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Examining the Influence of Climate Change Attitude on the Relationship between Climate Change Knowledge and Perception among University Students: An Evidence from United Arab Emirates

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Abstract

One of the most important global issues of our day is climate change, which calls for widespread knowledge and action. This study examines the connections between university students in the United Arab Emirates (UAE) and their knowledge, attitudes, and perceptions regarding climate change. The study included a sample of 340 pupils from various demographic backgrounds. The results show a strong correlation between these three important factors. Information of climate change showed a weak but positive correlation with attitude, suggesting that attitudes tend to become more favorable as information grows. Knowledge and perception showed a stronger, more positive correlation, highlighting the role that knowledge plays in influencing people's opinions of climate change. Furthermore, a somewhat positive correlation between attitude and perception was found. The study offers insightful information for campaigns aimed at raising public awareness and education about climate change. Integrated climate change education, advocacy groups, required courses on climate change, and customized educational campaigns are among the recommendations. Future research must address the study's weaknesses, especially the sample and data collection techniques. In addition to adding to the current conversation on climate change education, this study emphasizes the importance of knowledge, attitude, and perception in promoting climate change awareness and constructive action among UAE youth, who are crucial players in tackling this global issue.

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Keywords: Climate Change, Climate change knowledge, climate change perception, climate change attitude, United Arab Emirates, Ecosystem

Chapter 1: Introduction

Study Background:

Climate change is a worldwide issue that crosses borders, affecting people, ecosystems, and economies all across the world (Abbass, et al., 2022). Its influence is evident, needing both international cooperation and individual participation to lessen its effects and adapt to a changing environment (Lehman, et al., 2019). The setting of climate change takes on a distinctive and fascinating aspect in the United Arab Emirates (UAE), a nation noted for its fast modernization and economic diversification (Paglia & Parker, 2021). The United Arab Emirates is a place where history and innovation coexist, and where the harsh desert landscape is home to futuristic cities distinguished by tall skyscrapers and renewable energy initiatives. Climate change awareness is especially important in this dynamic context, as the country grapples with the problem of supporting sustainable behaviors while balancing economic growth. University students, as a significant demographic in the UAE, play an important role in influencing the country's response to climate change. They are not just the recipients of educational programs, but also future champions, decision-makers, and innovators (Kotcher, et al., 2021). Their grasp of climate change, attitudes toward it, and judgments of its significance are critical. The way people respond to this global problem, both individually and collectively, has far-reaching ramifications for the UAE's climate resilience and sustainability.

This study sets out to investigate the deep web of links between climate change knowledge, attitude, and perception among UAE university students. It aims to reveal the layers of understanding, beliefs, and emotions that define climate change consciousness in this diverse and dynamic context. As we investigate this topic, we hope to gain a better understanding of how these young brains see and respond to the complicated issue of climate change, while also recognizing the special nuances that distinguish their viewpoint. The significance of raising climate change

awareness among UAE university students cannot be emphasized. In a world marked by rising global temperatures, more frequent extreme weather events, and mounting environmental difficulties, the UAE, with its strategic location and one-of-a-kind environment, is vulnerable to various climate-related vulnerabilities (Sharma, 2021). Forecasts for the region include more intense heat, altering rainfall patterns, and increased dangers connected to water resources and agriculture. Responses to these difficulties require not just smart policy and technology solutions, but also an aware, involved, and devoted populace to ecologically friendly practices (Pörtner, et al., 2021).

As we embark on this journey of climate change awareness, we are guided by the realization that the effectiveness of climate action is dependent not only on scientific findings or government policy, but also on individual attitudes and perceptions. These attitudes and perceptions, formed by cultural and educational environments, influence individual decisions ranging from energy sources to products consumed. They also have an impact on the level of support and urgency that people have for climate change policy, shaping the political will required for comprehensive and effective climate action.

Purpose of the research:

The aim of this study is to obtain a thorough understanding of the knowledge, attitudes, and perceptions of university students in the United Arab Emirates (UAE) regarding climate change. This study intends to identify the elements that influence how students in the United Arab Emirates understand and react to climate change by looking at these interrelated variables. The purpose of this study is to investigate the impact of climate change knowledge on climate change perception of university students in United Arab Emirates. Moreover, this research wishes to study the moderating role of climate change attitude among the relationship of independent and dependent variable.

Research Statement:

The intention of this study is to look at the relationship between climate change knowledge, attitude, and perception among university students in the United Arab Emirates (UAE). The study intends to shed insight on the variables influencing students' responses to this critical global issue by analyzing the amount of climate change awareness, the formation of attitudes, and the ensuing

perceptions within this particular cultural and environmental setting. It seeks to determine if increased climate change knowledge and positive attitudes transfer into a more urgent and worried view of climate change impacts. Finally, this research leads to a better understanding of climate change awareness and improves environmental education and policy efforts in the UAE.

Research Problem:

The intricate interactions between university students' knowledge, attitudes, and perceptions about climate change in the United Arab Emirates (UAE) constitute the research challenge this study attempts to solve. Even though people all over the world are becoming more aware of how important it is to address climate change, there is still more work to be done in understanding how people, especially the younger generation, view and react to it. This is especially true in a country as distinctive and fast evolving as the United Arab Emirates. Knowledge of climate change is one aspect of the scientific challenge (Nordhaus, 2019). It is commonly known that having a basic understanding of climate change is essential to making informed decisions and taking appropriate action.

Nonetheless, nothing is known about how much understanding UAE university students have about climate change. It is crucial to determine the extent of their comprehension of the causes, implications, and possible mitigation measures of climate change. Given the complexity of the problem, university students' knowledge levels can have a big influence on their ability to contribute to solutions, have meaningful conversations, and make educated decisions. Additionally, the research problem includes attitudes toward climate change, which is a crucial component of our study. Regarding climate change, attitudes reflect a complex interaction of sentiments, convictions, and emotions. They play a crucial role in inspiring people to adopt eco-friendly practices and promote climate action. As a dynamic and diverse demographic group, university students are essential in determining the course of their country and the world at large. Examining their views on climate change is not only informative, but also essential to comprehending the potential effects that upcoming influencers and leaders may have on sustainability and climate policy (Malhi, et al., 2020).

Perceptions of climate change represent another aspect of the research challenge. This section explores the perceptions of UAE university students regarding climate change, including their evaluations of its significance, urgency, and possible repercussions. Knowledge, attitudes,

individual experiences, and the information that pupils are exposed to are some of the aspects that affect their perception. Determining whether the global messages about climate change, which are frequently based on international reports like those from the United Nations and the Intergovernmental Panel on Climate Change (IPCC), resonate with students in the United Arab Emirates is a crucial component. It is essential to comprehend how they view climate change in order to assess the urgency of the situation, since this will determine how ready they are to adapt to changes in the environment and how eager they are to be change agents.

The research problem also presents attitude toward climate change as a moderator in the associations between perception and knowledge. University students in the United Arab Emirates come from a variety of backgrounds and experiences, so it's possible that their attitudes will moderate the effects of climate change knowledge on how they perceive it. We can better understand the processes at play by examining the moderating role of climate change attitude and how information interacts with cultural, social, and educational factors to affect perception.

Research Objectives:

The goals and objectives that support this study are mentioned below, delving into the specific purposes of unraveling the interconnections between climate change knowledge, attitude, and perception among university students in the United Arab Emirates. These goals direct the research toward a thorough examination of how these variables interact within this unique cultural and environmental landscape, generating significant insights for informed decision-making and policy formulation.

- To examine the level and depth of climate change knowledge among university students in the UAE.
- To investigate the diversity and determinants of climate change attitudes within this demographic.
- To investigate how students view climate change and its impact on their lives.
- To study the role of climate change attitude as a moderator in the link between knowledge and perception.

Research Questions:

The research questions for the current study are mentioned below:

- What is the level of climate change knowledge among university students in the UAE, and how does it vary across demographics?
- What are the prevailing attitudes of university students in the UAE toward climate change, and what factors influence their attitudes?
- How do the climate change attitudes of university students in the UAE moderate the relationship between their knowledge and perception of climate change impacts?

