Relationship Between Background of Youth and Their Awareness, Attitude and Perception Towards Climate Change

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ABSTRACT
Nowadays, climate change has been a topic of discussion for many people at various levels all over the world. With the increase in world temperature year by year, there are many reports of extreme weather, melting of the polar ice cap, and rising of the sea level that are affecting people in their daily lives. Since it is disrupting human life, efforts are being carried out by international bodies, governments, and various NGOs in mitigation and adaptation efforts of climate change impact by raising awareness on climate change issues. In Malaysia, such efforts are being carried out too, and many studies are conducted to analyse various aspects of climate change, including social science. In this study, youth are targeted as the respondents as they can play an important role in climate change mitigation, which makes analysing their level of awareness, perception, and attitude towards climate change needed. Therefore, using purposive sampling techniques, undergraduates at Universiti Sains Malaysia (USM) currently taking the WSU 101: Sustainable Issues, Challenges, and Prospects course are chosen as respondents. Using an online questionnaire, 234 out of 498 students participated in this study. In order to understand the intention and motivation of youth towards climate change, the Theory of Planned Behaviour is used, and three types of variables, which consist of independent variables (gender, age, education background, and knowledge), intervening variables (personal experience, self-interest, and intention), and dependent variables (awareness, perception, and behaviour), are used to analyse the relationship and factors. Using all the data collected, it was found that respondents in this study are aware of and have a good understanding of climate change. Moreover, it is also found that they are aware that climate change is affecting their lives, and there is a relationship between their demographic background, experiences, and behaviour or attitudes towards climate change. Since climate change impacts are affecting our livelihoods and youth, which represent almost half of Malaysia’s current population; it can be an effective and efficient tool to promote climate change awareness for mitigation and adaptation programs. Thus, the findings of this study can be used as a baseline for climate change programs among youth, and this can be done by collecting responses from a larger youth population so that more comprehensive initiatives can be planned and implemented.

KEYWORDS: Climate change awareness, Youth perception, Theory of Planned Behaviour, Sustainable issues

1. INTRODUCTION
In the recent decade, climate change has been a topic discussed by experts on various platforms, but it is not necessarily accessible to people at large, though the impact of climate change is affecting everybody either directly or indirectly. It has become a defining and critical issue nowadays (Pandve et al., 2009) due to its impact on our livelihood and the future of our planet. Further to that, the urgency is reflected in Goal 13: Climate Action in Sustainable Development Goals (SDG), which urges quick action to tackle climate change issues and the impact must be taken. Even though the situation has been improving over time as information is easily accessible due to current technologies, the knowledge and understanding of people about climate change may be skewed as the interpretation may be according to their personal experience. Thus, the motivation of this paper is to understand the perception, awareness, and attitude of the people towards climate change, and perhaps the findings will fill the gap in understanding the scenario to ensure a holistic approach and policy with regard to climate change. For the first part of this paper, the author will discuss this study using the 4 W’s and 1 H approach by looking at (i) what the study is about; (ii) who is involved in the study; (iii) where the study was conducted; (iv) why the study is being carried out; and (v) why the study is being carried out.

1.1 Research Background
According to a study by the IPCC in 2017, the surface temperatures of the world have risen by 0.13°C every
year since 1950, and the global average surface temperatures are expected to increase from 1.8°C to 4°C by the end of the 21st century, depending on future greenhouse gas emissions. Tangang et al. (2012), in the study Climate Change and Variability over Malaysia: Gaps in Science and Research Information, stated that ‘climate change has been recognized as the most pressing environmental problem that the world will face in the 21st century’. The United Nations Framework Convention on Climate Change (UNFCCC) also viewed climate change as one of the most noteworthy global problems that affects the structure of the environment both directly and indirectly. Muhammad Fakhruddin concludes in Menanggapi Wacana Perubahan Iklim di Malaysia that climate change issues in Malaysia are no longer seen as scientific findings only because they affect human life in the long run.

1.2 Problem Statement
At various platforms or discourses, climate change and its impact are being discussed by the government, NGOs, academicians, experts, and even laymen, as more and more evidence is found either through research and studies or extreme weather and natural disasters that occur all around the world. It has been an evolving topic globally and has led to new ideas, debates, and interests within the community of experts (Agbata et al., 2019). Nevertheless, the opinion of the general public is usually varying and fluid based on their gender, age, personal experiences with natural disasters, knowledge of climate change, economic background, education level, geographic settlement, or even political standing. All these factors will affect their views on climate change, its effects, and how to adapt to and mitigate it. In order to fill in the gap in knowledge and information needed with regard to these issues, many studies have been carried out at various locations on specific groups. In the case of Malaysia, the issues of climate change are discussed through various channels and platforms, either domestically or internationally. This has resulted in policies being introduced and implemented, laws being regulated, and treaties being signed to show our commitment to international communities. In line with this, many studies on the cause and impact of climate change have been conducted, but not much on the awareness or perception and its relationship with the backgrounds of the respondents.

