapter describes how data relating to students attitude and adaptation to heat waves during summer months in near east and Cyprus international university, northern Cyprus were collected and analyzed. It is focused on research model, research design, area, population of the study, sample and sampling technique, instrumentation, validation and reliability of instruments, method of data collection, and data analysis.

## 3.1. Research model

The descriptive survey research design was employed in this study. Survey research design is a data collection technique in which information is gathered from individual called respondents (Otuka, Azare and Ogunsala, 2004). The study is cross-sectional survey because it will require data to be collected at a particular time from a large sample, for the purpose of describing the population to be presented by the sample at that particular time. Cross sectional design involve the collection of data within a short span of time from a simple random sample of the targeted population Anikweze (2009). This design is considered suitable because it will assist in establishing the relationship in university students' perception, attitude and adaptation to heat waves during summer months in, northern Cyprus.

## 3.2. Population and participants of the Study

The population of the study consists of students from NEU and CIU northern Cyprus. The participant of the study consists of 150 respondents that would voluntarily complete the questionnaire. All the samples would be in the two institutions which makes the research more convenient and flexible.

## 3.3. Instrumentation

The instruments for the study were questionnaires structured by the researcher. One questionnaire was developed, consisting of two sections i.e section A and B, section A comprises of personal data (demographic) of respondent while section B comprises of

views of respondent on attitude and adaptation to summer heat waves. The questionnaire is made up of thirty four (34) items centered on the three elements of global warming, attitude and adaption to heat waves. The questionnaire was design on a modified LIKERT scale of four (4) points of rating as follows: Strongly Agreed (SA)(4), Agreed (A)(3), Disagree (DA)(2),and Strongly disagreed (SD)(1).

### 3.4. Validity and Reliability of the Instrument

In order to determine the validity of the instrument, sample of the structured questionnaire was given to the researcher's supervisor for face and content validity of the instrument (Obradovich, N. 2017). Also the instrument was subjected to the critical appraisal of experts in Measurement and Evaluation which fielded a validity index of 0.67students instruments.

Furthermore, the instruments were pilot tested on a small portion of the target population who are not part of the sampled respondents. The instruments were pilot tested on ten (10) students from Cyprus international university. This was to determine the reliability of the instruments. Split Half Method of estimating reliability was employed to compute coefficient of internal consistency. The reliability coefficient was 0.86 for student attitude and adaption questionnaire.

# CHAPTER IV
# PRESENTATION OF DATA AND ANALYSIS RESULT

This chapter is divided into three sections. The first is the characteristics of the respondents' where the demographic section is examined. Secondly is the characteristics of the measurement scale used employed in the study and thirdly, discussion of the analysis of the research.