Significance of the Research:

The significance of this research stems from its potential to address important global concerns related to climate change within the context of the United Arab Emirates (UAE). This study can provide useful insights with practical implications by thoroughly investigating the links between climate change knowledge, attitude, and perception among university students. To start, knowing how aware UAE university students are of climate change has significant ramifications for the region's governments and educational establishments. As climate change continues to harm the UAE's unique ecology, including rising heat, deserts, and water scarcity, targeted environmental education must address knowledge gaps and misconceptions. In order to improve understanding of climate change, environmental education is crucial, according to a 2007 study by Rickinson et al. This study can serve as a basis for curriculum design and instructional techniques meant to produce knowledgeable citizens who can support local sustainability.

The results of this study have the potential to improve the worldwide conversation on climate change knowledge and action. Climate change is a worldwide concern that we all share, and perspectives from a varied region such as the United Arab Emirates add to our understanding of how people, especially young people, view and react to this problem. Myers et al. (2013) found that cultural, societal, and educational characteristics all have an impact on people's opinions toward climate change. The results from students in the UAE can provide insightful cross-cultural comparisons and significant comparative data.

Furthermore, it is strategically critical to comprehend the viewpoints of the UAE's youth as it undertakes aggressive efforts to combat climate change, such as the UAE Vision 2021 and the Dubai Clean Energy Strategy 2050. Localized climate policy and advocacy initiatives can be influenced by a thorough grasp of university students' views and opinions. For example, the results

of this study could help shape the direction of focused public outreach programs if they show that students who hold particular attitudes are more likely to support climate-friendly legislation.

Furthermore, this study's distinctive feature—the moderating influence of climate change attitude—can offer complex insights into the interplay between knowledge and perception. A number of studies, including Leiserowitz et al. (2010), have highlighted the importance of attitude as a moderator and how it influences public support for climate measures. Understanding how attitude affects how knowledge is interpreted is important because it can guide programs meant to modify behavior and encourage university students to take action on climate change.

This study has a great deal of importance since it addresses local policy and educational requirements while also adding to the global conversation on climate change knowledge and action. This research has the potential to change educational practices, inform policy decisions, and provide a richer understanding of how young minds around the world perceive and engage with the pressing issue of climate change by examining climate change knowledge, attitude, and perception within the particular context of UAE university students.

Summary:

Climate change, a global concern with far-reaching effects, necessitates international cooperation and individual involvement. The United Arab Emirates (UAE), a country that combines innovation and history in a unique way, is the subject of this study. In the midst of fast modernization, climate change awareness is essential. Understanding and managing climate change is crucial for UAE university students, who will play a significant role as future leaders. With this study, UAE university students' knowledge, attitudes, and perspectives on climate change will be further explored. In this dynamic setting, the study challenge explores the complex relationships that shape students' perceptions, comprehension, and reactions to climate change. The study tackles the lack of information on UAE students' understanding of the causes, effects, and mitigation strategies of climate change. Individual actions and the political will to take action on climate change are greatly influenced by attitudes and perceptions, which are shaped by cultural and educational contexts. The research objectives aim to examine climate change knowledge depth, explore attitude determinants, understand students' views on climate change impacts, and study the moderating role of climate change attitude. The research questions further probe knowledge variations across demographics, factors influencing attitudes, and the moderating impact of attitudes on the

relationship between knowledge and perception. With a special focus on students in the United Arab Emirates, the study's value rests in its significant insights into worldwide discourses on climate change understanding and action. It can influence local climate policy and advocacy campaigns, as well as curriculum design, policy decisions, and public communication programs. The study offers insightful advice for changing behavior and promoting proactive actions against climate change by examining the moderating impact of climate change attitude. Overall, the research advances our understanding of how young people perceive and interact with climate change globally, in addition to meeting local policy and educational requirements.

Chapter 2: Literature Review

The following literature review delves into the existing body of research concerning climate change knowledge, attitude, and perception among university students in the United Arab Emirates (UAE). This chapter provides detail about the existing literature. It provides the framework for this research, allowing us to identify the gaps, patterns, and insights that direct our investigation of the distinct climate change awareness environment in the United Arab Emirates.

Climate Change and United Arab Emirates:

An unparalleled worldwide concern, climate change has profound effects on the environment, society, and economy (Raihan, 2023). In recent decades, its importance has been more and more evident as scientific agreement has emphasized how human activities—like the release of greenhouse gases—are the primary cause of rising temperatures and the corresponding biological changes (Cianconi, et al., 2020). Threats from climate change are many and include increased frequency and intensity of extreme weather events, rising sea levels, extinction of species, and disturbances to the world's food and water supplies (Kumar, et al., 2021). Although the nation is well known for its quick urbanization, diversity, and economic growth, these accomplishments have not been without an impact on the environment.

The UAE is particularly relevant to climate change because of its geographic location (Neira, et al., 2023). The nation is heavily coastal, and because of its low-lying geography, one of the main effects of climate change is sea-level rise, which could particularly affect it (Salimi & Al-Ghamdi, 2020). The UAE's vulnerability to climate change is exacerbated by its proximity to the Arabian Gulf, as discussed in the scholarly article "Climate Change Impacts on the UAE and Global Climate Change Mitigation and Adaptation Policy" by Al-Mazrooei et al. (2015). The article projects increased frequency and intensity of heatwaves, extreme weather events, and challenges related to water resources and agriculture. In addition, the UAE contributes significantly to greenhouse gas emissions due to its economy's heavy reliance on the exploitation and export of fossil fuels (Brosch, 2021). This dual role—that of an emissions provider and a country dealing with the fallout—highlights the UAE's complex place in the global climate change arena (Bazoobandi, 2019).

The UAE has actively addressed climate change in response to these difficulties (Djoundourian, 2021). The UAE Vision 2021 and the Dubai Clean Energy Strategy 2050 are two of its ambitious

sustainability goals that aim to shift the economy toward being more environmentally conscious, diverse, and sustainable. These programs demonstrate the nation's dedication to reducing climate change, protecting the environment, and building climate resilience. This comprehension offers the contextual framework required to evaluate the manifestations of climate change knowledge, attitude, and perception in this particular environment (Luomi, 2020). In light of the fact that UAE university students belong to a generation that has the potential to shape the country's response to sustainability and climate change, it is important to examine their points of view.

Climate Change Knowledge Among University Students:

According to the evidence that is currently available, university students typically have a basic understanding of climate change, especially when it comes to its relationship to carbon emissions, the greenhouse effect, and the environment as a whole (Luomi, 2021). But this information is frequently shallow and generalized, and it varies depending on the population. Research from a number of nations has shown that although a large number of college students are aware that climate change is a real thing, there are still misunderstandings and knowledge gaps. Some pupils, for example, could not completely understand the idea of climate change as a long-term trend and instead mistakenly interpret certain weather occurrences as proof of climate change. There are also false beliefs about the origins and effects of climate change. It's possible that some pupils are unaware of how crucial human activity is to climate change, such as using fossil fuels.

Additionally, differences in climate change awareness according to gender, academic major, and previous exposure to environmental education have been found in the research that has already been conducted (Birkmann, et al., 2022). Research has indicated, for example, that students who major in environmental science or science-related professions typically have a more thorough and accurate understanding of climate change than students who study in non-scientific subjects (Barchielli, et al., 2022). In a similar vein, children who have engaged in climate-related activities or have been exposed to environmental education demonstrate increased knowledge and awareness (Rana, 2020).

These results highlight how critical it is to modify instructional strategies to bridge these knowledge gaps about climate change among college students. Teachers may create more effective climate change curriculum and communication techniques to improve students' knowledge and encourage well-informed decision-making by detecting these misconceptions and discrepancies.

As this research develops, it is critical to look into how these patterns appear among UAE university students in light of the country's unique cultural and environmental context. Only then can educational and awareness initiatives be designed to specifically cater to the needs of this particular demographic (Vladu & Enache, 2023).

Climate Change Attitudes Among University Students:

Numerous studies have examined how university students feel about climate change, providing insight into the complex interactions that influence how they see and react to this global issue. University students' perspectives toward climate change vary widely, as these research projects demonstrate (Syauqi, et al., 2020). Some students show a great deal of worry and a strong commitment to taking action against climate change because they see it as an urgent global issue that has to be addressed right away. Some individuals may exhibit a more detached or uninterested demeanor, potentially impacted by elements such as a perceived deficiency of personal significance or hindrances to personal involvement (Nordhaus, 2019).