1.3 Objectives
As climate change has become one of the most debated problems globally due to its impact on a nation’s livelihood, economy, and political standing, Malaysia continues to move forward on this issue by taking part in numerous platforms. As such, research and studies, both scientific and social in nature, are required to develop comprehensive adaptation and mitigation strategies. In accordance with that, the purpose of this article is to examine the relationship between youth backgrounds, such as gender and educational background, and their degree of knowledge and awareness regarding the climate change issue.

2. LITERATURE REVIEW

2.1 Climate Change
According to a National Aeronautics and Space Administration (NASA) analysis, earth’s global surface temperature in 2022 continued a long-term warming trend, ranking as the fifth warmest year on record since 1880 and it signifies a significant warming of approximately 2 degrees Fahrenheit (1.11 degrees Celsius) compared to the late 19th-century baseline. Furthermore, earth’s global average surface temperature in 2022 is ranked as the fifth warmest since instrumental records began in 1880 and this finding aligns with the observed trend of long-term planetary warming. Relative to the 1951–1980 baseline period established by NASA’s Goddard Institute for Space Studies (GISS), global temperatures in 2022 were 1.6 degrees Fahrenheit (0.89 degrees Celsius) higher. Various factors influence yearly temperatures, and in 2022, human-caused greenhouse gas emissions have rebounded following a brief drop in 2020 due to the COVID-19 pandemic, as international scientists, including those at NASA, determined that carbon dioxide emissions were the highest on record for that year. Aside from that, NASA found some super-emitters of methane, which is another powerful greenhouse gas.

In the United States, for example, NASA’s GISS also reported that land temperature changes are 50% more than ocean temperature changes, two to three times greater in Eurasia, and three to four times greater in the Arctic and Antarctic Peninsula. Apart from that, records show that the Arctic Ocean’s surface is the largest area for ocean surface warming, followed by the Indian and Western Pacific Oceans in second, and the Atlantic Ocean in third. In addition, the Institute’s analysis reveals that the average global temperature on Earth has increased by approximately 0.8°C since 1880, and the year 2017 setting the highest record at 1.1 degrees Celsius above the pre-industrial period, whereby two-thirds of the warming has occurred since the year 1975 with a rate of around 0.15 to 0.20°C every decade. Figure 1 shows that the world temperature has increased year by year, and based on the record, there has been a rapid increment in temperature from the 1970’s onward.

Meanwhile, in Malaysia, the temperature and rainfall are rapidly increasing between +0.6 and 3.4°C and -1 and +32% in 60 years, respectively, and the rise of sea level is about 13–94 cm within 100 years, respectively (INC, 2000), which has negative impacts on the livelihood of Malaysians. For the past few years, a few states like Terengganu, Kedah, and Johor have experienced very bad floods, as we have experienced temperature
changes ranging from +0.3°C to +4.5°C and rainfall from -30% to +30%. Figure 2 shows the annual Temperature Anomalies in Malaysia from 1940 until 2023 (The World Bank Group, 2021). Furthermore, as we continue to experience the impact of climate change, either naturally or due to human activities, it calls for an urgent and holistic approach and cooperation by countries in order to mitigate and adapt the climate change effect.

2.2 Youth and Climate Change

As there are more and more impacts of climate change seen in our daily lives, people need to understand how climate change will affect them and what they can do to cope with it so that solutions can be planned and implemented (UNEP, 2003). In order to do this, knowledge of climate change is crucial, and it can be done by raising awareness on climate change (Freije et al., 2017), as a knowledgeable public can make wise and better decisions and responses to climate change issues (Ekpoh & Ekpoh, 2011). In this matter, studies show that environmental education at schools and universities is the best way to raise environmental consciousness (Aydin, 2010; Liarakou et al., 2011; Tosun, 2013; Rideout, 2014; Freije et al., 2017).

![Figure 1: Global Temperature Anomaly, compared to the 1951 – 1980 average](image1)

![Figure 2: The Annual Temperature Anomalies in Malaysia from 1940 Until 2023](image2)
According to Wolf and Moser (2011), the levels of understanding, perception of reality, and urgency of climate change, the issue of a sense of responsibility to act, concern for the future, and the roles different demographic groups hold with regard to climate-relevant issues can be affected by individual characteristics such as educational level, age, gender, occupation, and ethnic origin, though the evidence is not uniform. Based on a study conducted on University of Bahrain science students on their awareness of the environment, global warming, and the greenhouse effect, the findings of the study show that there are no significant differences between new students and those that are at higher academic levels, suggesting that they have mainly gained their knowledge through general education rather than academic achievement at the university level (AbuQamar et al., 2015). Other than that, AbuQamar et al. (2015) also find that the awareness of science students on climate change impacts is expected to be highest as compared to other students, which also indicates the level of knowledge among the general public.

