

# **TERTIARY STUDENTS' AWARENESS OF CLIMATE CHANGE: A CASE STUDY OF A SELECTED UNIVERSITY OF TECHNOLOGY**

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## **Abstract**

**Introduction:** Climate change (CC) is harming the planet. All of society should be involved in managing climate changes or it will become uncontrollable. Students should not be left out as they are regarded as important to the society and in a good position to deal with the changes because they will become tomorrow's decision makers and influencers.

**Problem statement:** It is unclear whether students at tertiary institutions are aware of climate change.

**Aim of study:** The aim of the research was to explore the level of climate change awareness of tertiary students.

**Research methodology:** The research adopted the objectivist ontology. A positivist approach was followed and the research approach was deductive. The intent of the study was to generalise what tertiary students think and know about climate change, therefore, the survey strategy was appropriate. Questionnaires were used to collect data from 603 students who participated in the study. The data were analysed using MS Excel and SPSS available at the university. A factors analysis was also performed. In total, 42 findings were identified.

**Ethics:** Participants were informed of the purpose of the study and their rights to privacy. No cultural or any other sensitive questions were asked, and participants had the option to participate in the study and withdraw at any time.

**Finding:** Students are aware of climate change, but more needs to be done to empower students to become advocates of climate change.

**Keywords:** Climate change, tertiary students, awareness

## **Introduction**

This research focuses on tertiary students' awareness of Climate Change (CC). University students' knowledge and awareness of CC is of utmost importance as it equips them with skills to cope with the future impact of CC (Mugambiwa & Dzomonda, 2018). Climate change has become a reality. It affects everyone in society. According to Jamshidi et al. (2018:1369), CC "is one of the most important environmental problems facing the world today". Rother and Godsmark (2018) state that CC now forms a major part of the global debate. The planet faces a major upheaval in the making and it is essential that all role-players become involved in the battle against negative climate change.

## **Problem statement**

CC has a detrimental effect on the planet. According to Edwards (2020), the planet is in the midst of CC disaster in slow motion. According to Kennedy and Lindsey (2015), the planet has challenge with CC. CC is the defining health and environmental crisis of the twenty-first century (Gordon, 2020).

Future generations need to be aware of the problem and become involved in the management of CC (O'Brien et al., 2018). Narksompong and Limjirakan (2015) suggest that empowering young people on issues related to CC is essential. Trott (2021) also supports that everyone should become knowledgeable about CC already at childhood. Without the involvement of all the people, and particularly students, the planet will eventually be irrevocably be changed or destroyed (Agboola & Emmanuel, 2016). Unfortunately, there is little information available on the level of awareness of students on CC and more research needs to be done on the awareness levels of students on CC (Barreda, 2018). It is unclear whether students at tertiary institutions are aware of CC.

## **Demarcation**

The study focused on tertiary education students. Only one university was selected as a case. Although it is acknowledge that there are many factors affecting CC, only the level of awareness of students at a specific university was studied. Schools and other tertiary institutions such as TVETs were excluded.

## **Limitations of the research**

The questionnaires used for data collection was prepared in English and this may have been a problem for some students as English is generally a second, or even a fourth language to them .Only students were interviewed. Only one UoT was used.

## **Literature review**

CC affects the everyday life of all the people on the planet. There is a need for a deep understanding of the CC problem and for understanding the human and its relationship with the planet at large. The people of the world need to be involved in the management of CC. In this research, students' levels of CC awareness are explored. To do this, a literature review was done using keywords identified from the title, problem statement, research questions and aim of the study.

## **History of climate change**

The science of CC has a relatively long history (Bhandari, 2018). Hamza et al. (2020) argue that there is sufficient historical proof to back the theory that CC is a natural occurrence. The term 'climate' is derived from the Greek word Klima, which means "inclination, the earth's expected slope toward the pole". Black (2013:1) argues that, "when it comes to CC science, the research underlying this perception has accumulated steadily over decades, similar to other major paradigm shifts". The first scientific observation related to this subject can be traced back to the French physicist Joseph Fourier, who discovered the natural greenhouse effect of the Earth in 1824.

