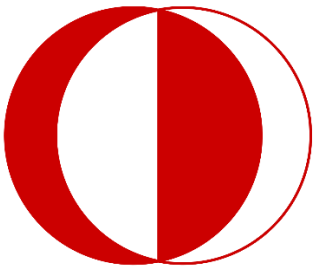
CLIMATE CHANGE AWARENESS of METU STUDENTS



A FINAL PROJECT REPORT SUBMITTED
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SAMPLING AND SURVEY TECHNIQUES
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ABSTRACT

The statistical study investigated the climate change awareness of METU students. The sample was created by the stratified sampling method according to departments. The survey was prepared to examine which situations affect the student's awareness level and behaviors. In the survey consisting of 17 questions, six of the questions were designed to collect personal information that is thought to affect awareness, and the other eight were asked to measure whether the participants' knowledge was translated into action. This subject is important since there is a lot of misconceptions about factors that affect the climate change awareness level. Therefore, to indicate these factors, and see the real relationship, this study is conducted. To do so, five main questions that focus on the main factors that students' awareness level and their behavior about climate change. Several statistical methods such as ANOVA, Z-Test, MANOVA, Correlation Test, Chi-Squared Test were used and visualized by box plots, post-hoc, and various other graphs. By those tests, it is appropriate to say that there are associations between climate change awareness level of students and social media usage time per day, period of learn climate change. Moreover, it can be said that students' behavior about climate change is affected by their gender, their faculties, and their parents' education level. However, there is not an association between the social media usage time and awareness of policies.

Keywords: Survey, climate change, awareness level, METU

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1. Introduction

Climate change refers to long-term shifts in temperature and weather patterns. These shifts may be due to natural causes, such as oscillations in the solar cycle. However, since the pre-Industrial period, the phrase "climate change" has been used to characterize changes in the Earth's climate caused mostly by human activity. Especially, the burning of fossil fuels and the destruction of forests has resulted in a rather rapid increase in carbon dioxide content in the atmosphere. In addition to this, energy, industry, transportation, buildings, agriculture, and land use are also all major polluters.

Oruonye (2011) defines climate change awareness as a "synthesis of conception, interpretation, and perceptions of climate change-related concerns, which influence people's behavior and the nature of their reactions to the problems." People with a high level of awareness consider it simpler to act on this issue. Climate action refers to activities aimed at adapting to and mitigating climate change in order to maintain a healthy and sustainable ecosystem (Akrofi, Antwi, and Jabulani 2019). Hence it is important for people to be aware of climate change.

The fundamental goal of this study is to better understand the level of climate change knowledge of METU students, the quality of action among students, and the variables that may influence climate change awareness among students. This study examines the factors that are thought to affect students' awareness level (age, faculty, period of awareness, etc.) and how their level of knowledge influences their activities, such as the use of plastic or the significance they place on recycling.

2. Literature

Despite allegations by some groups that there is no good evidence that human activities are affecting the Earth's climate, the scientific community is united that such data is clear and compelling. However, students know that humans affect Earth, but they are just responsible for their actions. In the past years, much research has been conducted to understand the factors that might be affecting a student's awareness of climate change. Halliru (2014) and Idris (2019) state that if students see climate change in all classes, they will be exposed to climate change concepts at the same level as their developed-world peers, with a greater willingness to positively influence

their environmental behavior. This is supported by Siegner's (2018) claim that successful climate change education will lead to climate action. Another study investigated that the respondents' level of climate change awareness was significantly influenced by their parents' educational status. The respondents whose parents are college students and graduates are more conscious of climate change than those whose parents are elementary and high school graduates and undergraduates, according to their mothers' and fathers' education. This could be since more educated parents have a higher level of environmental concern, which their children may have seen and witnessed (Ozturk et al.,2012).

3. Aim of Research

Climate change is one of the world's significant challenges in the twenty-first century. The sustainability of the earth's environment is dependent on students because they are the leaders of tomorrow in environment protection. The primary purpose of this research is to understand the level of climate change awareness, the quality of action among students, and the factors that may have an impact on climate change awareness among students. Also, we aim to spread awareness among students by directing questions about their daily behavior because they may realize what kind of consumer they are while responding to this questionnaire.

3.1. Research Philosophy

The Philosophy of this survey research is positivism because it is focused on research questions and hypotheses that can be examined and analyzed. The researcher's role in positivist research is to concentrate on facts, look for causes, and test hypotheses that have been formed. Positivism, as a theory, adheres to the belief that only "based on fact" information derived by observation, including measurement, is credible. In positivism, statistical probabilities are used to generalize.

4. Survey Methodology

4.1. Survey Design

4.1.1. Sample Design

In a survey, it is essential that have a group of people representing the whole population. The term "sample" refers to a small group of people. Following the appropriate sample selection, inferences about the entire population may be drawn using the information from the sample survey data. The sample design may be thought of as the platform for sample selection.

This study is conducted with METU undergraduate students, and the sample was determined according to the population by using stratified sampling according to faculties. The population of

undergraduate students is 19097 and their distribution by faculties is 48.7% in Engineering, 23.2 in Art and Sciences, 11.3% in Economic and Administrative Sciences, 9.5% in Education, and 7.4% in Architecture.

In this study, the sample was calculated as 643 by using the stratified sampling method according to faculties in order to make inferences about the climate change awareness of METU students. When calculating the sample, the confidence interval was considered as 5 confidence level 99%.

4.1.2. Methods of Data Collection

The strategies of collecting information from various sources are referred to as data collection. When it comes to obtaining information, there are a variety of options. This survey has been conducted online due to the Covid-19 situation. Thanks to this, the questionnaire had the advantage of easy accessibility and reached the maximum number of people on the METU campus. At the end of the responses, 616 students returned and were examined. The distribution of the sample according to faculties is 43.7% in Engineering, 20.1% in Science and Literature, 12.5% in Economics and Administrative Sciences, 12% in Education, and 11.7% in Architecture.