These opinions are influenced by several factors. Cultural elements are important because the cultural context in which pupils are embedded shapes their views and values. For example, kids may show more proactive and worried attitudes regarding climate change in areas where environmental stewardship is prioritized. On the other hand, kids may not be as concerned about climate change in societies that place a high value on economic growth (Amir, et al., 2020). An important factor in determining how people feel about climate change is social influence. Social networks, family, and peers can support or contradict a student's viewpoint. Being with people who share your interest for environmental issues can increase your worry and inspire you to take action (Fidalgo, et al., 2020).

University students' perspectives toward climate change are significantly influenced by their educational experiences. It has been demonstrated that students' perspectives are positively impacted when they are exposed to climate change education, whether through curriculum, extracurricular activities, or community engagement. Furthermore, the degree of concern about climate change can be influenced by the caliber and depth of environmental education (Almahasees, et al., 2021). Students frequently have a deeper comprehension of climate change and a stronger sense of personal responsibility when they receive thorough and varied environmental education. Examining the influences on attitudes about climate change becomes

especially important in the context of the United Arab Emirates, given its unique cultural and social milieu (Al-Nofaie, 2020). Comprehending the ways in which cultural norms, societal structures, and the particular educational backgrounds of college students mold their perspectives can help develop initiatives that are specifically designed to promote environmental awareness and climate action in this distinct area.

Climate Change Perception Among University Students:

Numerous studies have looked into how university students view climate change, providing insight into their understanding of the significance and impact of this worldwide issue. These studies regularly show that different university students have different perspectives on climate change. Although most students agree that climate change exists, different demographic groups have differing perspectives on how important and significant it is to them (Gifford, 2011).

Given their deeper comprehension of the science underlying climate change, students choosing scientific or environmental majors frequently demonstrate a stronger awareness of the issue's significance (Thomas & Benjamin, 2018). They frequently see climate change as a serious issue that demands immediate attention. Students studying non-science subjects, on the other hand, could believe that climate change is not as urgent or pertinent to their personal or academic lives. Furthermore, perceptions of climate change can also be influenced by demographic variables including gender and cultural background. Studies indicate that women are more likely than men to voice concerns about climate change (Spence, et al., 2012). This gender gap could be explained by variations in how people perceive risk and empathy, with women often being more risk-aware and sympathetic when it comes to environmental challenges.

The way that people see climate change is significantly shaped by their cultural background (Moser, 2010). Pupils from areas where environmental stewardship is highly valued culturally might have a more immediate and proactive perspective on climate change. Students from societies where economic development comes first can, on the other hand, consider climate change to be less important (Bulkeley, 2013).

It is crucial to comprehend these differences in how people perceive climate change, especially in the context of the United Arab Emirates, which has a diverse population and a distinct cultural blend. Developing successful instructional tactics and outreach programs that are suited to the unique requirements and perceptions of university students in this area requires an understanding

of the factors that affect perception. By considering these subtleties, educators and politicians can create interventions that connect with a wider range of demographic groups, encouraging university students to feel more deeply committed to solving climate change and to acting quickly.

The Moderating Role of Climate Change Attitude:

Research in this area has repeatedly demonstrated that attitudes toward climate change have a big impact on how knowledge is processed, which in turn affects perception. Perceptions of climate change as a pertinent and urgent issue can be influenced by attitudes, which serve as a filter through which people interpret information (Wolf & Moser, 2011). For example, those who have a proactive or positive attitude toward climate change—that is, who are eager to take action and believe that addressing climate change is important—tend to perceive the problem as more urgent and serious (Corner, et al., 2014). Their mindset strengthens the link between perception and understanding of climate change, increasing the likelihood that they will understand the gravity and urgency of the issue (Pearson, et al., 2017).

On the other hand, people who are more doubtful or apathetic about climate change might show a poorer correlation between their perception and knowledge (Moser, 2016). Their mindset may serve as a buffer, causing individuals to minimize or reject the data, which prevents them from seeing climate change as a serious issue. These results demonstrate the intricate interactions that exist between perception, attitude, and knowledge about climate change (Amir, et al., 2020). The moderating effect of attitude emphasizes that perception is influenced by one's attitude as much as their information, not just by their knowledge alone.

Examining how climate change attitude influences the knowledge-perception relationship becomes more pertinent when considering UAE university students. By comprehending the ways in which their attitudes impact the conversion of knowledge into perception, instructional techniques and targeted interventions can be developed. Educators and politicians should endeavor to cultivate a more profound comprehension of climate change and an increased feeling of urgency among university students in the United Arab Emirates by customizing techniques to address the distinct views that are common among this group.

Climate Change Education in the UAE:

Since the UAE realized how important it was to prepare its citizens—including university students—to face the difficulties posed by climate change, the country has focused more and more on climate change education. A number of programs and laws have been put into place to support education on climate change, and these endeavors have been crucial in increasing public awareness and encouraging sustainable lifestyles (Alkhaldi, et al., 2023). The inclusion of climate change education in the national curriculum is one notable initiative in the United Arab Emirates. The significance of integrating environmental subjects, like as climate change, into school curricula at different levels has been underscored by the government. This is a proactive measure to guarantee that pupils are taught about climate change from an early age.

Additionally, the UAE has started awareness campaigns and initiatives aimed at college students. The main goals of these programs are to advance energy efficiency, sustainability, and ecologically conscious behavior. The purpose of these programs is to make children aware of the implications of climate change and the part they may play in reducing its effects. But evaluating these programs' and policies' efficacy is a continuous process. They have certainly helped to increase awareness of climate change, but it is important to assess how they have affected students' understanding, attitudes, and views (Griffin, et al., 2022). Assessing the degree to which these instructional initiatives have impacted students' behavior and dedication to sustainability is crucial to determining their overall efficacy.

One area that could use improved is how broad and in-depth the education on climate change is. More knowledgeable and driven people may result from making sure that kids are exposed to viable solutions as well as comprehensive information about the causes and effects of climate change. Furthermore, combining sustainability initiatives and real-world applications with climate change education can provide a more hands-on learning environment. It can enable learners to actively participate in environmental issues and create solutions, increasing the relevance of the learning process.

In conclusion, the UAE has started significant initiatives to increase awareness among university students and include climate change teaching into its educational system. Assessing the success of these programs and putting reform plans into action will help the nation better prepare for the problems posed by climate change and produce future leaders and citizens who are proactive and environmentally aware.

Cross-Cultural Perspectives:

University students' perceptions and awareness of climate change from a cross-cultural viewpoint offer a useful prism through which to view the global dynamics of this pressing issue (Majumdar & Varadarajan, 2013). Studies that compare pupils in the United Arab Emirates (UAE) to those in other locations have been carried out to find out how these differences differ and what lessons can be drawn from them. A noteworthy discovery from these cross-cultural investigations is the impact of socioeconomic circumstances and cultural values on knowledge of climate change. Studies have indicated, for example, that students in the United Arab Emirates, which is located in an arid region, might be more cognizant of water scarcity and how it relates to climate change, while students in other regions that face different environmental challenges might be more focused on other aspects of climate change (Jabeen, et al., 2017).

Additionally, students' attitudes and beliefs on climate change are influenced by cultural variables. Comparing students in the UAE with those in Western nations may uncover different perspectives; the former may place more value on community and group efforts, while the latter may place more emphasis on individualism and personal accountability in the fight against climate change (Corner, et al., 2014). Furthermore, disparities in climate change awareness and attitudes can also be attributed to discrepancies in educational systems and techniques. The effectiveness of various educational initiatives in promoting environmental consciousness among university students can be evaluated through cross-cultural studies (Majumdar & Varadarajan, 2013).

Exploring these cross-cultural viewpoints is not only informative, but also necessary for adjusting climate change education and communication tactics to distinct regional and cultural contexts. It aids in comprehending the complicated nature of climate change awareness and the need to engage pupils in ways that are meaningful to their diverse cultural backgrounds and environmental concerns. These comparative insights help to broaden our understanding of how climate change is seen and acted upon around the world, and they have the potential to drive more effective global climate policy and sustainable practices.

Theoretical Framework:

Understanding the intricate interplay of climate change knowledge, attitude, and perception frequently relies on existing theoretical frameworks that offer light on the dynamics of these relationships. Several theoretical models, including the Knowledge-Attitude-Behavior (KAB)

model, the Environmental Belief Model (EBM), and the Theory of Planned Behavior (TPB), have been used to explicate this complex link.