## **Understanding the climate change concept**

Many different schools of thought believe that CC is caused dominantly by anthropogenic and natural events (Jehanzaib et al., 2020). The CC subject remains a complex issue, which is differently defined. According to Hoogendoorn et al. (2020:1577), CC "is a combination of both natural events and human activities".

## **Impact of climate change on the world**

There is no doubt that the planet's climate is changing and has been changing for thousands of years (Verichev et al., 2020; Kotir, 2010). According to Adil and Chohan (2020) as well as Dawson and Carson (2018), people worldwide are facing an uncertain future because of environmental issues that present a multitude of challenges, including human diseases, sea levels rising, economic impacts, ocean oxygen depletion and acidification, droughts, extreme weather events, arctic ice melting, and loss in biodiversity.

## **Impact of climate change in Africa**

Africa has been identified as one region of the world most vulnerable to the impacts of CC (Edenhofer, 2014). The United Nations Environment Programme (2012) report suggests that numerous issues should be considered when relating the series of impacts and the underlying

vulnerability of Africa to CC. Oduniyi (2013) states that the impact of CC on Africa is real and severe because of its high agricultural dependency and limited capacity to adapt. Baarsch et al. (2020) debate that CC is anticipated to have a harmful effect on the African nations' economic development and that their income inequalities will subsequently continue to be the highest on the globe.

### **The impact of climate change in sub-Saharan Africa**

Zewdie (2014) suggests that sub-Saharan Africa is more vulnerable to the effects of CC than any developing region in world. Southern Africa is a fast emerging region of great climatic, ecological, and cultural variety (Network of African Science Academies, 2015). In sub-Saharan Africa, the consequences of CC will be felt in many ways throughout human and natural systems.

The climate of the Southern African region is typified by changes in the severity, frequency, and length of weather extremes, causing recurring droughts, floods, and tropical cyclones in southern Africa (Kusangaya et al., 2021).

### **The impact of climate change in South Africa**

Ziervogel et al. (2014) state that CC is a key concern for South Africa where yearly temperatures over the past five decades raised with 1.5 times the perceived universal average of 0.65 °C. The South African rainfall patterns demonstrate high inter-annual changes and decreasing trends, even though CC as the cause is not statistically supported (Dube & Nhamo, 2019). The 2016 drought that affected parts of South Africa is assumed to be the result of recently noticed CC (Masipa, 2017). South Africa is confronted with a population growth and CC-related challenges such as high temperatures, drought, and floods (Jude et al., 2019).

### **Relationship between weather, natural disasters and climate change**

#### *Weather*

The United States Environmental Protection Agency (2018:16) report indicates that "weather is a condition that is normal but when its average pattern changes over time it could be an indication of CC". The Climate Council of Australia (2017) report suggests that heavy rain events, flooding, rising sea-levels, heat waves and bushfires are proof that relates weather to CC.

#### *Disasters*

Several research studies shed more light on the link between CC and disasters (Neumayer & Barthel, 2011). In the past two decades, CC-related natural disasters such as floods, hurricanes, and droughts have illustrated these links (Chen et al., 2020).

### **Climate change responsibility**

The debate about who is responsible for CC has taken a central position on most global platforms, including the United Nations Framework Convention on CC. Some groups argue that large and industrialised countries must take full responsibility as they have a history of contributing to the highest proportion of emissions leading to CC (Frumhoff et al., 2015).

### **The role of humans in climate change**

It is suggested that since the mid-19th century, human activities have largely increased greenhouse gases such as methane, carbon dioxide, and nitrous oxide, which resulted in CC (Rossati, 2017). Many climate ethicists argue that the conscience about climate-related matters requires basic morals and understanding of individually responsibility (Lahikainen, 2018).

### **Human Behaviour Theory**

Swim et al. (2011) suggest that the reason for fast changes in global climate is attributed to human behaviour and the manner in which individuals think and reason. The nature of the ecosystem strongly depends on the patterns of human behaviour (Shafiei & Maleksaeidi, 2020). To combat climate change, a behavioural change model inspired by CC education is needed (Stevenson et al., 2018).

### **Climate change and students**

Pitpitunge (2013) suggests that students have a poor understanding and knowledge of CC. CC awareness by students is a necessary ingredient for a successful execution of CC laws (Oruonye, 2011). According to Mercer (2019), institutions such as the International Federation of Medical Students' Associations are already advocating for the universal inclusion of CC into the core curriculum by 2020 to spread CC awareness.