In a study by Carr et al. (2015) on climate change awareness amongst secondary level students and teachers in a Dar es Salaam University College of Education in Tanzania, he finds that students have common misunderstandings, inaccurate information, or a lack of general knowledge of climate, though he finds that students are interested in climate change issues and eager to learn more about them and how to contribute to tackling, adapting, and mitigating climate change effects. Other than that, Carr also found that there are no significant differences between males and females in his study.

Meanwhile, in a study by Skalík (2015) on university students at Masaryk University and students from several grammar schools in the Czech Republic, students have an extremely low level of climate change knowledge, and there is a relationship between the amount of information accessed and the student’s evaluation of the seriousness of climate change. Furthermore, students who have good knowledge or are aware of climate change are also found to feel more personally responsible for it, and both males and females have a similar level of knowledge of it, though females feel more personal responsibility towards climate change. In a study by Hassan (2012), it was also found that students with a better scientific attitude are more aware of environmental issues, and vice versa. In another study on youth and climate change in some communities in the northern region of Ghana, the findings show that youth in the area are aware of the effects of climate change on their livelihoods and are concerned about the consequences of climate change for their future. Devkota and Phuyal (2017) also found that 98% of respondents in a study he conducted among Nepalese youth say that they are well aware of climate change, and only 2 percent are not sure about it. Furthermore, the study also found that the majority of his respondents discuss it in their community, and they also talk about climate change with their families; however, only half of them know about climate change interventions by the government. Other than that, as part of the community that is technology-forward, youth play a crucial role in climate change adaptation and mitigation, as emphasized by Pandve et al. (2009). Furthermore, UNISDR (2011) also claimed that successful implementation of disaster prevention and risk management strategies can be done with the help of youth, as they can promote the necessary behaviours and mentalities. In 2007, UNFCCC stated that “education provides the skills people need to thrive in the new sustainable economy, working in areas such as renewable energy, smart agriculture, forest rehabilitation, the design of resource-efficient cities, and the sound management of healthy ecosystems.

In Malaysia, The National Youth Climate Change Survey (NYCC) published in the report “Change for Climate” by United Nations Development Programme (UNDP) and United Nations International Children’s Emergency Fund (UNICEF) discovered that nine out of ten Malaysian youth have experienced environmental and climate-related effects in the past three years. Based on the survey, 92% of young people believe climate change is a crisis, and 90% of Malaysian youth are already working to be more environmentally conscious in their daily lives. Nevertheless, the knowledge gap, the higher cost of eco-friendly solutions, and discouragement due to the notion that individual acts may not be adequate are some of the hurdles that Malaysian youth face in making a positive change to tackle and mitigate climate change.

Therefore, higher education institutions should also play a lead role in the effort to produce and disseminate knowledge and to engage the community in gaining knowledge, as proven by the higher rate of literacy and level of awareness among the Japanese, which helped them respond to the impacts of tsunamis and earthquakes accordingly (Barredda, 2018). Moreover, the youth's energy and knowledge should be used to raise awareness through various programs and implement adaptation and mitigation projects (Mercado, 2023).

3. METHODOLOGY
3.1 Theoretical Framework
3.1.1 Theory of Planned Behaviour
In this study, the Theory of Planned Behaviour (TPB) is used to understand and capture the intention and motivation of individuals to perform or engage in a given behaviour, or in this case, towards climate change. As outlined by Ajzen (2011) and Ajzen and Schmidt (2020),
TPB argues that an individual’s intentions to engage in a given behaviour are affected by three fundamental constructs namely attitude, subjective norms, and perceived behavioural control. According to this theory, attitude refers to an individual’s evaluation of a specific behaviour, e.g., youth’s attitude toward adopting recycle, reuse, and reduce (3R) as climate-friendly actions, subjective norms refer to social influences that determine behaviour or how we view the ideas of other people about a specific behaviour, i.e., attitude of family, friends, and colleagues toward climate change, and finally, perceived behavioural control is the factor that reflects an individual’s perception of their ability to perform a behaviour or to behave in a certain way i.e. the more control we think we are capable of practising 3R in daily life, the stronger our intention to perform it. As a general rule, the stronger the intention to engage in a behaviour, the more likely its performance should be (Ajzen, 1991) and behavioural beliefs as conceptualized by Fishbein and Ajzen (1977), it exerts influence on the individual’s perception of adopting a new behaviour relative to a specific outcome. Since climate change may not operate effectively without fear appeals, there are limitations in this theory as well, as it is a lack of motivating emotional variables, like fear (Gregory & Mendelsohn, 1993), that can influence people to make extreme changes to their lifestyles. TPB is particularly crucial in the field of pro-environmental research for several compelling reasons. Michie et al. (2014) report that TPB has demonstrably informed 17 out of 83 prominent behaviour change theories, highlighting its theoretical robustness and practical utility. Meanwhile, Yuriev et al. (2020) found that TPB-based treatments are highly effective at driving changes in behaviour, with results similar to other known models. TPBs also offer a concise framework, as observed by Yuriev et al. (2020), enabling researchers to easily include and assess new constructs relevant to particular situations, thus enhancing adaptability across different pro-environmental domains. In short, TPB provides an effective framework that allows one to understand the complex forces that drive pro-environmental behaviour.