Model of Knowledge-Attitude-Behavior (KAB): The Knowledge-Attitude-conduct (KAB) model is a well-established theoretical framework for understanding the relationship between an individual's knowledge, attitude, and conduct in regard to a certain topic, such as climate change. According to this paradigm, an individual's understanding of a subject influences their attitude toward it, which shapes their conduct. Individuals with a higher level of awareness about climate change are more likely to acquire positive attitudes and engage in pro-environmental activities, according to the KAB model. This theoretical framework emphasizes the interrelationship of these three factors, emphasizing the importance of information in shaping attitudes and, as a result, behaviors related to climate change mitigation and adaptation (Kuhlemeier, et al., 2012).

Environmental Belief Model (EBM): The Environmental Belief Model (EBM) is a theoretical framework that investigates people's environmental beliefs, attitudes, and behaviors in relation to environmental challenges such as climate change. According to this paradigm, an individual's perceptions about the environment influence their attitudes and, as a result, their behaviors. The EBM emphasizes the importance of understanding an individual's fundamental environmental beliefs and values in the context of climate change, as these factors impact their attitudes and responses to climate-related problems. Individuals who hold strong environmental views are more likely to acquire favorable attitudes on climate change, which leads to pro-environmental behavior and a commitment to reducing its effects. The EBM highlights the role of basic environmental values in affecting attitudes and actions toward climate change (Ali, et al., 2022).

These theoretical frameworks shed light on the mechanisms that underpin the links between climate change knowledge, attitude, and perception. They aid researchers in comprehending the sequential flow of various variables as well as the factors that mediate or moderate their interactions. Scholars may provide a more thorough knowledge of how climate change awareness develops and how it can be utilized to promote sustainable behaviors and informed decision-making by using these frameworks.

Hypothesis:

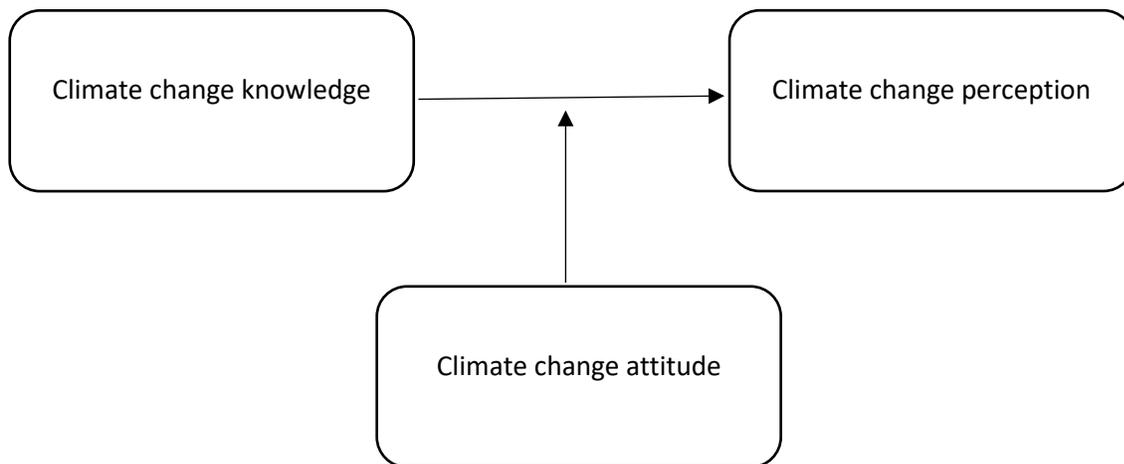
The following hypotheses serve as the study's guiding propositions, providing a framework for investigating the complex links between climate change knowledge, attitude, and perception among university students in the UAE. These hypotheses aim to identify the intricate links and potential moderating effects of climate change attitude on the knowledge-perception relationship through thorough empirical study.

H0: There is no significant relationship between the level of climate change knowledge among university students in the UAE and their perception of climate change impacts.

H1: A higher level of climate change knowledge among university students in the UAE is positively associated with a more concerned and immediate perception of climate change impacts.

H2: Climate change attitude moderates the relationship between climate change knowledge and perception among university students in the UAE, such that the effect of knowledge on perception is stronger for those with more positive attitudes.

Conceptual Framework:



Variables Under study:

Climate Change Knowledge:

In the current study the variable climate change knowledge is playing the role of the independent variable. An individual's comprehension of the basic ideas, causes, consequences, and mitigation tactics associated with climate change is referred to as their climate change knowledge (Masson-Delmotte, et al., 2021). It includes knowledge of the scientific theories underlying climate change,

including those pertaining to the greenhouse effect, carbon emissions, and phenomena associated with the climate. This knowledge also includes an understanding of the wider environmental, socioeconomic, and policy implications of climate change. Understanding climate change is essential for making educated decisions and taking appropriate action, hence it plays a crucial role in influencing how people view and react to climate change-related issues. It is frequently evaluated using quizzes or questionnaires designed to test an individual's knowledge of climate science and its effects on the environment and society (Malhi, et al., 2020).

Climate Change Perception:

In this study the variable climate change perception is playing the role of a dependent variable. A person's subjective understanding and evaluation of climate change and its effects on their surroundings, way of life, and the global community is referred to as their "climate change perception (Clayton, 2020)." It includes people's views on the causes and effects of climate change as well as their perceptions of its urgency and actuality. Individuals' perceptions of climate change might differ depending on factors such as cultural background, education, information exposure, and personal beliefs. Understanding climate change perception is critical for developing effective communication tactics, legislation, and educational programs to combat climate change and promote environmental responsibility (Hickman, et al., 2021).

Climate Change Attitude:

In this study climate change attitude is playing the role of the moderator in the relationship of the independent and dependent variable. An individual's or a group's perspective, temperament, and emotional response to the topic of climate change is referred to as their climate change attitude (Clayton, 2020)." It encompasses a variety of climate-related attitudes, beliefs, and values, as well as the desire to act or make decisions in response to this global environmental crisis. Climate change attitudes can range from positive and proactive views that emphasize the necessity of addressing climate change to more apathetic or skeptical attitudes that discount the significance or urgency of solving it. These attitudes are shaped by a complex interaction of factors such as cultural background, education, information exposure, and personal beliefs, and they can considerably alter an individual's desire to engage in climate-friendly actions and advocate for climate action. Understanding climate change attitudes is critical for developing successful

communication strategies, legislation, and educational efforts aimed at encouraging sustainable practices and mitigating climate change impacts.(Jones & Davison, 2021).

Summary:

The second chapter examines the literature on university students in the United Arab Emirates (UAE) and their knowledge, attitudes, and beliefs regarding climate change. The UAE's susceptibility to climate change is emphasized by its coastal location and economic dependence on fossil fuels. The UAE's dedication to sustainability, exemplified by programs such as UAE Vision 2021 and Dubai Clean Energy Strategy 2050, establishes the background conditions for researching university students' knowledge of climate change. The research emphasizes that even though university students often have a fundamental understanding of climate change, there are still knowledge gaps and misconceptions that call for specialized teaching strategies. The necessity for focused treatments is highlighted by differences in awareness depending on factors such as gender, major, and exposure to environmental education. Students' opinions toward climate change vary widely, impacted by cultural, social, and educational variables, from active engagement to indifference. Students' perceptions of the urgency and relevance of climate change vary, and these perceptions are related to factors such as gender, academic major, and cultural background. The chapter stresses how crucial it is to take these things into account, especially given the UAE's multicultural setting. It is shown that attitudes have a substantial impact on how information is received by highlighting the moderating function of climate change attitude in altering the knowledge-perception relationship. The literature study delves into climate change education programs in the United Arab Emirates, highlighting the significance of evaluating their efficacy in molding students' cognizance, outlook, and understanding. Diverse cultural viewpoints highlight how socioeconomic status and cultural norms impact people's knowledge of climate change. The introduction of theoretical frameworks like the Environmental Belief Model (EBM) and the Knowledge-Attitude-Behavior (KAB) model sheds light on the complex dynamics of climate change awareness. The chapter concludes by introducing the research hypotheses, which include the connections between UAE university students' perceptions, attitudes, and knowledge of climate change. In order to set the stage for empirical research, the conceptual framework outlines the variables under study—climate change knowledge, perception, and attitude—and highlights how they are related to one another.