### **Climate change education**

The United Nations Environment Scientific, Cultural Organisation (2013) perceives CC education as a largely unused strategic resource for constructing resilience and sustainable communities. Mochizuki and Bryan (2015) agree that CC education is vital and should be part of an international response in dealing with these complex challenges.

Deisenrieder et al. (2020) share the same sentiments, stating that formal education often lacks effective CC education. Eilam et al. (2020) agrees that very little is known about how school curricula discuss the need to understand this crisis.

### **Climate change and the general population**

Ajuang et al. (2016) suggest that the general public is conscious of global CC. Knight (2016) indicates that an increase in CC knowledge and perception among the general public could boost an understanding of CC and reduce the challenges of formulating international climate policies that are politically viable and effective. Only with the general public's broad acceptance and involvement, will the optimistic aims of reducing CC be accomplished (Schwirplies, 2018).

### **Sources of information on climate change**

CC information is a vital driver for people to take personal or collective action to mitigate climate issues (Dong et al., 2018b). It is therefore of the utmost importance to choose the right communication channel when communicating CC issues. For example, Veltri and Atanasova (2015) suggest that an emotional text about CC is more likely to capture the attention of people than corporate media. Mavrodieva et al. (2019) agree that social networking outlets such as Instagram, Twitter, and Facebook have given the general public the ability to express views and participate in the CC debate as never before.

### **Methodology**

Wong (2016) regards research methodology as important because it shows the plan on how the research problem will be addresses. It describes the action required to complete the study. It includes the research paradigm or philosophy, research strategy, research design, research methods, data collection and data analysis.

### **Research philosophy**

#### *Ontology*

Al-Saadi (2014:1, citing Crotty, 1998) defines ontology as “the study of ‘being’ and is concerned with ‘what is’, i.e., the nature of existence and structure of reality as such”. Objectivism has been selected. Ratner (2012: online) defines objectivism as “a view that an objective reality exists and can be known more through the gathering of more information. It is more practical and focuses more on facts from individually participants”. For this reason this research is done from an objectivist perspective.

## *Epistemology*

A positivist approach was followed. Positivism is regarded as a philosophical approach only recognising that which is verified scientifically. It posits that a scientific approach is the only way to establish truth (Kawulich, 2012).

## **Research approach**

According to Creswell and Plano Clark (2007:23), deductive researchers “work from the top down, from a theory to hypotheses to evidence to support or refute the theory”. For this study a deductive approach was followed. The results cannot be generalised; it can only be applied to the University of Technology (UoT) studied.

## **Research design**

According to Creswell (2014:113), research design is “an outline that has been formed to find answers to the research questions”. It includes processes used for the collection and analysis of data. Quantitative research was adopted for this study. It emphasises collecting numerical data to explain a specific phenomenon. Quantitative methods focus on objective measurements using statistical and numerical analyses of collected data through surveys and questionnaires (Creswell, 2014).

## **Research strategy**

The research strategy followed was that of a survey. Kendall (2011:31) argues that “a research survey is a tool in which the investigator gathers facts or attempts to determine the connection among facts”. A survey is commonly used method, making it possible to study things that are not seen, such as the beliefs or attitudes of people. The unit of analysis was the students of a selected UoT in South Africa. The survey was structured to gain insight into the answers of the students on the research question and sub-research questions posed to them.

## **Sample population**

The population is defined as the students of the District 6, Mowbrey, Athlone, and Bellville campuses of the selected UoT. The unit of analysis (UoA) was randomly selected (all students have an equal chance to be selected) (Saunders et al., 2019). Selected students on the campuses were approached to complete the questionnaire. Furthermore 1st, 2nd, 3rd and 4th year students were sampled. In total, 603 students participated in the study; 127 were 1st year, 157 were 2nd year, 152 were 3rd

year, and 168 were 4th year students. The data collection and analysis were done under the supervision of the research supervisor.

### **Data collection**

The survey questionnaire was used as a tool to collect data. The questionnaire was given to two experienced researchers, and after the inputs of the researchers have been incorporated, the questionnaire was piloted with students in the different sample clusters.