Furthermore, the theory can explain clearly the part of stakeholders’ intention to plan adaptation to climate change and can be used to understand and predict it, along with other parameters. The study also found that intention to engage in local climate change adaptation was explained by a subjective norm that perceived social pressure to engage in planning adaptation to climate change and a perceived behavioural control that perceived ability to engage in planning adaptation to climate change. Furthermore, the theory is also able to explain that decision-makers, using the injunctive belief that one should be planning adaptation to climate change and have knowledge on policy-making strategies and instruments (Bellon & Massetti, 2022).

Figure 3 illustrates the Theory of Planned Behaviour.
3.2 Variables  
In this study, there are independent variables, intervening variables, and dependent variables used to analyse the relationship and factors that influence the behaviour of the respondents. For this study, the independent variables are gender, age, educational background (both in secondary and university), and knowledge. Meanwhile, there are also intervening variables like personal experience, self-interest, and intention that can affect the awareness, perception, and behaviour of youth about climate change. Figure 4 shows the variables involved in the study.

3.3 Research Hypothesis  
The literature of this study suggests that there is a relationship between the independent variables and dependent variables, but sometimes it is also not uniform as it may be affected by some intervening variables. Therefore, the hypothesis of this paper is that demographics, basic knowledge, and experience determine their awareness, perception, and attitude toward climate change.

3.4 Sample Design  
Since the objectives of this research are to find out the awareness of youth about climate change, students taking the WSU101 course Sustainability: Issues, Challenges, and Prospects at USM, Penang Main Campus, have been chosen as the sample as they are at the right age according to the definition of youth in Malaysia. In Malaysia, the definition of youth according to Akta 668: Akta Pertubuhan Belia Dan Pembangunan Belia 2007 is “someone of the age not less than 15 years old and not more than 40 years old’. Nevertheless, the definition of youth has been changed ‘to someone of the age of not less than 15 years old and not more than 30 years old’ in 2015. In Malaysia, most of the youth are either in secondary or tertiary education institutions, as they are at the age of either completing their compulsory education in schools or pursuing their education in higher education institutions like universities. Students who participated in the study also came from various backgrounds, like gender, personal experience with climate change-related scenarios, previous education streams during secondary school, or even their current study major in university.

3.5 Sampling Techniques  
Sampling is the statistical process of selecting a subset, known as a ‘sample’, of a population of interest in order to make observations and statistical findings about the population. It is important to choose a sample that is properly representative of the population so that the findings made from it can be applied back to the population under study (Bhattacherjee, 2019). The sampling technique is decided after the sample size is determined and there are two types of sampling procedures namely non-probability sampling and probability sampling (Chua, 2020). Non-probability sampling is a process for choosing samples when individuals in the population do not have equal chances of being selected as participants in the study. In this method, the researcher selects a sample based on particular characteristics or particular requirements, and data is gathered conveniently using a non-random selection based on predefined criteria.

This is a simple approach for collecting data, but the resulting sample may not exactly represent the full population. Non-probability sampling techniques include quota sampling, accidental sampling, subjective sampling (or purposeful sampling), expert sampling, snowball sampling, and modular instant sampling (Etikan & Bala, 2017; Chua, 2020; Bisht, 2023). Non-probability sampling can be used when conducting homeless issues, whereby we do not have a list of homeless people that can be used.
On the other hand, probability sampling is carried out by randomly choosing a sample of people who share all of the characteristics in the study population. Before carrying out the process, the population size and a list of people participating in the population must be determined. In probability sampling, each unit or component of the population has an equal chance of being included in the final sample. This method of sampling provides a more comprehensive and unbiased sample, which allows for accurate inferences about the whole population (Chua, 2020; Bisht, 2023). Researchers often use simple random sampling, systematic sampling, stratified sampling, multiple-layered area sampling, and cluster sampling in the research they do (Chua, 2020). This method can be simply explained by considering that every person would have a probability of 1 out of 10 being chosen if there were 10 people in a room.

For this study, purposive sampling is used to select the respondents due to their homogeneous characteristics. Purposive sampling, also known as judgment, selective, or subjective sampling, focuses on one particular subgroup in which all the sample members are similar, like a particular occupation or level in an organization’s hierarchy or students studying the same course in university. The respondents for this study are students taking the WSU 101 Sustainability: Issues, Challenges, and Prospects course for the 2018–2019 session. The course is one of the elective courses introduced by the Centre for Global Sustainability Studies (CGSS) for undergraduates, and it emphasizes on the implementation of sustainable development. The current number of students taking the course is approximately 498, ranging from year one to year four, from various fields.