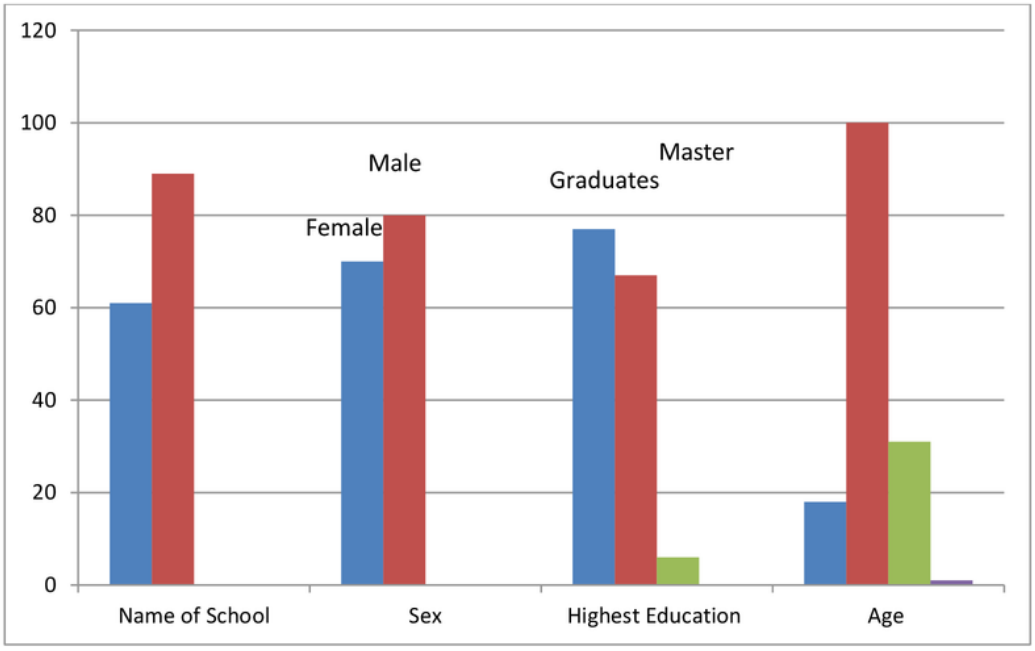
## 4.1. Respondents' characteristics

The profile of the respondents' with respects to school, sex, education, age and country is shown below:

**Table2.** Socio-demographic Variables of the Sample

| | | n (%) |
|---|---|---|
| **Institution** | NEU | 89 (59.3) |
| | CIU | 61 (40.7) |
| **Gender** | Female | 70 (46.7) |
| | Male | 80 (53.3) |
| **Age** | Below 20 | 18 (12.0) |
| | 21-30 | 100 (66.7) |
| | 31-40 | 31 (20.7) |
| | 41-above | 1 (0.7) |
| **Education Qualification** | Undergraduate | 77 (51.3) |
| | Masters | 67 (44.7) |
| | PhD | 6 (4.0) |

**Figure1.** A histogram showing the socio-demographic characteristics of respondents




From table 2 and figure 2 above, majority of the respondents were from NEU represented by 59.3% which were mostly male with 53.3%, age range between 21-30 represented by 66.7% and mostly undergraduate 51.3%.

### 4.2. Presentation and analysis of data.

Data are presented according to the research questions that were stated to guide the study.

#### 4.2.1. Research question 1.

What is the perception of students on global climate change?

**Table3.** Descriptive statistics of students' perception on global climate change

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 1 | Global Climate change is a major problem facing the world today. | 132 (88) | 18 (12) | 150 100 | 3.31 | 0.786 |
| 2 | Increase in the amount of greenhouse in the atmosphere can alter the atmosphere. | 12 (8) | 138 (92) | 150 100 | 1.69 | 0.655 |
| 3 | Trapped greenhouse gases in the atmosphere make us experience warmer climate. | 12 (8) | 138 (92) | 150 100 | 1.67 | 0.680 |
| 4 | The high summer heat waves during summer months in Cyprus have to with global warming. | 105 (70) | 45 (30) | 150 100 | 2.92 | 1.078 |
| 5 | Environmental problems should be government top priority. | 42 (28) | 108 (72) | 150 100 | 2.12 | 1.022 |
| 6 | Global Climate Change has been established as a serious problem and immediate action is needed. | 148 (98.6) | 2 (1.3) | 150 100 | 3.47 | 0.575 |
| 7 | I believe we will have to live with and adapt to a warmer climate. | 132 (89.3) | 16 (10.7) | 150 100 | 3.22 | 0.812 |
| 8 | Do you believe that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off? | 49 (32.7) | 101 (67.4) | 150 100 | 2.12 | 1.080 |
| 9 | High summer heat waves we experience might have a connection with global warming. | 120 (80) | 30 (20) | 150 100 | 3.01 | 0.905 |

To provide a clearer position of respondents on each issue considering that there can be only two positions of agree or disagree, therefore, the two agree columns and

disagree columns were added together for the purpose of interpretation (Nkom, 1982 cited in Kukwi, 2003).

Therefore, from table 3 item 1 shows that 88% of the respondents strongly agree that global climate change is a major problem facing the world today. However, only 12% of the respondent selected for the study disagree that global climate change is a major problem facing the world today.