4.2. Questionnaire Design & Construction

The questionnaire design is one of the most significant aspects of survey design. The format and questions should be capable of effectively measuring the views, perceptions, and attitudes of the persons in the study. Correct random sampling and high response rates may be wasted if the questionnaire is not correctly structured. Moreover, questionnaire design is a complex process requiring several details to be paid attention to. The questionnaire design process can be complicated as questions can be answered in many ways, affecting how people respond to later questions on many different topics and questions asked earlier in a survey. Therefore, a pilot survey was conducted with 10 random students who were sent questionnaires to the participants, and it was determined whether there were any problems. The response time was approximately two (2) minutes. Questions were clear, there were not any irrelevant or misunderstood questions.

In the questionary, scaled questions were prepared to examine what people were doing about climate change. On a scale of 1 to 5, 1 meant never and 5 meant always in the questions. Moreover, following the data collection, an awareness score column was created to analyze the students' climate change behaviors. Those who acted consciously received the highest scores.

4.3 Methods of analysis

Statistical approaches included descriptive statistics and statistical tests. The statistical method of the identifier is represented by graphical methods and information tables that demonstrate frequency. As can be seen, this data also provides information that allows for visualization and identification of the data. Statistical tests will also be employed in various approaches, including ANOVA and normality testing. In addition, logistic regression methods will be used for modeling.

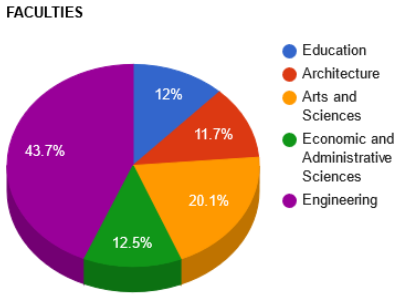
4.3.1 Descriptive Statistics

In this part, various graphical methods e.g., pie charts and bar charts, etc. have been used to be able to understand the dataset clearly at the first sight.

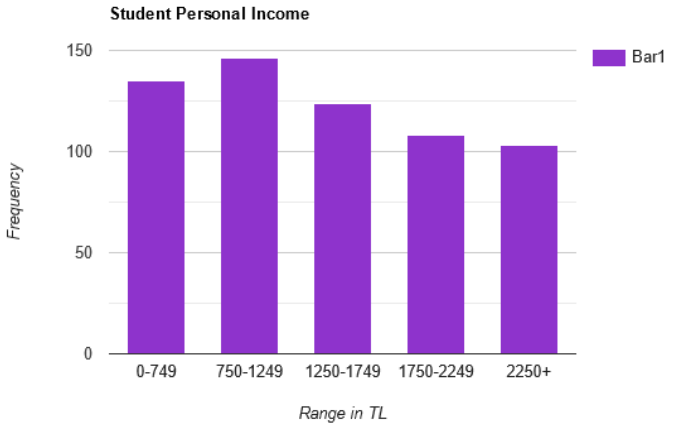
Gender Distribution

#	Gender	Frequency	Percentage
1	Male	271	44
2	Female	296	48
3	Prefer not to say	28	5
4	Others	21	3

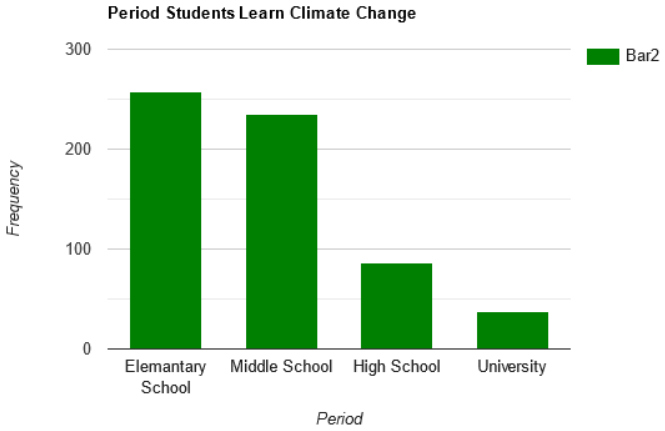
In this research, the numbers of female and male participants are close to each other that can be seen in Table 1 on the left. In addition to this, the distributions of percentages for female and male students are 48 and 44 respectively.



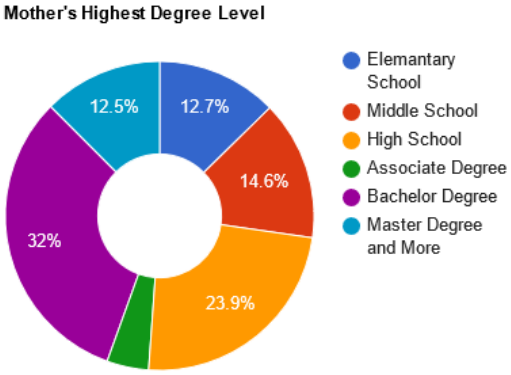
Distribution of the faculties of students has been shown with Figure 1 on the left—most of the students from our research by 43.7% from the Faculty of Engineering. Following the Faculty of Art and Sciences with 20%, Faculty of Economic and Administrative with 12.5%, Faculty of Education with 12%, Faculty of Architecture with 11.7%.



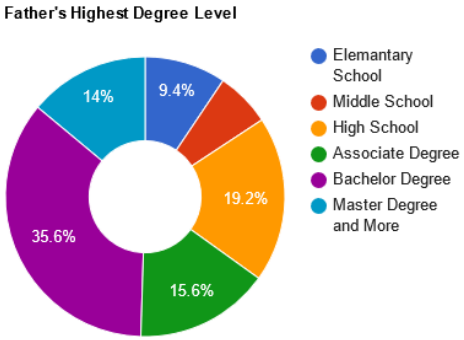
According to figure 2 on the left– most of the students' income is 750-1249 with the frequency of 146. Following the 135 student's income is in the range of 0-749, 124 student's income is in the range of 1250-1749, 108 student's income is in the range of 1750-2249, and 103 student's income is in the range of 2250+ TL.