### 3.6 Sample Size

The Krejcie and Morgan table (Krejcie & Morgan, 1970) is commonly utilized by behavioural and social science researchers to determine sample size from the representative of the population being studied (Memon et al. 2020). For the 2018-2019 sessions, 498 students are taking the WSU 101 Sustainability: Issues, Challenges, and Prospects course and out of the whole population and 234 students participated in the survey. The participants consist of undergraduate students ranging from year one to year four from different fields of study. Using Krejcie and Morgan table (Table 1), the nearest population sample for 498 population sizes is 500, and since the required sample size for the population is 217, the collected 234 samples were adequate.

### 3.7 Research Instrument

In order to collect data for this research, an online questionnaire has been used to gather relevant data from the target group. The questionnaire was designed to the study’s objectives and research questions by referring to various research questions of the same interest from all over the world. An online questionnaire was chosen as the method to gather data since the target group is youth that are internet savvy and have access to the internet, and they can answer it anytime and anywhere according to their preferences during the period of gathering the data.

### Table 1: Krejcie and Morgan Table

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### 3.8 Data Analysis

All data collected were analysed using Statistical Package for Social Sciences (SPSS) version 22, and the standard statistical techniques used are frequency and crosstab analysis. Microsoft Excel 2013 is also used to create the table and charts to present the analysis.

### 4. DATA & ANALYSIS

#### 4.1 Demographic

Overall, a total of 234 respondents have been involved in this research, and the majority of them are female, with a total number of 187 (79.9%), while the other 47 respondents (20.1%) are male. The higher number of female respondents corresponds to statistics reported by the Ministry of Higher Education in 2020 (Source: Kementerian Pengajian Tinggi, 2020), whereby the rate of female intake for bachelor degree level in local public universities is higher (62.88%) compared to 37.11% of male students, thus explaining the significance difference between female respondents as compared to male respondents in this study.

As the respondents are undergraduate students taking the course WSU 101 (Sustainability: Issues, Challenges, and Prospects), an elective program offered to undergraduate students at USM, the respondents involved are from various study years. For their secondary school study background, 112 of the students are in the
science stream, while 117 of them are in the art stream. Meanwhile, five (5) of them are neither in the science nor art stream, as they are taking accounting. As students have the option to further their studies in various fields other than choosing their path in secondary school, the number of respondents according to either the science or art stream is almost the same, despite the fact that there are more non-environmental majors in this study.

4.2 Relationship of Awareness, Attitude and Perception to The Respondent Demographic

4.2.1 Relationship Between Gender and Level of Knowledge on Climate Change Among Youth

Overall Figure 5 shows only 1% or 2 of the respondents have no knowledge of climate change, while 99% of the respondents have at least a little knowledge about climate change. The findings of the studies show that 59 respondents (25%) know a little about climate change, half of them (121 respondents, 52%) know about climate change, another 35 respondents (15%) have more knowledge about climate change, and the other 7% (17 respondents) admit that they know climate change very well. Separately, more than half, or 99 (53%) of the female respondents, know about climate change, while the male respondents are 22 (47%). More female respondents (35 respondents, 15%) also admit that they know more about climate change as compared to 6 or 13% of male respondents. Nevertheless, the percentage of male respondents who know climate change very well is higher than that of female respondents, with 19% male and only 4% female. Furthermore, there are 1% (2) of female respondents who admit that they don’t know about climate change. From this finding, it is clear that youth are aware of and have at least a little knowledge of climate change, and the level of knowledge varies. From the perspective of gender, the finding shows that both males and females know about climate change with at least some basic information about it. Even though the percentages are almost the same for both male and female respondents, there is a significant difference in the percentage of male respondents who know climate change very well as compared to female respondents, and there is also a small number of female respondents who have no knowledge of climate change.

4.2.2 Relationship between genders with the level of importance on the issue of climate change

The study shows that the majority of males and females think that climate change issues are important, as reflected in the high numbers of respondents who think climate change issues are very important (129 respondents, 55%) and quite important (100 respondents, 43%) (Figure 6).

Figure 5: Chart Showing Relationship Between Gender and Level of Knowledge on Climate Change Among Youth
Separately, male respondents show a higher percentage (60%) as compared to female respondents (54%) who think the climate change issue is very important, with only a slight difference (6%). Meanwhile, the percentage of female respondents who think climate change is an issue is slightly higher compared to male respondents (43% female, 40% male). Overall, the finding shows that both males and females know that climate change is important, and this may be due to their exposure to climate change information, either through their studies or other information sources like the internet and mass media. Nevertheless, from the total 234 respondents, it can be concluded that the majority of the respondents that think the issue of climate change is very important is higher with 43.5% (101 respondents) compared to male respondents at only 11.96% (28 respondents).