From item 2, minority of the respondents represented 8% of the students agree that increase in the amount of greenhouse gases in the atmosphere can alter the climate. However, 92% of the respondents used for the study disagree that increase in the amount of greenhouse gases in the atmosphere can alter the climate.

From item 3, minority of the respondents represented by 8% of the students agree that trapped greenhouse gases in the atmosphere make us experience more warmer climate. However, 92% of the respondents used for the study disagree that trapped greenhouse gases in the atmosphere make us experience warmer climate.

From item 4, majority of the respondents represented by 70% agree that the high heat waves during summer months in Cyprus has to do with global warming. On the contrary, 30% of the respondents disagree that the high summer heat waves during experience in summer months in has to do with global climate change.

Again, from item 5, minority of respondents represented by only 28% agree that environmental problems should be government top priority. However, 72% which are majority of the respondents disagree that environmental problems should be government top priority.

From item 6, majority of the respondents represented by 98.6% agree that global climate change has been agreed to be a serious problem and immediate action is necessary. However, 1.4 of the respondents disagree that climate change has been established as a serious problem and immediate action is necessary.

Also, from item 7, majority of the respondents which are 89.3% of the respondents agree that they believe we will learn to live with and adapt to a warmer

climate. However, 10.7 % of the respondents used for the study disagree that we will learn to live with and adapt to a warmer climate.

Furthermore, from item 8, 32.7% of the respondents agree that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off. However, 67% of the respondents disagree that we have a responsibility to look out for the environment in the interest of future generations even if it means ourselves worse off.

Finally, from item 9, majority of the respondents represented by 80% agree that high summer heat wave might have a connection with global warming.

**Table4.Comparison of view of students on global climate change and gender**

| Variable | N | Mean | S.d | DF | T | P |
|---|---|---|---|---|---|---|
| Female | 70 | 23.91 | 2.98 | | | |
| | | | | 148 | 1.562 | 0.120 |
| Male | 80 | 23.23 | 2.42 | | | |

Show the comparison of gender and view of students on global climate change. From the t-test result presented in table 4 above, there is no statistically significant relationship between view of the participant on global climate change and their gender( t=1.562, p>0.05)

### 4.2.2. Research question 2.

What is student perception on summer heat waves as it influences academic performance?

**Table5.Descriptive Statistics of student's perception on influence of summer heat waves to academic performance**

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 10 | Cyprus summers are unbearable | 146 (97.3) | 4 (2.6) | 150 100 | 3.50 | 0.59 |
| 11 | All the rooms in my apartment are fully equipped with air conditions. | 24 (16) | 126 (84) | 150 100 | 1.85 | 0.59 |
| 12 | I enjoy studying in my room without air condition in summer months. | 108 (72) | 42 (28) | 150 100 | 3.04 | 0.91 |
| 13 | The high heat waves do not allow me to sleep well at night. Hence, I get weak in the morning and have difficulty assimilating while studying. | 87 (58) | 63 (42) | 150 100 | 2.7 | 1.13 |
| 14 | Despite I have air-condition, I prefer using fan to minimize payment of electricity bill. | 148 (98) | 2 (1.3) | 150 100 | 3.36 | 0.91 |
| 15 | Generally, I have problem studying in summer due to the high heat waves. | 120 (80) | 30 (20) | 150 100 | 3.12 | 0.91 |
| 16 | I have solar panel connected to my apartment. | 23 (18.3) | 127 (84.7) | 150 100 | 1.71 | 0.91 |
| 17 | The solar panel in my apartment is connected to my air condition. | 29 (19.3) | 121 (81.4) | 150 100 | 1.83 | 0.91 |
| 18 | Due to the high heat waves, I don't take summer school. | 88 (58.7) | 62 (41.3) | 150 100 | 2.67 | 1.96 |
| 19 | Global warming might be the reason for this hot summer in Cyprus. | 135 (90) | 15 (10) | 150 100 | 3.27 | 0.96 |
| 20 | My academic performance always improves in summer. | 35 (23.3) | 115 (76.6) | 150 100 | 1.93 | 0.95 |
| 21 | I do not have air condition in my room. Hence I use fan. | 141 (94) | 9 (8) | 150 100 | 3.43 | 0.67 |
| 22 | The noise of my fan does not allow me to study and sleep well. | 132 (88) | 18 (12) | 150 100 | 3.26 | 0.83 |