Chapter 3: Methodology

The upcoming chapter embarks a thorough journey through research methods and data analysis. The foundation for understanding the intricate interactions between climate change knowledge and climate change perception within the United Arab Emirates university students is laid during this key phase of this study. This research seeks to glean important insights and reach well-informed findings that increase the general understanding of this crucial relationship by thorough data collecting, methodical analysis, and solid techniques.

Research Design:

Research Approach:

Establishing a clear study methodology is essential in the quest for comprehending the complex relationship between climate change knowledge and climate change perception within the United Arab Emirates university students. The research methodology used in this study includes quantitative components for ensuring a thorough investigation of the topic. The systematic collecting of numerical data and the use of statistical analysis to quantify relationships, patterns, and trends comes under quantitative research (Mohajan, 2020). The use of quantitative research in this study will make it possible to measure and quantify factors like climate change knowledge and climate change perception within the United Arab Emirates. It gives individuals the tools to test theories, find relationships, and make generalizations based on empirical data (Pawar, 2020). Statistics can be used to determine the strength and importance of correlations between variables from quantitative data, which is frequently collected through well-structured surveys. Incorporating quantitative research methods, this study aims to provide a fair and comprehensive analysis of the topic. Quantitative methods offer statistical consistency and empirical validity (Aithal & Aithal, 2020). This strategy enables a more thorough investigation of the impact of climate change knowledge on climate change perception within the unique setting of the United Arab Emirates banking. This approach provides a thorough and nuanced examination, enriching the study's conclusions and advancing our understanding of the intricate dynamics at work.

Data Collection:

Structured questionnaires would be used for gathering data and would be distributed to students and staff members in educational institutions of United Arab Emirates. The study will ask questions about how does climate change knowledge influence climate change perception.

Sampling:

This study's sampling technique attempts to obtain a representative and diverse sample of university students in the United Arab Emirates (UAE). Given the diversity of the population, a stratified random sampling strategy will be used. The UAE has a diverse population of nationalities, and university students come from a variety of cultural and socioeconomic backgrounds. Stratification enables the selection of subgroups based on essential factors such as nationality, primary field of study, and geographic location, ensuring that the sample reflects the diversity of the population. This method allows researchers to make more solid findings regarding climate change knowledge, attitude, and perception within specific demographic groups while still ensuring overall representativeness.

Sample Size:

Particularly in quantitative research investigations, a sample size of 200+ people is regarded as robust and statistically significant (Lakens, 2022). It offers a sizable dataset that can produce trustworthy results and permit useful analyses. This sample size enables to do different statistical analyses, investigate correlations, and perhaps even pick up on more nuanced interactions between variables (Serdar, et al., 2021). The desired sample size of the current study is 200+.

Data Analysis:

This study's data analysis will use a variety of quantitative methodologies to investigate the links between climate change knowledge, attitude, and perception among university students in the UAE. To offer an initial picture of the data, descriptive statistics will be used, including the calculation of averages, standard deviations, kurtosis, and skewness. This will allow the identification of central tendencies, data spread, and distribution shape.

The frequency distribution of responses will be assessed demographically, providing insights into how climate change knowledge, attitude, and perception differ across different subgroups of university students. Cronbach's Alpha will be calculated separately for each variable to assess the internal consistency and reliability of items on the scales evaluating climate change knowledge, attitude, and perception. Pearson's correlation coefficient will be used to investigate the correlations between various variables, allowing potential associations and patterns to be identified. Finally, regression analysis will be used to determine the influence of climate change

knowledge and attitude on climate change perception. This analysis will provide valuable insights into how these variables interact and influence one another within the context of the study, ultimately contributing to a comprehensive understanding of the dynamics of climate change knowledge, attitude, and perception among UAE university students.

Ethical Considerations:

The research procedure will strictly adhere to ethical principles, such as informed consent, data confidentiality, and data security. All participants will remain anonymous, and their participation will be entirely voluntary (Abbasi, et al., 2022).

Summary:

The research design, methodology, sampling strategy, sample size, data analysis methods, and ethical considerations are described in Chapter 3 in order to examine the intricate relationship between university students' perceptions and knowledge of climate change in the United Arab Emirates (UAE). With the use of standardized questionnaires given to employees and students in UAE educational institutions, the study takes a quantitative approach. The study uses a stratified random sampling technique with a robust sample size of more than 200 to ensure variety, taking into account variables including country, field of study, and geographic location. Descriptive statistics are used to provide a broad overview of the data, followed by frequency distribution to investigate demographic differences, Cronbach's Alpha to evaluate reliability, Pearson's correlation coefficient to find correlations, and regression analysis to determine how knowledge and attitudes about climate change affect perception. In order to ensure adherence to ethical norms including informed permission, data confidentiality, and security throughout the study process, the chapter places a strong emphasis on these issues. The goal of this thorough approach is to produce insightful information about the complex dynamics of university students' understanding of climate change in the United Arab Emirates.

Chapter 4: Data Analysis and Findings

This chapter takes us on an exploration and discovery journey, where data-driven insights provide a clear picture of the awareness of climate change among UAE university students. Our mission is to disentangle the intricate connections between perception, attitude, and knowledge about climate change in this particular cultural and environmental context. By examining the data, we hope to give not only a thorough understanding but also insightful analysis that can help guide policy choices, instructional plans, and social reactions to climate change in the United Arab Emirates.

Pretest:

Pretests are an essential part of the research process since they act as an early assessment of the tools, techniques, and protocols used in the study before the main data collection phase starts. The pretest phase is especially important in the context of our study on university students' understanding of climate change in the United Arab Emirates (UAE). The pretest's main goals are to find any potential problems or ambiguities in the survey instruments and make sure the questions are objective, understandable, and sensitive to cultural differences. We can improve the survey during this phase to better suit the intended audience, which is UAE university students. It assists in locating any unclear or complex inquiries that could result in erroneous answers, hence enhancing the validity and dependability overall.

A small sample of people who match the characteristics of the study's real respondents are chosen to participate in the pretest. These people could be students with comparable ethnicities, demographics, and educational backgrounds. In addition to filling out the survey, they are asked to comment on how relevant and clear the questions are. The replies from the pretest participants are analyzed to find any trends in misinterpretation, perplexity, or other survey problems. The pretest participants' feedback is very helpful as it helps us improve the survey tool and fix any errors. It might result in questions being rewritten or restructured, language being clarified, and the survey being made to fit the unique experiences of UAE university students as well as the cultural background. The ultimate survey will be more accurate, insightful, and better suited to the intended audience thanks to this iterative approach.

Additionally, the pretest helps evaluate the validity and reliability of the survey items. We can determine how well each question captured the intended information by examining the internal

consistency and coherence of the pretest replies. It assists in determining which items should be changed or removed in order to improve the survey's overall quality. We are also able to assess the practicality and logistics of data gathering during the pretest phase. It helps determine any logistical or technological obstacles, estimates the amount of time needed to complete the survey, and guarantees that the data collection procedure will function well when we interact with a bigger sample.

Pilot Testing:

Pilot testing is an important step in the research process that is carried out with 50 respondents. To evaluate the efficacy of the survey instrument and methods, a smaller sample of participants who represent the target population are given the survey. Pilot testing yields valuable insights and feedback that are crucial for improving the survey and guaranteeing the quality of data obtained for the larger study. The 50 participants in the pilot study were requested to fill out the survey and provide their answers to the questions. Evaluating the survey items' comprehensibility, relevancy, and clarity was the goal. It made it possible to find any questions that needed clarification or were unclear, and it also made sure that the questions were appropriate for UAE university students and sensitive to cultural differences.

These 50 participants' comments and answers were carefully examined to look for any trends of miscommunication, misunderstanding, or incorrect interpretation of the survey questions. Through this process, the survey instrument was improved, with questions being reworded or restructured to increase their precision and clarity. Pilot testing was essential in determining the practicality and logistics of the data collection procedure. Estimating the time needed to complete the survey and detecting any logistical or technological issues that might come up while working with a bigger sample were both aided by it. This information is crucial for making sure that the primary research phase's data collection process runs smoothly. We were also able to evaluate the validity and reliability of the survey items thanks to the pilot testing. The survey's overall quality was improved by identifying any items that need revision or removal through an analysis of the internal consistency and coherence of the pilot test replies.