4.2.3 Relationship between gender and perception towards climate change
The study shows that there is no significant difference between the perceptions of male and female respondents towards climate change, with 98% of male respondents perceiving that climate change affects them personally, as compared to 94% of female respondents (Figure 7). The findings of the study do not show a significant difference, as both male and female respondents in this study have the same types and levels of information obtained from the course they are taking. Overall, the majority of the respondents (221 respondents, 94%) think that climate change will affect them personally, while another 6% (13 respondents) do not think in such a way.

4.2.4 Relationship between Gender and Perception That Climate Change Can Be Mitigate / Tackle
A total of 210, or 90%, out of the 234 respondents think that anything can be done to tackle climate change, while only 24, or 10% think otherwise (Figure 8). Meanwhile, on a gender basis, the percentage of male respondents (94%) who think anything can be done to mitigate climate change is higher as compared to female respondents (89%). The findings show that the majority of the respondents know that climate change can be mitigated or tackled, and this may be a result of their access to information about climate change. Nevertheless, a higher percentage of male respondents think that climate change can be mitigated as compared to female respondents, which may be because male respondents in this study are more positive and know about ways to mitigate climate change.
4.2.5 Relationship between Major in University with Level of Knowledge in Climate Change

The study shows that the majority of the respondents know about climate change with only two or 1% of the total respondents have no knowledge of it (Figure 9). The finding of the study also shows that respondents who study environmental-related courses know climate change very well in climate change with 11% compared to only 6% for non-environmental-related courses.

Nevertheless, a higher percentage is recorded for non-environmental related respondents with 54% as compared to those who are in environmental related courses. From the findings, it can be concluded that people with more knowledge and exposure to the environmental through courses they are taking in university have a higher level of knowledge of climate change.

The finding of the study also shows that a higher percentage (32%) of respondents in environmental-related courses know more about climate change as compared to non-environmental-related courses.
change. According to the study, the vast majority of respondents are aware of climate change, with only two, or 1%, unaware of it. The survey’s findings also suggest that respondents who study environmental courses are quite knowledgeable about climate change, with 11% versus only 6% for non-environmental courses. The study’s findings also suggest that a higher percentage (32%) of respondents in environmental courses are better knowledgeable about climate change than those in non-environmental courses. Nonetheless, non-environmental responses had a higher percentage (54%) than those enrolled in environmental courses. According to the data, people have more awareness and exposure to environmental issues through the courses they are taking at university.

4.2.6 Relationship between Major in University and Level of Importance of Climate Change Issue

The majority of respondents in the study know that the climate change issue is very important, as shown in the findings, whereby 129 respondents (55%) think it is very important and 100 respondents (43%) think it is quite important (Figure 10).

![Figure 9: Chart showing Relationship between major in university with level of knowledge in climate change](image)

![Figure 10: Chart showing the relationship between major in university and level of Importance of climate change issue](image)
Only 4 respondents (2%) say it is not important, and one respondent thinks it is not important at all. Nevertheless, 70% of respondents who are taking environmental-related courses know that the climate change issue is very important, and another 28% think it is quite important, while there is one respondent that represents 2% of respondents with an environmental background that thinks the climate change issue is important. Meanwhile, for respondents with non-environmental backgrounds, the response is more dispersed, whereby 51% of them thinking it is very important, 43% thinking it is quite important, and another 2% thinking it is not very important. The finding shows that those majoring in environmental-related courses place a higher level of importance on climate change since they understand the matter very well.

4.2.7 Relationship between Major in University Perception of Climate Change Will Affect Personally
The study shows that 221, or 94%, of the total 234 respondents think that climate change will affect them personally (Figure 11). Meanwhile, there is a slightly higher percentage of respondents that are taking environmental-related courses, with 98%, as compared to 94% for those that are taking non-environmental-related courses. There are also respondents who do not think climate change will affect them personally, with one or 2% of the respondents having an environmental-related course and 12 respondents, or 6%, having a non-environmental-related course. From the findings, it can be concluded that respondents who are majoring in environmental courses have a positive relationship as they know the impacts that they are facing due to climate change effects.

4.2.8 Relationship between Major in University and Perception Towards Tackling Climate Change
Overall, the findings of the study show that the majority (210 respondents, or 90%) of the respondents think that anything can be done to tackle climate change (Figure 12). More than 91% of respondents with environmental backgrounds think that anything can be done to tackle climate change, while only 9% do not agree. Meanwhile, respondents with non-environmental backgrounds show a lower percentage of respondents who agree that anything can be done to tackle climate change, with only 89%. Even though the percentage of respondents from non-environmental-related majors is lower than that from environmental-related majors, it can be concluded that all respondents perceive that anything can be done to tackle climate change. Moreover, the respondent’s major is not a significant factor that can influence their perception of climate change impact mitigation.