This research question seeks to determine the perception of students on the influence of summer heat waves to academic performance. Descriptive statistics were used to determine mean scores, standard deviations, frequencies and percentages which were used in this analysis. In the analysis, strongly agree and agree were categorized as agree while strongly disagree and disagree are categorized as disagree. The result of the analysis is presented in table 5 mean score above or below 2.5 was considered positive and negative respectively. The minimum and maximum frequencies were 2 and 148 respectively and the mean score ranged from minimum of 1.79 (SD=0.91) to maximum of 3.50 (SD= 0.59). Generally, the students have positive perception about the influence of high summer heat waves on their academic performance.

**Table6.**Comparison of view of summer heat waves according to nationality of the participants

| | N | Mean | S.d | F | P |
|---|---|---|---|---|---|
| Nigeria | 65 | 35.5 | 3.11 | 1.36 | 0.182 |
| Cameroon | 17 | 34.9 | 2.12 | | |
| Zimbabwe | 19 | 37.8 | 3.43 | | |
| Kenya | 6 | 36.1 | 3.66 | | |
| Zambia | 5 | 35.2 | 2.05 | | |
| Congo | 5 | 34.4 | 4.28 | | |
| Lebanon | 3 | 36.3 | 3.06 | | |
| Botswana | 7 | 37.4 | 0.53 | | |
| Rwanda | 6 | 36.8 | 2.56 | | |
| S/ Africa | 2 | 35.0 | 1.41 | | |
| Gambia | 3 | 36.0 | 1.73 | | |
| Ghana | 6 | 37.0 | 2.79 | | |
| Tanzania | 2 | 34.0 | 2.83 | | |
| Uganda | 4 | 34.0 | 3.56 | | |

From the ANOVA result presented in table 6 in above, there is no statistical relationship between summer heat waves and nationalities of the participants (F=1.369, P>0.005). Therefore, irrespective of the nationality of these African students, the heat wave is affects their academics.

### 4.2.3. Research question 3

What is student perception to physical, social and learning environment to students' academic performance?

**Table7**. Descriptive Statistics on perception of students on the influence of physical, social and learning environment on academic performance?

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 23 | I always want to be in school in summer. | 15 (10) | 135 (90) | 150 100 | 1.7 | 0.73 |
| 24 | I feel comfortable with the learning environment in my school. | 100 (66) | 50 (33) | 150 100 | 2.87 | 0.95 |
| 25 | Good school ecology enhances students' performance. | 114 (76) | 36 (24) | 150 100 | 2.96 | 0.97 |
| 26 | I have gardens in my school where I usually sit and study in summer month after library and classroom. | 30 (20) | 120 (80) | 150 100 | 2.01 | 0.85 |
| 27 | I feel comfortable with the learning environment in my school. | 73 (48.7) | 77 (51.3) | 150 100 | 2.51 | 0.91 |
| 28 | My academic performance is always high in summer. | 46 (30.6) | 104 (69.4) | 150 100 | 2.18 | 1.04 |
| 29 | School climate is a major factor that affects students' performance | 112 (74.7) | 38 (25.3) | 150 100 | 2.98 | 1.04 |

This research question was to find out the perception of the students on the influence of physical, social and learning environment to students' academic performance. The result of the analysis is presented in table 7 the minimum and maximum frequencies of the students responses to the questionnaire were 135 and 15 respectively. And the mean scores ranged from 1.7 (SD = 0.73) to 2.98 (SD = 1.04). Therefore, there is a positive perception on physical, social and learning environment to students' academic performance.