In order to obtain the required number of questionnaires, fieldworkers were recruited. A workshop was held to train the field workers. They worked on voluntary basis and no one was remunerated in any way. After each session of data collection, the field workers were debriefed to maintain the same standard of data collection and on what was needed to improve the clarity of the questionnaire.

### **Data analysis**

The collected data were captured to an Excel spread sheet. SPSS and Microsoft Excel were used to analyse data. Exploratory factor analysis (EFA) was used to find hidden meanings.

### **Results**

The chapter is divided into section A and section B. Section A presents the contribution figures of all the faculties and levels (from here on forward 'levels' and 'year of study' are used interchangeably) of studies in the institution. Section B presents CC-related questions and research hypotheses. The data were collected by means of a questionnaire, and then coded and analysed using Microsoft Excel and SPSS.

### **Section A**

#### **Faculties**

This chapter presents the research results from the collected data and discusses the research findings. Students have been asked which faculty they represent to support the sampling method do as to ensure that all faculties were included in the survey. A total of 603 students participated in the study – 22% (130) from Business and Management Sciences, 20% (120) from Informatics and Design, 17% (104) from Health and Wellness Sciences, 16% (95) from Education, 13% (81) from Engineering and Built Environment, and 12% (73) from the Faculty of Applied Sciences. Table 1 display the numbers of students from the various faculties of the University of Technology.



**Table 1: Number of students per faculty who completed the survey**

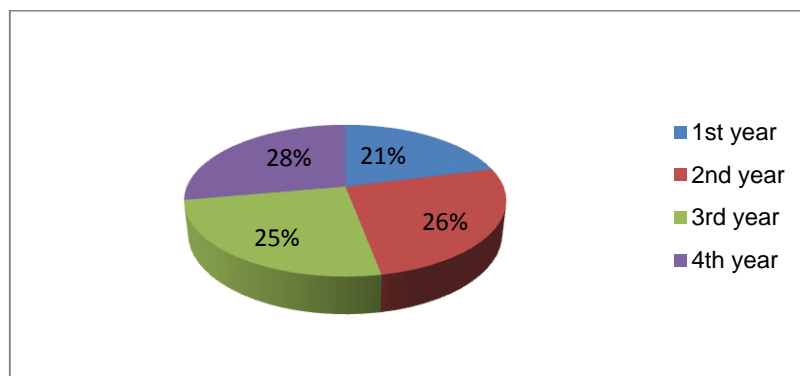
Faculty	Business and Management Sciences	Applied Sciences	Informatics and Design	Education	Engineering and Built environment	Health and Wellness Sciences
Number of students (603)	130	73	120	95	81	104
Percentage	22%	12%	20%	16%	13%	17%

**Student year of study**

The question was asked to ensure that all the years (levels) of study were included in the survey. Students who participated in the study were inclusive of all levels, from 1st year, 2nd year, 3rd year to 4th year. Twenty-one percent (21%) (127) of the students who participated were 1st year, 26% (157) 2nd year, 25% 3rd (152) year and 28% (168) 4th year students. Table 2 and Figure 1 show the students numbers for each year level of study.

**Table 2: Number of students per year of study**

Year of study (level)	1 <sup>st</sup> year	2 <sup>nd</sup> year	3 <sup>rd</sup> year	4 <sup>th</sup> year
Number of respondents	127	157	152	168
%	21%	26%	25%	28%

**Figure 1: Number of students per year of study****Section B**

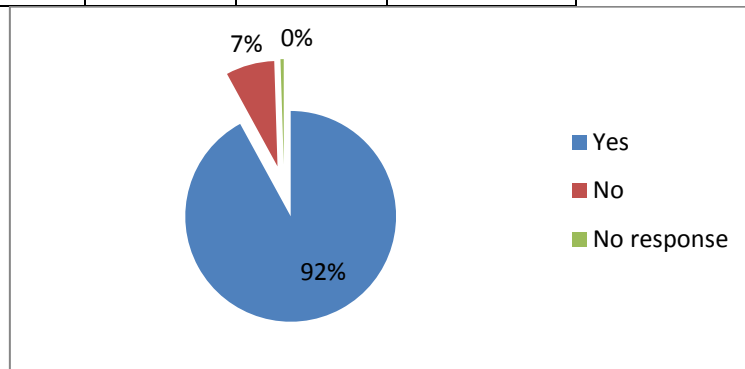
This section sought to explore the students' awareness of CC and responding to the research questions.