![Figure 11: Chart showing the relationship between major in university perception of climate change will affect personally](image-url)
4.2.9 Relationship between Subject’s Stream in School and Level of Knowledge on Climate Change

Overall, 99% of the respondents have basic knowledge about climate change, and this is also the same when comparing the findings of respondents who took the science stream or the art stream during secondary school (Figure 13). For respondents that have taken the science stream during primary school, 7% of them know about climate change very well, while 13% know about it more. The majority, or 52%, admit that they know about it, and another 28% know a little about it. There are also 7% of respondents with art stream backgrounds who know climate change very well; 16% know more about it; 52% know about it; 24% know a little about it; and only 1% don’t know about climate change. Meanwhile, for respondents that have taken other streams like accounting, 20% of them know about climate change very well, while there are 40% of respondents have more knowledge about climate change or know about it. Overall, even though the subject streams taken by the respondents are different, there are only slight differences between the levels of their knowledge. This might be due to early exposure to science or geography subjects in schools.

4.2.10 Relationship between Subjects Stream in School with Perception on the Level of Importance of Climate Change Issue

As a whole, respondents in this study know that the climate change issue is important (Figure 14). Only 1% of respondents who have taken the science stream in secondary school think climate change issues are not important, while 54% think they are very important, 45% think they are quite important, and another 1% think they are not important at all. The response for respondents who have been in the art stream in secondary school is that 56% think the climate change issue is very important, 41% perceive it as quite important, and the last 3% think that it is now very important. For respondents from both the science stream and the art stream, 60% perceive climate change as very important, and 40% think it is quite important. From the findings, it can be summarized that the majority of respondents’ stream of study during secondary school does not make a big difference in terms of perception towards the importance of the climate change issue, though overall, the majority of respondents perceive it to be important. This may be due to the basic knowledge that they get in school or easily available information online or in mass media.

4.2.11 Relationship between Subjects Streams in School with Perception Whether Climate Change Can Affect Them Personally

The findings of the study show that 96% of respondents with a science stream background responded that the climate change issue affects them personally, while only 4% don’t think so (Figure 15). Meanwhile, for those from art backgrounds during secondary school, the majority of them (93%) also think that climate change will affect them personally. For others from different backgrounds, all five of them, or 100%, agree that it will affect them personally. Basically, 93% of the total number of respondents think that climate change issues can affect them personally, though the percentage of those from the science stream is higher than that of those from the art stream. The slight difference might be due to the fact that those with a science background find it easier and faster to understand the climate change issue as compared to other respondents from different backgrounds.
4.2.12 Relationship between Subject Streams in School with Perception about Tackling Climate Change

The findings of the study show that 88% of respondents who have taken the science stream during secondary school agree that anything can be done to tackle climate change, while another 12% do not agree (Figure 16). The percentage of respondents from the art stream background with 91% agrees, but only 9% do not agree that anything can be done to mitigate climate change. 100% of respondents from different backgrounds agree with the statement. Findings of the study also show that the percentage of respondents with an art stream background who think anything can be done to tackle the climate change issue is higher as compared to those with a science stream, and this may be because they are skeptical of the current progress of the climate change mitigation and adaptation process in the country at the moment.

Figure 13: Chart showing the relationship between subjects stream in school and level of knowledge on climate change

Figure 14: Chart showing the relationship between subjects stream in school with perception on the level of importance of climate change issue
Figure 15: Chart showing the relationship between subject streams in school with perception whether climate change can affect them personally.

<table>
<thead>
<tr>
<th>Personal Affect</th>
<th>Science stream</th>
<th>Art stream</th>
<th>Other</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numbers</td>
<td>%</td>
<td>Numbers</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>107</td>
<td>96%</td>
<td>109</td>
<td>93%</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>4%</td>
<td>8</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100%</td>
<td>117</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 16: Chart showing the relationship between subject streams in school with perception about tackling climate change.

<table>
<thead>
<tr>
<th>Anything can be done to tackle climate change</th>
<th>Science stream</th>
<th>Art stream</th>
<th>Other</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Numbers</td>
<td>%</td>
<td>Numbers</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>99</td>
<td>88%</td>
<td>106</td>
<td>91%</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>12%</td>
<td>11</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>112</td>
<td>100%</td>
<td>117</td>
<td>100%</td>
</tr>
</tbody>
</table>
5. DISCUSSION AND CONCLUSION

Overall, this study manages to analyse the relationship between the background of youth and their level of awareness, perception, and attitude. Since it is conducted among youth who are currently pursuing their studies at a public higher education institution, the study is able to analyse the level of awareness, perception, and attitude of a group of youth that have access to information about climate change either through the field, they are pursuing or through a course like WSU101: Sustainability: Issues, Challenges, and Prospects that they take as an elective course that will help them to graduate.