Through the use of SPSS software, the collected data was examined to check the reliability thresholds. All of the constructs' results were respectable, and all variables' reliabilities surpassed the acceptable threshold. The acceptable limit for factor loadings is > 0.6 , and all of the displayed

values are higher than 0.6. The acceptable limit for Cronbach's alpha is > 0.7 , and the values of the result show that each construct's Cronbach alpha value was greater than 0.7. Results of the pilot test are shown in the table.

	Cronbach's Alpha	Mean	Std. Deviation
CCK	0.93	1.79	2.90
CCP	0.83	1.85	2.12
CCA	0.90	1.87	2.12

The pretest analysis significantly boosted confidence in the constructs before they were evaluated on the whole sample. All of the sample's data was gathered after the pilot test, and the complete results are detailed here.

We have taken a big step in our research process by distributing 365 questionnaires to students from different universities in the United Arab Emirates (UAE). The purpose of our research is to find out how aware this diverse population is of climate change. Every questionnaire is a useful data source that sheds light on the complex connections between perception, attitude, and knowledge about climate change. However, 25 questionnaires that were collected during the data collecting phase were not included in the study. To maintain the accuracy and consistency of the dataset, these omissions were made in accordance with certain standards, such as missing or inconsistent responses.

Although it is unfortunate that these 25 surveys could not be incorporated into the final analysis, their exclusion was an essential measure to ensure the research's integrity and dependability. Our data analysis and conclusions will be based on the remaining 340 surveys, which provide a sizable and representative sample of UAE university students. The knowledge gathered from this large dataset will help provide a thorough grasp of climate change awareness within this particular cultural and environmental setting.

Socio-Demographics:

The table provides a breakdown of respondent characteristics across various categories.

Gender: The table shows the distribution of respondents by gender. There are 201 (60.5%) male respondents and 133 (38.9%) female respondents.

Age: Respondents' age distribution is presented in three categories. The majority, 290 (84.8%), fall into the age group of 18-25 years, followed by 27 (7.9%) respondents aged 25 years and above. There are 23 (6.7%) respondents less than 18 years of age.

Marital Status: The majority of respondents are single, with 320 (93.6%) falling into this category. A smaller number are married (18, 5.3%), and a very small percentage are divorced (2, 0.6%).

Level of Study: The table indicates the level of study of respondents. The largest group is 3rd-year undergraduate students with 139 (40.6%), followed by 2nd-year undergraduate students with 110 (32.2%). Other categories include 1st-year undergraduate, 4th-year undergraduate, graduate (Master), and graduate (PhD).

Field of Study: Respondents' field of study is categorized into various disciplines. The largest group is in the "Arts" category with 114 (33.3%), followed by "Humanities" (58, 17.0%) and "Biological science" (29, 8.5%).

Religious Affiliation: The majority of respondents affiliate with Islam, with 322 (94.2%) indicating this as their religion. There are smaller numbers of respondents who affiliate with Christianity (9, 2.6%), Hinduism (3, 0.9%), and Buddhism (6, 1.8%).

Climate Change Courses/Training: Respondents were asked whether they have completed any climate change courses or training. 26 (7.6%) respondents indicated "Yes," while the majority, 314 (91.8%), responded with "No."

Sources of Knowledge on Climate Change: This category identifies where respondents acquire knowledge about climate change. "University" is the most common source, with 180 (52.6%) respondents obtaining knowledge from this source. Other sources include "Internet," "Social Media," "Radio/Television," "Print Media," and "Other sources."

Household Size: The table displays the distribution of respondents by household size. The majority of respondents, 307 (89.8%), come from households with 2 to 4 members.

Father's Occupation: Respondents' father's occupation is categorized into "Formal employment" and "Informal employment." The majority, 234 (68.4%), indicated "Informal employment," while 106 (31.6%) indicated "Formal employment."

Mother's Occupation: Respondents' mother's occupation is similarly categorized into "Formal employment" and "Informal employment." The majority, 254 (74.3%), indicated "Unemployed."

Father's Highest Educational Level: This category provides information on the highest educational level attained by respondents' fathers. The majority have "Undergraduate" education, with 288 (84.2%) falling into this category.

Mother's Highest Educational Level: Similarly, this category indicates the highest educational level attained by respondents' mothers. The largest group falls into the "Undergraduate" category with 258 (75.4%).

Category		Frequency	Percent (%)
Gender	Male	201	60.5
	Female	133	38.9
Age	Less than 18 years	23	6.7
	18-25 years	290	84.8
	25 years and above	27	7.9
Marital Status	Single	320	93.6
	Divorced	2	0.6
	Married	18	5.3
Level of Study	1 st year undergraduate	26	7.6
	2 nd year undergraduate	110	32.2
	3 rd year undergraduate	139	40.6
	4 th year undergraduate	47	13.7
	Graduate (Master)	12	3.6
	Graduate (PhD)	6	1.8
Field of study	Science	25	7.3

	Arts	114	33.3
	Humanities	58	17.0
	Biological science	29	8.5
	Nursing	28	8.2
	Business Administration	33	9.6
	Food and Agriculture	20	5.8
	Engineering	16	4.7
	Medical science	17	5.0
Religious Affiliation	Islam	322	94.2
	Christianity	9	2.6
	Hinduism	3	0.9
	Buddhist	6	1.8
	Others	-	-
Have you completed	Yes	26	7.6
any climate change	No	314	91.8
courses/training?			
Sources of Knowledge	University	180	52.6
on	Internet	80	23.4
Climate Change	Social Media	70	20.5
	Radio/Television	10	2.9
	Print Media	-	-
	Other sources	-	-
Household Size	2 to 4	307	89.8
	5 to 7	24	7.0
	Above 7	9	2.6
Father's Occupation	Formal employment	106	31.6
	Informal employment	234	68.4
	Unemployed	-	-
Mother's Occupation	Formal employment	36	10.5
	Informal employment	50	14.6
	Unemployed	254	74.3

Father's	highest	Illiterate	-	
Educational Level				
		Primary/Elementary(Grade 5)	-	-
		Intermediate (Grade 6-8)	-	-
		Secondary (Grade 9-12)	6	1.8
		Undergraduate (Honors/Degree/Equivalent)	288	84.2
		Graduate (Master/PhD)	32	9.4
		Others	14	4.1
Mother's	highest	Illiterate	-	-
Educational Level				
		Primary/Elementary(Grade 5)	-	-
		Intermediate (Grade 6-8)	-	-
		Secondary (Grade 9-12)	40	11.7
		Undergraduate (Honors/Degree/Equivalent)	258	75.4
		Graduate (Master/PhD)	39	11.4
		Others	3	0.9

Reliability and Validity Analysis:

Before analyzing the constructions in depth, the entire sample's data was tested. Anchor points and the mean value were examined for each construct. The results of the analysis for each construct are shown in Table. Results indicate that no construct had any major problems.

Variable	Constructs (items)	Anchor Points	Mean
Impact for knowledge	Forests can reduce climate change by decreasing the amount of GHGs in the atmosphere	True-1, False-0	1.00

	Carbon dioxide (CO ₂), Methane (CH ₄) and nitrous oxide (N ₂ O) are all greenhouse gases.	True-1, False-0	1.02
	Carbon dioxide (CO ₂) is the principal greenhouse gas.	True-1, False-0	1.06
	Emission of Greenhouse gases (GHGs) into the atmosphere is responsible for climate change.	True-1, False-0	1.03
	Climate change can be identified by changes in the mean or variability of its properties persisting for an extended period, typically decades or longer.	True-1, False-0	1.03
Impact for Attitude	Are you willing to use public transport in order to reduce the impacts of climate change?	1-Never, 5-Always	2.09
	Are you willing to pay more for a cleaner (environmentally friendly) source of energy in order to reduce the impacts....	1-Never, 5-Always	2.60
	Are you happy to reduce your energy use in order to decrease the impacts of climate change?	1-Never, 5-Always	3.42
	Are you willing to join any climate change advocacy group?	1-Never, 5-Always	2.76
	Are you willing to take a climate change course as a free elective?	1-Never, 5-Always	3.85
	The study of climate change should be mandatory for all undergraduate students?	1-Never, 5-Always	4.34

Impact for perception	Would you like to learn more about climate change?	1-Never, 5-Always	3.58
	Climate change will affect key factors, such as the environment. Human health, food security, natural.....	1-Strongly Agree, 5-Strongly Disagree	2.01
	Education can play a major role in mitigating the effects of climate change.	1-Strongly Agree, 5-Strongly Disagree	1.98
	Climate change will increase the incidence of food-borne and water-borne diseases, such as diarrhoea.	1-Strongly Agree, 5-Strongly Disagree	1.68
	Human activities are responsible for 21 st - century climate change.	1-Strongly Agree, 5-Strongly Disagree	1.63
	Climate change is real.	1-Strongly Agree, 5-Strongly Disagree	1.63

The next step after this was to look at the factor loadings for every item that was done using CFA. Each construct item's individual latent variables were loaded. The outcome demonstrated that all item factor loadings exceeded the cutoff point of > 0.60 . The details of the factor loading range are shown in the accompanying table, which also lists the item numbers for each variable.