**Climate change exists**

As a starting point, the question, "Do you think climate change exists?" was asked across faculties and year of study to explore the CC awareness of students. As shown in Table 4.3, 92% of students acknowledged that CC exists, while a minority of 7% did not. The response in Table 3 and Figure 2 show that the students are aware of the existence of CC.

**Table 2: Number of students responding to the existence of CC**

Response	Yes	No	No response
Number of respondents	555	45	3
%	92%	7%	< 1%

**Figure 2: Number of students responding to the existence of CC**

This may indicate that the students became aware of CC either before entering the university or during their university education.

### Climate change as a world problem

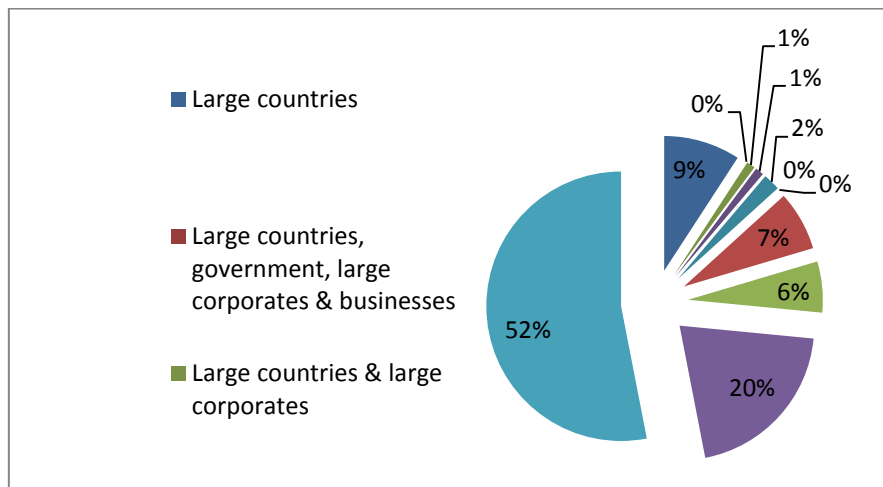
The question, “Do you think climate change is the world’s biggest problem?” aimed to assess the students’ understanding of the impact of CC on the world. As reflected in Table 4, of the 603 students, 79% (477) suggested that CC is the biggest problem while 21% (126) stated the opposite. This is not surprising, as most students are aware of CC.

**Table 3: Students’ view on CC as the world’s biggest problem**

Response	Yes	No
Number of respondents	477	126
%	79%	21%

### Causes of climate change

The question, “What do you think is the cause of climate change?” was constructed to verify the students’ perceptions of the contributions of countries, governments, corporations, businesses in general, and individuals to the causes of CC. Figure 3 show that 52% (316) of the students pointed to large countries, governments, large corporates, businesses and individuals as the major sources (causes) of CC. In total, 20% (122) suggested that individuals are responsible, 6% (39) indicated businesses in general, 7% (44) indicated large corporates, 2% (15) pointed to governments, 9% (54) indicated large countries, and 1% (7) opined that large countries and large corporates together are responsible for CC. Thus, all the role players were seen as responsible for CC. This is per se not useful – the question should have been posed differently.



**Figure 3: Role players contributing to CC as indicated by students**

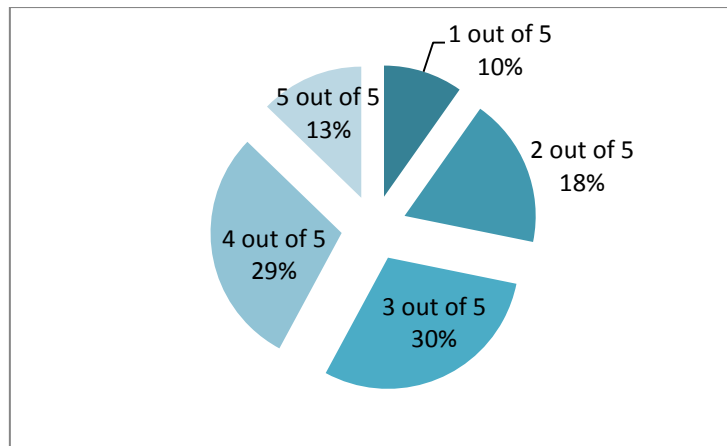
It is evident from the responses that the students place the blame of CC on a range of organisations and individuals. Again, this is to be expected as the students are aware of CC