Firstly, gender is not significant in determining the level of knowledge on climate change but the percentage of male respondents that know climate change very well is higher than that of female respondents. This finding is consistent with much existing sociology of science research, whereby women underestimate their climate change knowledge more than men (McCright, 2010). Both males and females think that climate change issues are very important but the study also finds female has a greater concern about climate change (Ballew et al., 2018). Other than that, this study also finds that both males and females perceive that climate change affects them personally and that climate change can be mitigated/tackled as found by Ballew et al. (2018).

5.1 Implications of The Study

Referring to the objectives of conducting this study and the importance of conducting it, the findings of the study can be used by policymakers in the country to make policies and introduce programs or initiatives as a continuous effort to mitigate climate change or adapt to the unavoidable impacts of climate change, especially impacts that occur due to natural factors. Since the respondents are youth, the findings can be used by the government to come up with programs that can attract them to be involved and contribute more to the mitigation and adaptation of climate change impacts. Other than that, since the respondents of this study are students that are currently taking WSU101: Sustainability: Issues, Challenges, and Prospects course, and the findings of this study show that the awareness, perception, and attitude of respondents are positive, climate change knowledge should be introduced to Malaysians through education and should be started since primary school. Moreover, it can also be a baseline for a curriculum that is embedded with climate change topics and elements, as students or youth can play an important role in climate change mitigation and adaptation.

In a study by UNDP and the University of Oxford, the survey shows a direct link between a person’s level of education and their desire for climate action whereby there was very high recognition of the climate emergency among those who had attended university or college in all countries, from lower-income countries such as Bhutan (82%) and Democratic Republic of the Congo (82%), to wealthy countries like France (87%) and Japan (82%) (UNDP, 2021). Findings of the UNDP and the University of Oxford survey also reflected in this study whereby it is shown that people with more knowledge and exposure to the environment have a higher level of knowledge in climate change but those majoring in environmental-related courses place a higher level of importance on climate change since they understand the matter very well.

As a result, demography, basic knowledge, and experience affect youth’s understanding, perception, and attitude toward climate change. In the survey, the majority of respondents were exposed to climate change information through education or information obtained from various sources. The findings also indicate that the majority of respondents are well-informed about and understand climate change. As a result, it is possible to conclude that demographics, knowledge, and personal experience influence or decide what individuals know, perceptions, and attitudes concerning climate change.

Finally, understanding global public sentiment on climate change is vital as governments throughout the world develop new national climate pledges to address climate change, known as Nationally Determined Contributions (NDCs) under the Paris Agreement. In Malaysia, one of the NDC’s key highlights is comprehensive sector-based projections, along with multi-stakeholder consultations with the public, private, civil society, and youth groups to provide inputs to the NDC revision process and a National Adaptation Plan, which will result in the development of an NDC Roadmap to help achieve NDC targets.

5.2 Limitations of the Study

As the respondents are 234 students among the current students who are taking WSU101: Sustainability: Issues, Challenges, and Prospects course at USM Main Campus, the findings of the study are limited to responses from a group of youth that have the opportunity to learn about climate change, which have an influence on the way they perceive climate change and their attitude towards it. Due to time and resource constraints, this study does not consider students from other universities or colleges, neither public nor private, to make comparisons with, as they may have 76 different experiences and exposures to climate change. Other than that, since the study used a quantitative method only for the data, the information gathered is limited to the questions asked in the questionnaire.
5.3 Recommendations for Future Study

This study provides valuable insights into climate change awareness among university students with a focus on sustainable development. However, to gain a more comprehensive understanding of Malaysian youth's perspectives on this critical issue, future research efforts should consider to expansion of sample size in multi higher education institutions that would facilitate comparative analysis of climate change awareness across different academic environments. Aside from that, the inclusion of younger age groups that includes primary and secondary school students would provide valuable insights into how younger generations understand this issue. Other than that, this study should be conducted among teachers in schools, as they are the ones who will be carrying out the duty to introduce climate change among youth at schools. This effort will be able to help policymakers determine what needs to be done and how to implement any policies, programs, and initiatives they introduce. Furthermore, a broader approach with a larger and more diverse sample size would ensure a statistically significant data that can strengthen the foundation for future research and policy development.

Besides that, a comparative insight by studying different population samples would enable researchers to identify potential variations in climate change awareness to tailor interventions accordingly and the creation of more effective climate action plans. By incorporating these recommendations, future research can establish a more comprehensive picture of climate change awareness in Malaysia. This knowledge will be instrumental in developing targeted strategies to raise awareness, improve perceptions, and cultivate a positive attitude towards climate change among Malaysian youth, ultimately empowering them to contribute to a more sustainable future.

ACKNOWLEDGEMENTS

The authors would like to thank RUI Grant, USM (Research Title: Relationship Between Background of Youth and Their Awareness, Attitude and Perception Towards Climate Change - Project Code: 8016118) for financial support. The authors are also grateful to the anonymous reviewers for their insightful suggestions and careful reading of the manuscript.

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