Variable	Items	Ranges of Factor Loadings
Impact of Knowledge	5	0.63-0.99
Impact of Attitude	7	0.68-0.78
Impact of Perception	5	0.69-0.96

Convergent Reliability and Validity:

A series of primary data analyses that could possibly grant the analysis eminence, including factors with low reliability, low validity, stern deviation from the assumption of normality, the factors multi-collinearity, and CMV temperament, guaranteed the absence of relics. In order to describe the factors, reliability scores, factor loadings, composite reliability (CR), average variance extraction, and inter-factor correlations were all carried out.

Confirmatory factor analysis (CFA) was used in this study to evaluate and validate the factor loadings values of the observed measurements. The item-factor accuracy is examined using CFA in order to prepare for the factor relationship analysis. According to Shrestha (2021), the factor loading value must be more than 0.6. The factor loadings for each construct component are shown in the table. The acquired findings demonstrated the validity of the suggested model indices because the values fall within the preferred range for loading values.

By examining the values of Cronbach's Alpha, CR (composite reliability), and AVE (average value extracted), the convergent reliability was examined. According to Chin (1998), the acceptable criterion for construct reliability is 0.8 for Cronbach's Alpha, 0.7 for composite reliability, and 0.5 for average value extracted. Since the values of all the corresponding variables are greater than the 0.7 threshold, all Cronbach's alpha values are satisfactory. By exceeding the thresholds of 0.7 and 0.5, respectively, composite reliability and average value extracted values have also reached a satisfactory level. All of the results show that all of the instruments used for the constructs were accurate because they are all higher than the threshold. Details are displayed in the table below.

Constructs	Number of Items	Loadings	Cronbach's Alpha	CR	AVE	SQRT AVE
Impact of Knowledge	5	0.627	0.74	2.10	0.65	0.81
		0.985				
		0.612				
		0.927				
		0.927				
Impact of Attitude	7	0.780	0.97	1.58	0.81	0.9
		0.710				

		0.691				
		0.735				
		0.679				
		0.718				
		0.675				
Impact of Perception	5	0.892	0.867	2.23	0.75	0.87
		0.802				
		0.685				
		0.964				
		0.964				

Correlations:

The following table represents the correlations among the variables under study. The correlations in the table provide valuable insights into the relationships between knowledge, attitude, and perception of climate change among the study participants. While all correlations are positive, the strength of the relationships varies, with the knowledge-perception relationship being the strongest, followed by the attitude-perception relationship, and the knowledge-attitude relationship being the weakest. Additionally, all of the correlations are statistically significant, indicating that these relationships are not likely due to chance.

		Correlations		
		KNOWLEDGE	ATTITUDE	PERCEPTION
KNOWLEDGE	Pearson			
	Correlation	1	.132*	.202**
	Sig. (2-tailed)		.015	.000
	N	340	340	340
ATTITUDE	Pearson			
	Correlation	.132*	1	.146**
	Sig. (2-tailed)	.015		.007
	N	340	340	340

PERCEPTIO	Pearson			
N	Correlation	.202**	.146**	1
	Sig. (2-tailed)	.000	.007	
	N	340	340	340

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

Chi-Square Test:

To determine whether the two variables under observation are likely to be connected or not, Chi-Square tests were performed. Given that the p value is less than 0.05, there is a substantial correlation among variables. The Chi-Square tests show that there are significant associations between Knowledge-Attitude, Knowledge-Perception, and Attitude-Perception in the context of climate change awareness among the study participants. This means that these variables are not independent, and changes in one variable are associated with changes in the other. The significant Chi-Square values suggest that these relationships are not likely due to chance.

Test Statistics			
	KNOWLEDGE	ATTITUDE	PERCEPTION
Chi-Square	256.059 ^a	182.529 ^b	353.124 ^c
df	9	8	6
Asymp. Sig.	.000	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 34.0.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 37.8.

c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 48.6.

Hypothesis Test:

The obtained results illustrated that there is a significant impact of climate change knowledge on climate change perception hence accepting the H1 hypothesis i.e. A higher level of climate change knowledge among university students in the UAE is positively associated with a more concerned and immediate perception of climate change impacts and rejecting H0. Bootstrapping approach was used to inspect moderating role of climate change attitude among the relationship of climate change knowledge and climate change perception in UAE. The results showed that climate change attitude highly influences their relationship thus, H2 hypothesis was accepted.

Hypothesis	Accepted/Rejected
There is no significant relationship between the level of climate change knowledge among university students in the UAE and their perception of climate change impacts.	No
A higher level of climate change knowledge among university students in the UAE is positively associated with a more concerned and immediate perception of climate change impacts.	Yes
Climate change attitude moderates the relationship between climate change knowledge and perception among university students in the UAE, such that the effect of knowledge on perception is stronger for those with more positive attitudes.	Yes

Summary:

The data analysis and conclusions from a thorough study on university students in the United Arab Emirates' understanding of climate change are covered in detail in Chapter 4. The chapter stresses methodological rigor, starting with pretesting and pilot testing phases to improve survey technologies. 365 questionnaires were distributed as part of the primary data gathering process; 25 were excluded to ensure data consistency. Sociodemographic analysis sheds light on a variety of

respondent variables, including gender, age, marital status, field of study, degree of education, religious affiliation, and courses taken on climate change. Analyses of validity and reliability ensure that the research instruments are robust. Confirmatory factor analysis (CFA) is used in the study to check factor loadings and guarantee proper representation. Cronbach's Alpha, Composite dependability (CR), and Average Variance Extraction (AVE) all above acceptable criteria, confirming convergent dependability. Positive and statistically significant correlations between climate change knowledge, attitude, and perception are revealed by correlation analysis. These relationships range in strength, with the knowledge-perception relationship being the strongest. Significant correlations between knowledge-attitude, knowledge-perception, and attitude-perception are validated using Chi-Square testing. The null hypothesis is rejected by the hypothesis testing, which finds a strong positive correlation between UAE university students' perceptions and knowledge of climate change. The study also reveals that the attitude toward climate change moderates the relationship between knowledge and perception, highlighting the significant influence of attitude on perception. The chapter ends with a thorough analysis of the factor loadings, validity scores, and reliability of the survey items. This provides a thorough and enlightening grasp of the intricate relationships between climate change knowledge, attitude, and perception among university students in the United Arab Emirates. The results provide insightful information for societal reactions to climate change in the distinct cultural and environmental setting of the United Arab Emirates, as well as for policy decisions and educational initiatives.

Chapter 5: Conclusion and Recommendations

Based on the study's findings, conclusion and recommendations are provided in the section that follows. These include incorporating education about climate change into curricula, advocating for climate change, making courses on the subject mandatory, promoting a variety of knowledge sources, incorporating parents, making sure that assessments are ongoing, working across disciplines, implementing research-based projects, and mentoring programs. The chapter ends with an acknowledgement of its limitations, which include sample demographics and the use of self-report questionnaires. It also emphasizes the necessity for future research to employ mixed-methods approaches and investigate a wider range of factors influencing environmental awareness.

Conclusion:

The purpose of this study was to investigate how university students in the United Arab Emirates (UAE) perceive, feel, and know about climate change. The guiding hypothesis of our research was that attitude mediates the relationship between knowledge and perception regarding climate change, and that information about climate change positively influences both attitude and perception. Using a quantitative research approach, we gathered information from 340 university students who were selected to reflect a range of demographic traits. The data analysis produced a number of important conclusions. First, we discovered a small but statistically significant positive link between attitude and climate change knowledge. A little tendency exists for students' opinions regarding climate change to become more positive as their knowledge about it grows. Second, a stronger positive correlation between perception and knowledge was found by the study. There is a greater propensity for respondents to see climate change favorably when they have a greater awareness of it. Thirdly, there was a rather favorable correlation found between perception and attitude. There is a greater tendency for students to have a positive perspective of climate change when they have more positive attitudes toward it.