#### **Students' perceptions on their level of CC awareness**

The question, "On a scale of 1 to 5, how would you rate your level of awareness of climate change?" aimed to measure the level at which students perceived their understanding of CC. As seen in Table 4.7 and Figure 4.8, 10% of students rated their level of CC understanding as poorly. Eighteen percent (18%) indicated that they are only a little aware of CC, 30% (179) said they have an idea of CC, 29% (177) stated that they are aware of CC, and 13% (77) opined that they are very aware of CC. The response to this question is a surprise, especially when taking into account the answers of the previous questions. When students were asked a more general question, e.g. "Do you think climate change exists?" compared to a questions on CC awareness with more options, the students were less certain of their level of awareness, ranging from 'having an idea' to 'very aware'.

**Table 5: Students' perceived level of CC awareness**

Scale	Poor	Little aware	I have an idea	Aware	Very aware
Number of respondents	59	111	179	177	77



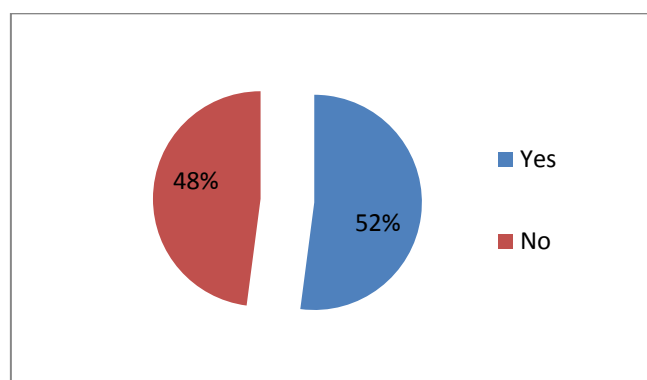
**Figure 4: Students' perceived level of CC awareness**

### **The role students' level of study plays in understanding climate change**

The question, "Does your level of study play any role in how you understand climate change?" was asked to explore the students' perception of whether the level (year) of study plays a role in the awareness and understanding of CC. As indicated in Table 6 and Figure 5, 52% (314) of students said they believe that level of education plays a significant role in understanding CC, while 48% (289) suggested the level of study does not really matter. The results surprisingly indicate a level of uncertainty whether education plays an important role in the CC awareness of students.

**Table 6: Role of the level of education in CC awareness**

Response	Yes	No
Number of respondents	314	289
%	52%	48%



**Figure 5: Role of the level of education in CC awareness**

### **The influence of students' personal background on climate change awareness**

"Do you think your personal background has an influence on the way you understand climate change?" This question was asked to determine students' perceptions on whether their background has any effect on their CC awareness level. As illustrated in Table 7, 70% (422) of the students said their personal background does have an effect on their awareness of CC, while 30% (181) felt the opposite. This indicates that the way students are raised may play a role in their awareness of CC.

This is not surprising, as the data show that TV and social media play an important role in creating CC awareness. Taking into account the socio-economic disparity in South Africa, where for example TV and social media are not freely available to all citizens, it makes sense that the background of the students may greatly vary.

**Table7: Personal background influence on CC awareness**

Response	Yes	No
Number of respondents	422	181
%	70%	30%

### **The lack of education in the awareness of climate change**

The statement, "Lack of climate change education is a major contributor to students' awareness of climate change" was posed to determine if the curriculum presented at the University of Technology assists with creating CC awareness within faculties and at different levels of education. Table 8 indicate that 47% (285) of the students strongly agreed that the lack of CC education at the university is a major contributor towards the lack of student awareness of CC, while 37% (221) somewhat agreed.

However, 13% (76) somewhat disagreed, while 3% (21) strongly disagreed. This shows that CC-related education is necessary to improve the awareness of students about CC, which is a surprise finding as it is expected that universities in general would teach at least to some degree the importance of CC and the impact on the planet.