In figure 3 on the left, it can be seen that most of the students at METU learned about climate change in Elementary school, with the number of 258. Followed by Middle school with the number 235. The rest of them learn it in High School with the number of 86 and University with 37.

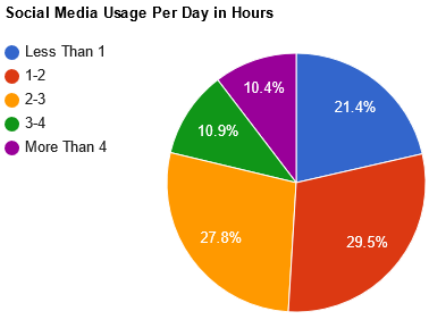


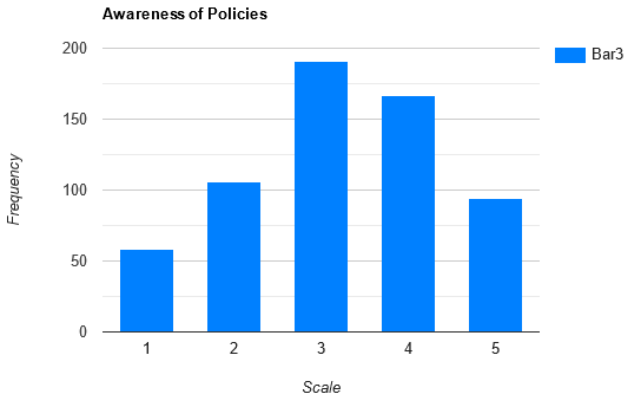
The distribution of the mother's highest education level has been shown in figure 4. Most of the student mother's highest education level is Bachelor degree by 32%. Following High school by 23.9%, Middle school by 14.6%, Elementary school by 12.7%, Master's degree and more by 12.5% and Associate degree by 4%.



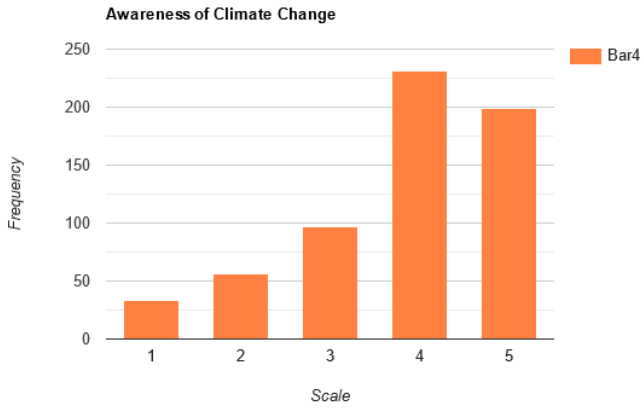
The distribution of the father's highest education level has been shown in figure 5. Most of the student fathers' highest education level is Bachelor degree by 35.6%. Following High school by 19.2%, Associate degree by 15.6%, Master's degree and more by 14%, Elementary school by 9.4% and Middle school by 6.3%.

According to this survey, social media usage has been shown in figure 6. 29.5% of METU students' social media usage is 1-2 hours, and 27.8% use social media 2-3 hours a day. In addition to this, 21.4% of students use less than 1 hour, 10.9% use 3-4 hours, and 10.4% use more than 4 hours a day.





In figure 7, students were asked about what they think about their awareness of climate change policies level. The majority of them rate themselves 3 points out of 5 by frequency of 191, following 4 points by frequency of 167, 2 points by 106, 5 points by 95, and 1 point by 58 students.



In figure 8, students were asked what they think about their climate change awareness level. Most of the students give themselves 4 and 5 points by frequency of 231 and 199, respectively. Ninety-seven of them give 3 points, 56 students give 2 points, and 33 give 1 point themselves.

4.3.2 Statistical Tests

This study uses statistical methods such as ANOVA, Z-Test, MANOVA, Correlation Test, Chi-Squared Test, and some data visualization methods like a boxplot line graph, etc. Also, collected data were analyzed using R Studio and Excel descriptive statistics.

5. Data Analysis, Findings, and Discussions

5.1 Does faculty is an essential factor in impressing climate change awareness behavior?

To check the significance of faculty on awareness behavior, an ANOVA test was used. Since the sample was large, normality was assumed, and homogeneity was checked with the Bartlett test.

H_O: all samples variances are equal.

H_A: at least two of them differ.

Bartlett Test of Homogeneity of Variances		
Data : Awareness Point by Faculty		
Bartlett's K-squared: 7.3987	Df: 4	P-value: 0.1163

P-value was greater than 0.05, Which means sample variances were equal. Also, there were no extreme outliers.

After those assumptions, an ANOVA test was used,

	Df	Sum Sq	Mean Sq	P-value
Faculty	4	82	20.497	0.0666
Residuals	611	5669	9.278	

H_O: The sample means are all equal.