Chi-Square tests of independence were another component of our study that supported the notion that these variables are connected rather than independent by showing additional evidence of strong relationships between them. This study was quantitative in nature and concentrated on the connections and interactions between perception, attitude, and knowledge about climate change. We analyzed the data using statistical methods, and the design of the study enabled us to make findings that could be applied to a larger group of UAE university students. The research's

conclusions are important for efforts aimed at raising university students' awareness of and education about climate change in the United Arab Emirates. Education campaigns and tactics that attempt to raise awareness of climate change and promote positive attitudes and perceptions can benefit from an understanding of the links between knowledge, attitude, and perception. To sum up, this study adds to the expanding corpus of research on climate change awareness and emphasizes how critical it is to take knowledge, attitude, and perception into account as interconnected elements in climate change education. Enhancing understanding, cultivating optimistic outlooks, and molding perspectives can further our joint endeavors to confront and alleviate the consequences of climate change in the United Arab Emirates and other regions.

Recommendations:

Education on Climate Change: Academic institutions in the United Arab Emirates ought to think about integrating thorough education on climate change into their curricula. In addition to imparting facts, this education ought to emphasize the development of positive attitudes and views. Students can better understand the multifaceted nature of climate change and how it relates to their chosen fields by integrating climate change subjects into their coursework across academic disciplines.

Promotion of Climate Change Advocacy: Universities and pertinent organizations can form and assist climate change advocacy groups on campuses to promote climate change advocacy and engagement. Students can expand their knowledge and develop positive attitudes by actively participating in climate-related projects through these clubs.

Mandatory Climate Change Courses: Considering the importance of climate change in the global context, academic institutions might think about requiring all undergraduate students to take climate change courses. A step like this would guarantee that every graduate knows the basics of climate change and its effects.

Diversification of Knowledge Sources: It is essential to motivate students to explore the internet and social media as other resources for information about climate change in addition to traditional academic institutions. To distinguish reliable sources from false information, media literacy instruction should be added to this.

Parental Involvement: Awareness campaigns can be created to educate parents about climate change and its significance in order to address the role of parents in climate change education. Incorporating parents into the discourse can result in a more comprehensive strategy for educating and advocating against climate change.

Educational initiatives that are specifically designed to target the requirements and cultural environment of the United Arab Emirates are crucial. To help pupils better understand the issue, these efforts ought to highlight how climate change is having an impact on communities and places.

Continuous Evaluation and Feedback: Academic institutions must to consistently evaluate the success of their climate change education initiatives and solicit student input. To stay up with changing attitudes and understanding, curriculum content and instructional strategies must be continuously improved.

Interdisciplinary Cooperation: The effectiveness of climate change teaching can be improved by cooperative efforts between departments and academic specialties within institutions. Multidisciplinary studies and projects can give students a comprehensive grasp of the complex issues raised by climate change.

Research-Based Initiatives: In order to develop a better understanding and a culture of inquiry and problem-solving, encourage students to participate in climate change research initiatives.

Mentorship and Role Models: Giving students access to mentors and role models who are actively engaged in advocacy and research related to climate change will help to motivate and direct them as they travel their own paths toward increased consciousness and action.

Limitations:

Similar to any other research project, this one has limits that must be acknowledged in order to fully comprehend the results. First off, the study's sample was made up of UAE university students, despite being rather diverse. Because of this, it's possible that the results can't be fully applied to other age groups or demographic backgrounds. Furthermore, the main technique for gathering data was the use of self-report questionnaires. These could have been influenced by participants' socially acceptable answers, which could have led to response biases and compromised the data's

accuracy. Another drawback of this study is its cross-sectional design. It offers a moment in time view of the connections between perception, attitude, and knowledge on climate change. Research using longitudinal methods may be able to shed light on how these characteristics change over time.

The study also made use of statistical analysis and quantitative data. Although this method worked well for looking at connections and associations, it might not have captured the subtle and qualitative facets of knowledge of climate change. A mixed-methods approach that includes in-depth interviews and qualitative data may yield a more comprehensive understanding. The study's scope is restricted to predetermined factors by using a structured questionnaire. It's possible that factors impacting climate change awareness that weren't covered in the questionnaire went unnoticed. Future studies ought to take into account a wider range of factors.

Summary:

The study on university students' understanding of climate change in the United Arab Emirates ends in Chapter 5 with important conclusions and suggestions. Positive relationships between attitude, knowledge, and perception of climate change are found in the research. Chi-Square analyses highlight how these elements are interdependent. The recommendations encompass a range of strategies such as including education on climate change into curriculum, promoting advocacy, enacting mandatory courses, expanding the range of knowledge sources, incorporating parents, guaranteeing ongoing assessment, collaborating across disciplines, research-based projects, and mentorship programs. The chapter highlights the necessity for future research to use mixed-methods approaches and take a wider look at factors impacting climate change awareness while acknowledging its limits.

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Appendix:

Questionnaire:

Climate Change Knowledge, Attitude and Perception of University Students in UAE

Ofori, B. Y., Ameade, E. P., Ohemeng, F., Musah, Y., Quartey, J. K., & Owusu, E. H. (2023). Climate change knowledge, attitude and perception of undergraduate students in Ghana. *PLOS Climate*, 2(6), e0000215.

Socio-Demographic Characteristics

Gender: Male , Female

Age: < 18 , 18–25 , > 25

Marital Status: Single or divorced , Married

Level of Study: 1st year undergraduate; 2nd year undergraduate; 3rd year undergraduate; 4th year undergraduate; Graduate (Master); Graduate (PhD)

Field of Study: Science , Arts , Humanities; Biological science , Nursing , Business Administration , Food and Agriculture , Engineering , Medical science

Religious Affiliation: Islam; Christianity; Hinduism; Buddhist; Others

Have you completed any climate change courses/training?: Yes; No

Sources of Knowledge on Climate Change: University; Internet; Social Media; Radio/Television; Print Media; Other sources

Household Size: 2 to 4; 5 to 7; Above 7

Father's Occupation: Formal employment; Informal employment; Unemployed

Mother's Occupation: Formal employment; Informal employment; Unemployed

Father's highest Educational Level: Illiterate; Primary/Elementary (Grade 5); Intermediate (Grade 6-8); Secondary (Grade 9-12); Undergraduate (Honors/Degree/Equivalent); Graduate (Master/PhD); Others

Mother's highest Educational Level: Illiterate; Primary/Elementary (Grade 5); Intermediate (Grade 6-8); Secondary (Grade 9-12); Undergraduate (Honors/Degree/Equivalent); Graduate (Master/PhD); Others

Items for Knowledge (True=1/False=0)

K1 Forests can reduce climate change by decreasing the amount of GHGs in the atmosphere

K2 Carbon dioxide (CO₂), Methane (CH₄) and nitrous oxide (N₂O) are all greenhouse gases.

K3 Carbon dioxide [(CO₂) is the principal greenhouse gas.

K4 Emission of Greenhouse gases (GHGs) into the atmosphere is responsible for climate change.

K5 Climate change can be identified by changes in the mean or variability of its properties persisting for an extended period, typically decades or longer.

Items for Attitude: N= Never=1, R= Rarely=2, S= Sometimes=3, O= Often=4, A= Always=5

A1 Are you willing to use public transport in order to reduce the impacts of climate change?

A2 Are you willing to pay more for a cleaner (environmentally friendly) source of energy in order to reduce the impacts....

A3 Are you happy to reduce your energy use in order to decrease the impacts of climate change?

A4 Are you willing to join any climate change advocacy group?.

A5 Are you willing to take a climate change course as a free elective?

A6 The study of climate change should be mandatory for all undergraduate students?

A7 Would you like to learn more about climate change?

Items for Perception: SD= Strongly Disagree=-2, D= Disagree=-1, N= Not Sure=0, A= Agree=1, SA= Strongly Agree=2

P1 Climate change will affect key factors, such as the environment. Human health, food security, natural.....

P2 Education can play a major role in mitigating the effects of climate change.

P3 Climate change will increase the incidence of food-borne and water-borne diseases, such as diarrhoea.

P4 Human activities are responsible for 21st- century climate change.

P5 Climate change is real.