**Table8.** Comparison of view of students on Physical, social living environment with education status of the students.

| | N | Mean | S.d | F | P |
|---|---|---|---|---|---|
| Undergraduate | 77 | 18 | 2.49 | | |
| | | | | 3.261 | 0.041 |
| Masters | 67 | 17 | 2.75 | | |
| PhD | 6 | 18 | 2.67 | | |

From the table above, there is a statistically significant relationship between the view of students' on physical environment and education. (f=3.261, p<0.05)

### 4.2.4. Research question 4.

What is student perception on transportation system?

**Table9.** Descriptive Statistics on perception on the influence of good transport system in summer on students' academic performance.

| NO | Statement | Agree | Disagree | Total | Mean | S.D |
|---|---|---|---|---|---|---|
| 30 | I always look forward to joining the school bus. | 41 (27.3) | 109 (72.6) | 150 100 | 2.19 | 1.05 |
| 31 | I always feel safe and comfortable in my school bus. | 102 (68) | 48 (32) | 150 100 | 2.85 | 1.08 |
| 32 | My school bus is usually fully air conditioned in summer months. | 39 (26) | 111 (74) | 150 100 | 1.92 | 0.09 |
| 33 | I wish I can join another school bus. | 99 (66) | 51 (34) | 150 100 | 3.00 | 1.06 |
| 34 | I wish I can join another school bus not my school bus. | 88 (58.6) | 62 (41.3) | 150 100 | 2.62 | 1.38 |

This research question seeks the perception of students on good transportation system. The result of the analysis is presented in table 9 in above, the minimum and maximum frequencies of the students responses to the questionnaire were 39 and 150 respectively. And the mean scores ranged from 1.92 (SD = 1.05) to 3.00 (SD = 1.06). Therefore, there is a negative perception on the transportation system of students

**Table10.**Comparison of view of respondents on students on transport and school of studies

| | N | Mean | S.d | T | P |
|---|---|---|---|---|---|
| Ciu | 61 | 10.93 | 2.26 | | |
| | | | | -7.604 | 0.00 |
| Neu | 89 | 13.67 | 2.10 | | |

From the t-test result above, there is a statistical significant relationship between view on students transport and school.

# CHAPTER V
# CONCLUSION AND RECOMMENDATIONS

In this chapter, we will see; Restatement of the Problem, Description of the Problem, summary of findings and Recommendations.

## 5.1. Restatement of the Problem

Complains from African students on the high heat waves experienced in North Cyprus during summer months (July, August, September), lack of gardens in school to sit and study, lack of air condition in students transportation buses, lack of air condition in students accommodation, lack of solar panels in students accommodation, high electricity bill associated with using air condition all these constituted effects of summer heat waves which amount to poor academic performance of students enrolling in summer school in NEU and CIU. Therefore, the thrust of the study is to assess the influence of summer heat waves on students' academic performance in North Cyprus.

## 5.2. Description of Procedures

The study made use of cross-sectional correlation survey research design as a plan for data collection. The population of the study consisted of 150 students of near east and Cyprus international university. A questionnaire was developed consisting of 34 items that revealed the components of summer heat waves were based on four (4) points Likert type scale and were administered to 150. The questionnaire was first pilot tested to determine reliability. Finally, the questionnaires were administered to the students and scores were obtained for analysis.

## 5.3. Summary of Major Findings

The study seeks to assess the influence of summer heat waves on students' performance. To achieve the set objectives, four research questions were raised. To solve this research questions, descriptive statistics were computed using SPSS 21.0.

Perception of the students on global climate change reveals that most of the students know of global climate change but do not know the cause. This is revealed in research question 1 'perception of students on global climate change'

Analysis of the data revealed that there is a positive relationship between summer heat waves and students' academic performance. That school climate influences students' academic performance in a direct manner whenever school climate improves, students' performance also improve and vice versa. Senge (1994) defines school climate in terms of four components of school environment which include: physical environment that is welcoming and conducive to learning, social environment that promotes communication and interaction, effective environment that promotes a sense of belonging and self-esteem and academic environment that promotes learning and self-fulfillment. In addition, Cotton, (1996) identified some areas as component of school climate to include: appearance and physical plant, student interactions, leadership, learning environment, attitude and culture and school community relations. But Cedeno L. et al, (2016) believed unfriendly heat waves experienced by the populace resulting in subclinical system like but not limited to cognitive function deficits. This Cognitive function deficits according to him results from indoor thermal conditions experienced during the period of high and extremely hot Heat Waves as experienced in Cyprus it extend beyond vulnerable populations.