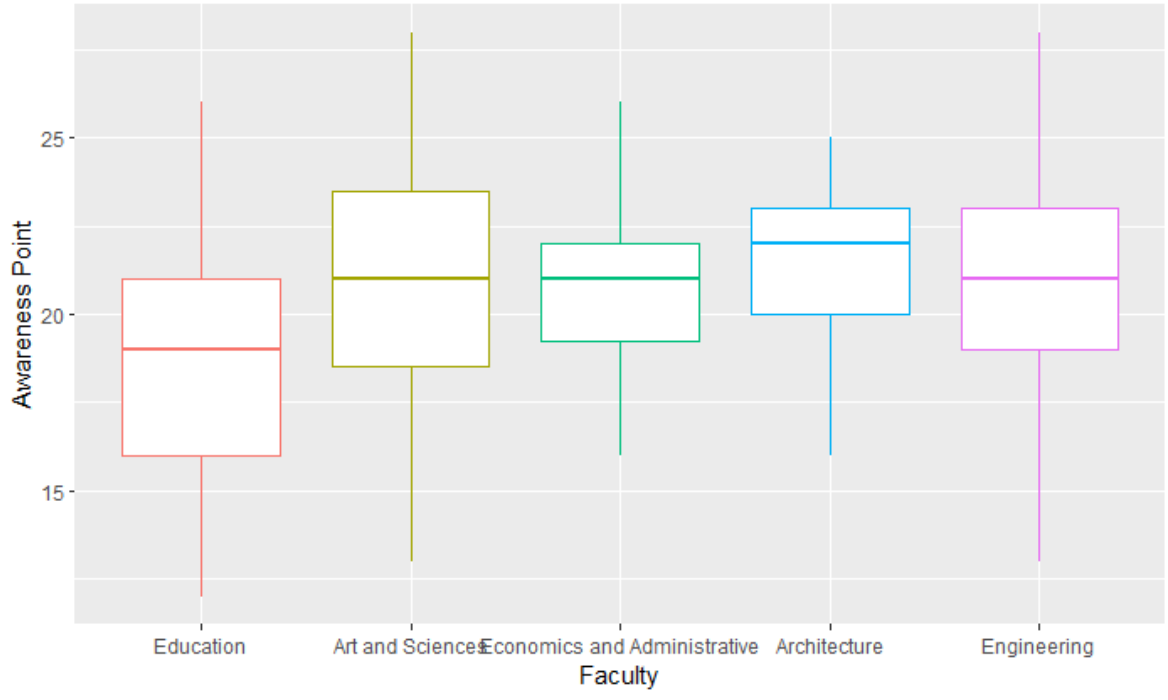
H_A: At least 1 sample median is different to others.

but the p-value was found slightly greater than 0.05. Then, another variable was added to ANOVA, which is gender.

Female	Df	Sum Sq	Mean Sq	P-value
Faculty	4	17.2	4.3	0.75
Residuals	291	2603.3	8.936	

Male	Df	Sum Sq	Mean Sq	P-value
Faculty	4	157.3	39.32	0.00258
Residuals	266	2490.5	9.36	

As a result, faculty has no significant effect on awareness points on female students' because the null hypothesis was not rejected. However, the null hypothesis was rejected, which means faculty significantly affects male students. Since the null hypothesis was rejected on male students' faculty, at least one faculty mean differs from others. To check this, a post-hoc test was used and three different significancy which are Education-Art and Sciences, Architecture Education and Engineering-Education.



As a result, the most significant difference was observed between architecture and education faculty. Also, engineering and art and sciences means statistically different from education faculty. Male students who study in architecture faculty have the highest mean, and that can be caused by the factor that architecture faculty include city-regional planning department.

5.2 Is there any relationship between parents' education level and students' behaviors about climate change?

In the study conducted by Gilbert C. Magulod Jr, it was shown that the climate change awareness levels of the participants vary according to the education level of their parents. When parents are more educated, their children are considered to have higher environmental anxiety. In this question, it was investigated whether the behaviors of the METU students on climate change were affected by the education level of their parents.

Parents education levels are categorical variables so Two-Way ANOVA Test is practicable. First, check the assumption for ANOVA Test.

There are no extreme outliers in both mothers' and fathers' education level

The population must be close to a normal distribution.

Shapiro-Wilk normality test	
Data: Awareness Point	
W = 0.98706	P-value: 2.83e-05

P-value is less than0.05, so distribution don't close to normal distribution. However, there are more than 30 variables in every group and this part may skip and assume it normal.

Samples must be independent. Parents' education level data is categorical. Chi-squared test is available to check independency.

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)		
Data: Awareness Point and Mother's education level (EL)		
X-squared = 106.58	df = NA	p-value 0.3093

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)		
Data: Awareness Point and Father's education level (EL)		
X-squared = 98.736	df = NA	p-value 0.5252

As the p-value 0.3103 and 0.5232 for mothers and fathers' education level, respectively. These are greater than the 0.05, we conclude that the parents' education levels are independent of total point and hence there is a weak or no correlation between the variables.

Variances must be equal.

Bartlett Test of Homogeneity of Variances		
Data: Awareness Point by Mother's EL		
Bartlett's K-squared: 7.8393	Df: 5	P-value: 0.1653

Bartlett Test of Homogeneity of Variances		
Data: Awareness Point by Father's EL		
Bartlett's K-squared: 3.5845	Df: 5	P-value: 0.6106

From the output, the p-values of 0.1653 and 0.6106 is not less than the significance level of 0.05. This means the null hypothesis cannot be rejected that the variance is the same for all groups.

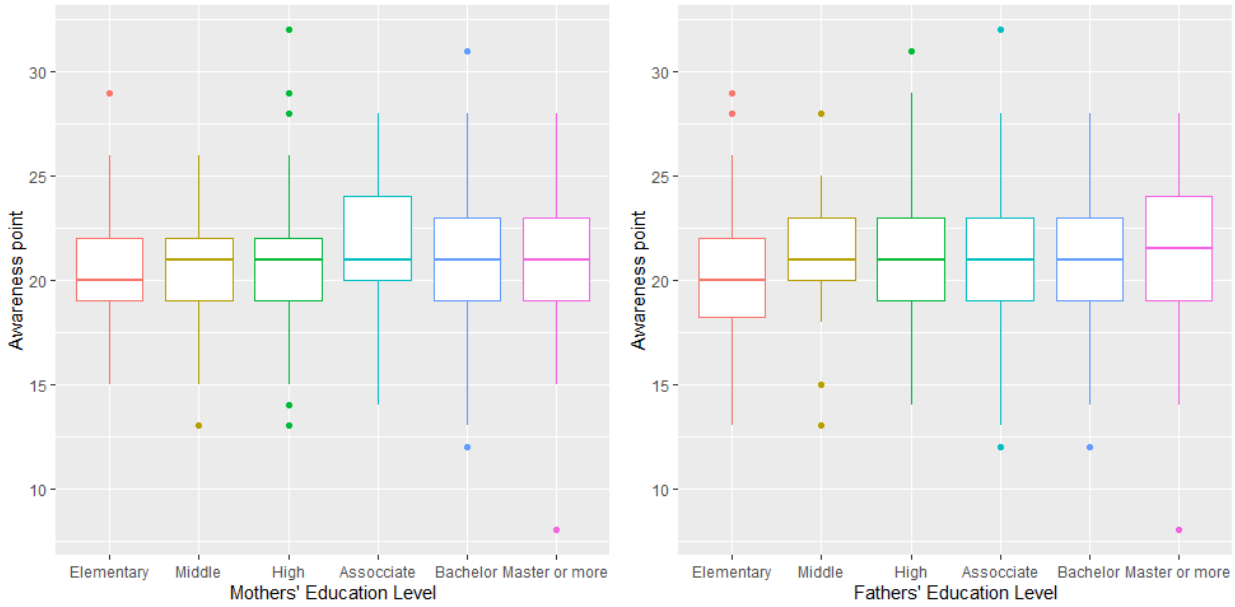
All assumptions to do ANOVA are checked, then the test was performed.

H_O: all samples means are equal.

H_A: at least two of them differ.

	Df	Sum sq	Mean sq	F value	Pr(>F)
Mother	5	36	7.296	0.779	0.565
Father	5	51	10.250	1.095	0.362
Residuals	605	5663	9.361		

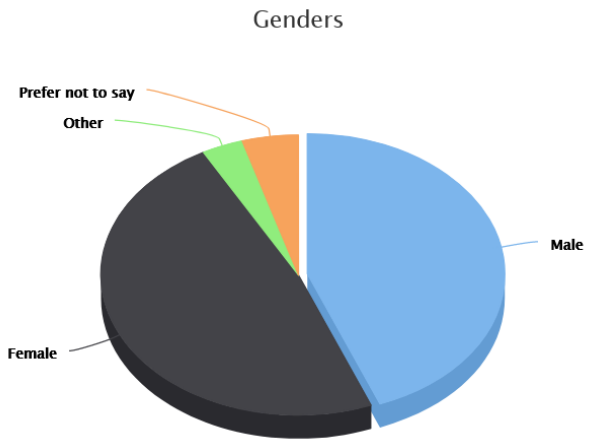
In this part it cannot be said that parents' education levels are significantly affect students' behaviors of climate change. However, when looking together the awareness score according to the education level of the mother and father, it can be said that the father is more effective than the mother in the behavior of the student. By visualizing the result, it can be seen where the difference is.

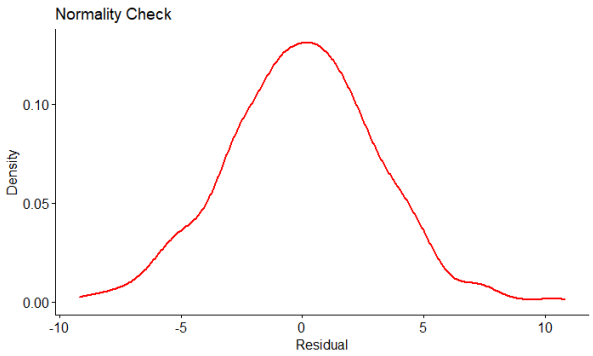


That is seen both mother and father education level that there is a difference between primary school graduate group are different than other groups. Also, the median difference is clearly visible. The median of the students whose mothers and fathers are primary school graduates is below the other groups. In addition, the median value of students whose fathers had a master's degree or above was higher than the other groups. Moreover, interquartile ranges show how the data dispersed between each sample. It is seen clearly in father education level. According to the father's education level, the awareness point data is more regular at the secondary school level and more dispersed at the master's level.

5.3 Do male students behave more aware of climate change at METU?

Because of the result from research question 1. To find out do male students behave more aware than female students, the z test was used. At first, two variables prefer not to say, and others were removed because of the sample size difference, as seen in the pie chart

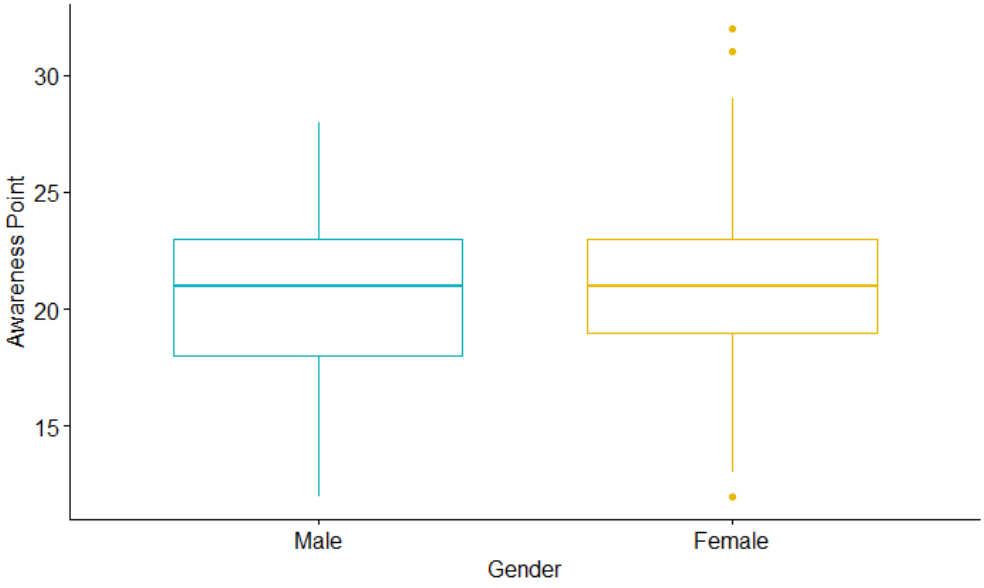




Then normality was checked, and the sample is normally distributed as seen in the density plot.

H_O: Male awareness point are not greater than females'
H_A: Male awareness point greater than females'.

After those tests, the z test was applied, and the p-value was 0.96, and it was greater than 0.05. Therefore, the null hypothesis was not rejected, and male students' awareness point is not greater than female students.



5.4 How does social media using time per day affect students' awareness level and awareness of government policy about climate change?

Social media is used to stay in touch with people and this allows information and news to spread quickly. Developments related to climate change, decisions taken by countries or things to be done are shared on social media.