He also added that sustainable adaptation measures in buildings to preserve educational attainment, economic productivity, and safety in a fast evolving climate should be an integral part of every building. Therefore, research question 2-4 relate learning environment, physical environment and social environment of the school to students' performance which are all components of school climate. All of these components influence students' performance in a direct manner. This findings implies that students need a conducive accommodation and school climate in summer to explore their potentials to the fullest. Therefore, research question 2-4 relate learning environment, physical environment and social environment of the school to students' performance which are all components of school climate. All of these components influence students' performance in a direct manner. This findings implies that students

need a conducive accommodation and school climate in summer to explore their potentials to the fullest.

Generally, table 4.1 shows the mean score range between 1.67 – 3.47. The highest mean is for global climate change is generally agreed to be a serious problem and immediate action is needed (3.47), while the lowest is for 'trapped greenhouse gases in the atmosphere makes us experience more warmer climate' (1.67). In view of this, it shows the average level of perception and awareness on issues related to the environment. The respondents are aware of global climate change but do not know the causes of climate change.

Table 4.2 shows that the mean scores range between1.71-3.50. the highest is for Cyprus summers are unbearable (3.50) with the lowest for my academic performance always improve in summer (1.71), which indicate that the respondents find Cyprus summer very unbearable which make them not to perform well during summer school.

Table 4.3 shows the mean scores range between 1.7 – 2.98, the highest is for school climate is a major factor that affects students' performance (2.98) while the lowest is I always want to be in school in summer, which implies that the nature of school climate affects students' academic performance, the students don't like coming to school in summer months. Now, if you attend classes during summer school how do you pass?

Table 4.4, the mean score range between1.92 - 3.00, the highest is for 'I wish I can join another school bus in summer. This shows that the heat wave is unfriendly and the students' transportation system to school is not motivating students to be in school during summer months.

General conclusion according to the research is that heat waves make students lazy and unable to perform at their maximum capability, thereby affecting their academic performance.

**5.4. Recommendations**

i. School administrators and stakeholders and government should adopt school climate as a priority and put in more innovations to enhance students learning.

ii. It is seen that the students' knowledge on the danger of climate change is relatively not low, but the causes of this climate change is yet unknown to so many students. It is important for teachers, environmental education students, non-governmental organizations to develop projects or set up groups such as peer sensitization groups to enlighten the students on the causes of this global climate change.

iii. Building engineers should equip all the rooms in the apartment with air condition.

iv. Government should build a fully equipped air condition hostels for students, students in such hostels should be exempted from paying high tax on electricity especially during summer months (July, August and September) which will enable students to use the air condition and at the same time will encourage more student to enroll in summer school.

v. Some students faint in school buses in summer. Some of the students feel discourage going to school during summer months due to the heat waves. School bus of the institutions should be fully air conditioned for the summer period. To motivate the students.

vi. Because the summer heat wave is a major concern to a lot of students, it could play a role in realizing the general objectives of environmental education. By using it to sensitize the students about environmental education.

vii. Education is the bedrock of every society and university education is seen as the apex level of education, elective environmental causes should be made mandatory for students studying all courses, because if knowledge about the environment is lacking, how can we collectively take care of our climate?

viii. There should be more gardens for students to relax and study in schools outside the physical structures of the library and the classroom.

ix. Most of the respondents are from third world countries and cannot afford to use the electricity air condition. Government should ensure solar panels are mounted in all buildings and connected to the air condition to enable students enjoy air condition in summer months and solar is environment friendly.

x. All the students school buses should be equipped with air condition especially during the months of July, August and September so that the buses are comfortable to join.

xi. Further research should be carried out in the whole of Northern Cyprus so results can be generalized.

# Thesis

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