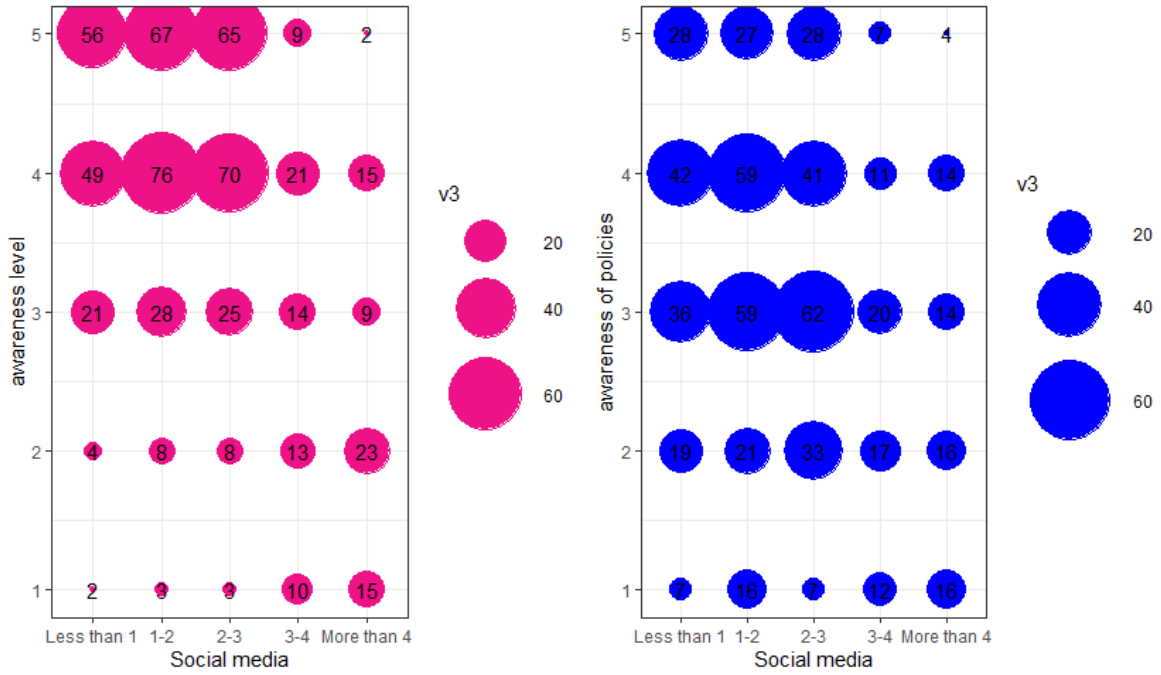
In this question, it is assumed that the use of social media can affect students' awareness levels or learn the government's climate change policy from social media.

The chi-squared test is used to check whether there is a correlation between the two groups.

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)		
Data: social media and awareness level		
X-squared = 173.13	df = NA	p-value 0.0004998

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)		
Data: social media and awareness of policies		
X-squared = 57.219	df = NA	p-value 0.0004998

Chi-Squared tests is shown that p values are equal and less than 0.05. It shows both students awareness level and awareness of government policy depend on social media but if we look X-squared values, it is seen that social media has more effect on students' awareness level.



Looking at the plot, it can be said that the increase in the social media usage time does not positively affect the awareness of the student. However, it cannot be said that the student who use the least social media are the one who has most awareness. It can be said that social media has shown its effect on the level of awareness and the policies of the country, in between 1- and 2-hours usage per day. It can be seen this from the gap with less than 1 hour.

5.5 Does the period when the students learn about climate change affect their awareness level and behaviors about climate change?

In this question there is multiple response variables, and they can be tested simultaneously using a multivariate analysis of variance (MANOVA)

In the bar plots, the students who gained awareness of climate change in elementary school both seem to have high awareness levels and their behaviors are conscious. Based on this inference, the relationship between them was examined by performing the MANOVA test.

	Df	Pillai	Approx F	F num	Den df	Pr(>F)
Awareness Period	3	0.038978	4.0548	6	1224	0.0004943 ***
Residuals	612					

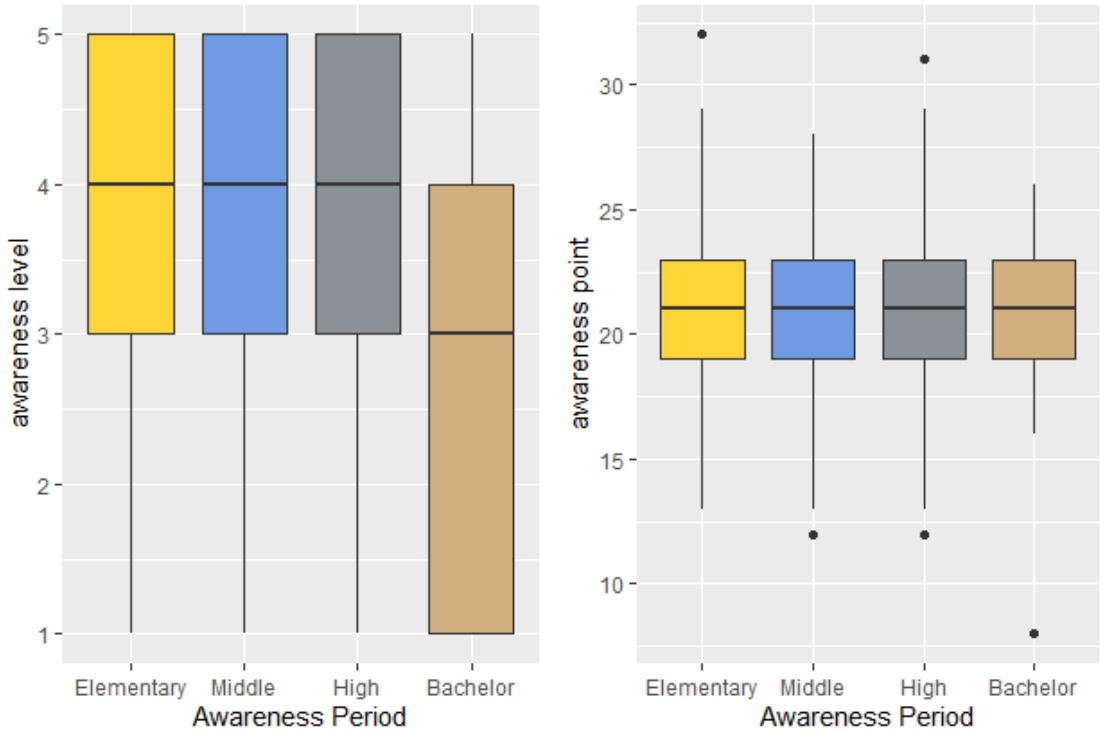
	Df	Sum sq	Mean sq	F num	Pr(>F)
Awareness Period	3	31.01	10.3367	8.251	2.178e-05 ***
Residuals	612	766.70	1.2528		

Response for Awareness Level

	Df	Sum sq	Mean sq	F num	Pr(>F)
Awareness Period	3	3.5	1.1531	0.1228	0.9467
Residuals	612	5747.6	9.3916		

Response for Awareness Point

From the output, the two variables are highly significantly different among awareness periods. However, when the variables are examined separately, it can be said that the awareness period is effective on the level of awareness, but it doesn't have a significant impact on the student's behavior.



The box plot shows that the explanation for this discrepancy is because the awareness level of students who learn about climate change at university is quite low.

6. Conclusion and Recommendations

Climate change is an issue that will affect everyone in a very short time. It affects everything from geopolitics to economies to migration. This subject, which touches every field imaginable, should be focused on, researched and discussed. With the recent Cop26 climate change agreement, each country has decided to reduce its carbon footprint. Accordingly, this research is prepared to investigate the climate change awareness of METU students. As a result of the research, it was seen that the faculty was a factor in climate change awareness. In addition, the period in which the student gained awareness and the use of social media are other factors. It was thought that the reason for the high awareness of the architecture faculty was the "City and Regional Planning" department. According to previous studies on this subject, although it was found that the education level of the parents was a factor in the awareness level of the people, it was seen that it is not a significant factor in this study conducted with METU students. People should be more aware of the climate change facing the whole world, and we should not wait until tomorrow to take action.

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Appendices

1. Which one is appropriate for you?
Female
Male
Prefer not to say
Others

2. Which faculty do you belong to at METU?
Architecture
Arts and Sciences
Economic and Administrative Sciences
Education
Engineering

3. Which one is your income range?
0-749 TL
750-1249 TL
1250-1749 TL
1750-2249 TL
2250+ TL

4. In which period did you learn climate change?
Elementary school
Middle School
High School
University

5. What is your mother's highest degree level?
Elemantary school
Middle school
High school
Associate degree
Bachelor degree
Master degree and more

6. What is your father's highest degree level?
Elemantary school
Middle school
High school
Associate degree
Bachelor degree
Master degree and more

7. Are you aware of the global policies or initiatives that are taken by organizations or governments to reduce climate change? (1 to 5)

8. Which one is appropriate for you about climate change knowledge? (1 to 5)

9. How much time do you spend on social media per day?
Less than 1 hour
1-2 hour
2-3 hour
3-4 hour
More than 4 hours

10. How often do you use plastic? (1 to 5)
11. How often do you use paper/carton? (1 to 5)
12.How often do you use recycling? (1 to 5
13. How often do you use deodorant or skincare products? (1 to 5)

14. How often do you eat meat?
Don't consume meat
4 times a month or less
4 times a week or less
Almost everyday

15. How often do you buy new clothes
Once a week
Once a month
Every 3 months
Every 6 months
Once a year

16. How many minutes do you spend in the shower?
0-10
11-20
21-30
31+

17. How often do you buy packaged materials? (Snacks,legumes,drinks,etc).
Never
Few times a month
Few times a week
Almost everyday

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library(dplyr);library(ggplot2);library(gridExtra);library(ggpubr)
library(car);library(lattice);library(rstatix);library(multcomp);library(BSDA);library(ggcorrplot);library(plyr)
data <- read.csv("survey5.csv");data$Anne <- factor(data$Anne,levels=c("Ilkokul","Ortaokul","Lise","On
lisans","Lisans","Yuksek lisans veya uzeri"));data$Baba <- factor(data$Baba,levels=c("Ilkokul","Ortaokul","Lise","On lisans",
"Lisans","Yuksek lisans veya uzeri"));data$Sosyal_medya <- factor(data$Sosyal_medya, levels = c("1 saatten az", "1-2 saat","2-
3 saat", "3-4 saat","4 saatten fazla"));data$Fakulte <- factor(data$Fakulte, levels= c("Egitim","Muhendislik","Fen-
Edebiyat","Iktisadi ve idari bilimler","Mimarlik"));data$Farkindalik_donemi <- factor(data$Farkindalik_donemi,levels =
c("Ilkokul","Ortaokul","Lise", "Universite"));data$Gelir <- factor(data$Gelir,levels = c("0-749 TL","750-1249 TL","1250-1749
TL","1750-2249 TL","2250 TL ve Uzeri"));data$Cinsiyet <- factor(data$Cinsiyet);shapiro.test(data$total_point)
chisq.test(data$total_point,data$Anne,simulate.p.value=TRUE);chisq.test(data$total_point, data$Baba, simulate.p.value =TRUE)
bartlett.test(totalpoint~Anne,data=data);bartlett.test(total_point~Baba,data=data);summary(aov(total_point~Anne+Baba,data=dat
a));levels(data$Anne) <- c("Elementary","Middle","High","Assocciate","Bachelor","Master or more");levels(data$Baba) <-
c("Elementary","Middle","High","Assocciate","Bachelor","Master or more");plot1 <- ggplot(data, aes(x=Anne, y=total_point,
color=Anne)) +xlab("Mothers' Education Level")+;ylab("Awareness point")+geom_boxplot()+theme(legend.position = "none")
plot2 <- ggplot(data, aes(x=Baba, y=total_point, color=Baba)) +xlab("Fathers' Education Level")+;ylab("Awareness
point")+geom_boxplot()+theme(legend.position = "none");grid.arrange(plot1, plot2, ncol = 2);table1 <-
table(data$Sosyal_medya,data$Farkindalik_seviyesi);table2 <- table(data$Sosyal_medya,data$Farkindalik);chisq.test(table1,
simulate.p.value = TRUE);chisq.test(table2, simulate.p.value = TRUE);levels(data$Sosyal_medya) <- c("Less than 1","1-2","2-
3","3-4","More than 4");forplot1 <- ddply(data, (data$Sosyal_medya, data$Farkindalik_seviyesi), nrow);names(forplot1) <-
c("v1","v2", "v3");g1 <- ggplot(forplot1, aes(v1, v2)) + geom_point(aes(size = v3), colour = "deeppink2") + theme_bw() +
xlab("Social media") + ylab("awareness level");a1 <- g1 + scale_size_continuous(range = c(1,20)) + geom_text(aes(label =
v3));forplot2 <- ddply(data, .(data$Sosyal_medya, data$Farkindalik), nrow);names(forplot2) <- c("v1","v2", "v3");g2 <-
ggplot(forplot2, aes(v1, v2)) + geom_point(aes(size = v3), colour = "blue") + theme_bw() + xlab("Social media") +
ylab("awareness of policies");a2 <- g2 + scale_size_continuous(range = c(1,20)) + geom_text(aes(label = v3))
grid.arrange(a1, a2, ncol = 2);res.man <- manova(cbind(Farkindalik_seviyesi, total_point) ~ Farkindalik_donemi, data = data)
summary(res.man);summary.aov(res.man);levels(data$Farkindalik_donemi) <- c("Elementary","Middle","High","Bachelor")
plot1 <- ggplot(data, aes(x=Farkindalik_donemi, y=Farkindalik_seviyesi)) +geom_boxplot(aes(fill = Farkindalik_donemi))+
xlab("Awareness Period") +ylab("awareness level")+theme(legend.position = "none")+fill_palette("simpsons");plot2 <-
ggplot(data, aes(x=Farkindalik_donemi, y=total_point)) +geom_boxplot(aes(fill = Farkindalik_donemi))+ xlab("Awareness
Period") + ylab("awareness point")+theme(legend.position = "none")+fill_palette("simpsons")
grid.arrange(plot1, plot2, ncol = 2);data <- read.csv("survey5.csv");data <- data[c(-1,-2)];data$Farkindalik_donemi <-
factor(data$Farkindalik_donemi,levels = c("Ilkokul","Ortaokul","Lise","Universite"));data$Fakulte <- factor(data$Fakulte)
data$Gelir <- factor(data$Gelir,levels = c("0-749 TL","750-1249 TL","1250-1749 TL","1750-2249 TL","2250 TL ve Uzeri"))
data$Cinsiyet <- factor(data$Cinsiyet);data$Anne <- factor(data$Anne,levels=c("Ilkokul","Ortaokul","Lise","On
lisans","Lisans","Yuksek lisans veya uzeri"));data$Baba <- factor(data$Baba,levels=c("Ilkokul","Ortaokul","Lise","On
lisans","Lisans","Yuksek lisans veya uzeri"));data$Farkindalik <- factor(data$Farkindalik);data$Sosyal_medya<-
factor(data$Sosyal_medya);bartlett.test(total_point~Fakulte,data=data);outliers <- data %>% group_by(Fakulte) %>%
identify_outliers(total_point);data.frame(outliers$is.outlier,outliers$is.extreme);summary(aov(total_point~Fakulte,data=data))
summary(aov(total_point~Fakulte,data=data[data$Cinsiyet=="Erkek",]));summary(aov(total_point~Fakulte,data=data[data$Cins
iyet=="Kadin",]));res_aov <-aov(total_point~Fakulte,data=data[data$Cinsiyet=="Erkek",]);post_hoc <- glht(res_aov,linfct =
mcp(Fakulte="Tukey"))#posthoc which one diff.;summary(post_hoc);levels(data$Fakulte) <- c("Education","Art and
Sciences","Economics and Administrative","Architecture","Engineering");ggplot(data[data$Cinsiyet=="Erkek",]) +aes(x =
Fakulte, y = total_point) +geom_boxplot(aes(color = Fakulte))+xlab("Faculty")+ylab("AwarenessPoint")+theme(legend.position
= "none")+scale_fill_brewer(palette="Dark2");my_data <- data.frame(data$total_point,data$Cinsiyet);my_data <-
my_data[my_data$data.Cinsiyet!="Diger",];my_data <- my_data[my_data$data.Cinsiyet!="Belirtmek istemiyorum",]
res_aovcin <- aov(data.total_point ~ data.Cinsiyet,data = my_data);levels(my_data$data.Cinsiyet) <- c("Belirtmek
istemiyorum","Diger","Male","Female");my_data$data.Cinsiyet[my_data$data.Cinsiyet=="Erkek"] <- "Male"
my_data$data.Cinsiyet[my_data$data.Cinsiyet=="Kadin"] <- "Female";ggdensity(res_aovcin$residuals,color =
"red",xlab="Residual",ylab = "Density",size=1,title = "Normality Check");ggboxplot(my_data, x = "data.Cinsiyet", y =
"data.total_point", ;color = "data.Cinsiyet", palette = c("#00AFBB", "#E7B800"),ylab = "Awareness Point", xlab =
"Gender")+theme(legend.position="none");z.test(my_data$data.total_point[my_data$data.Cinsiyet=="Male"],my_data$data.total
_point[my_data$data.Cinsiyet=="Female"],alternative="greater",mu =
0,sigma.x=sd(my_data$data.total_point[my_data$data.Cinsiyet=="Male"]),sigma.y =
sd(my_data$data.total_point[my_data$data.Cinsiyet=="Female"]),conf.level = 0.95)
```