**Table 8: Lack of CC education as major contributor to students' CC awareness**

Response	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Number of respondents	285	221	76	21
%	47%	37%	13%	3%

### Human behaviour and climate change

The statement, “Human behaviour is responsible for climate change”, has been made to determine the students’ views on human behaviour affecting CC. As shown in Table 9 , 55% (329) of the students strongly agreed that human behaviour is more responsible for changes in the climate, 32% (191) somewhat agreed, 11% (67) somewhat disagreed, and 3% (16) strongly disagreed. The students are aware that human behaviour is contributing towards CC.

Unfortunately, this research did not further explore the matter in terms of determining what type of behaviour is responsible for CC and how this behaviour can be changed. These challenges need further research.

**Table 9: Students’ view on human behaviour affecting CC**

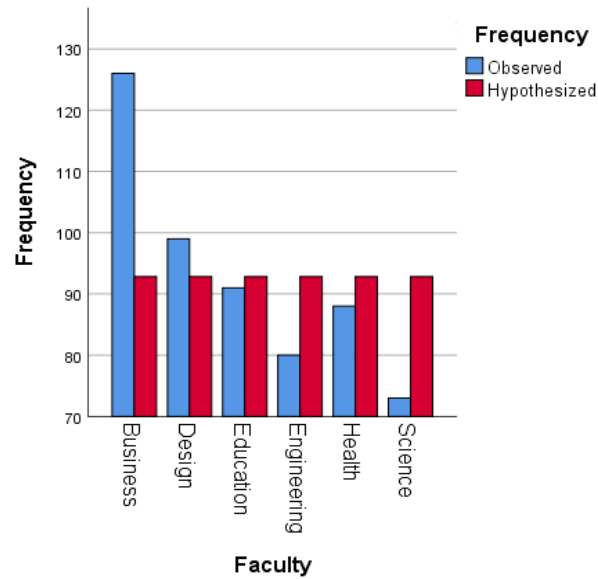
Response	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
No. of respondents	329	191	67	16
%	55%	32%	11%	3%

### H1: Students who are aware of climate change are more likely to study in some faculties rather than others

The hypotheses assessed whether the students believe in the existence of CC by comparing two variables, ‘faculties’ and ‘CC existence’. It seems that some areas of study are more likely to include CC than others.

**Table 10: One-sample Chi-Square test summary for H<sub>1</sub>**

Total N	557
Test Statistic	18.558 <sup>a</sup>
Degree of Freedom	5
Asymptotic Sig. (2-sided test)	.002
<sup>a</sup> There are 0 cells (0%) with expected values less than 5. The minimum expected value is 92.833.	



**Figure 6: One-sample Chi-Square test summary for H<sub>1</sub>**

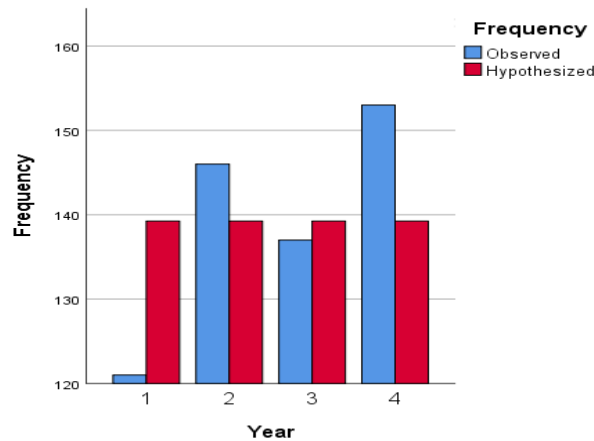
The Chi-Square goodness-of-fit test shows that  $H_0$  can be rejected ( $N=557$ ,  $DF=5$ ,  $p=0.002$ ), i.e. the students are not evenly distributed across faculties.

## **H2: The number of students who believe in climate change is likely to increase as they progress through university**

This hypothesis aimed to compare the different CC awareness levels of students as they progress with their studies by comparing their 'year of study' and 'CC existence'.

**Table 11: One-sample Chi-Square test summary H<sub>2</sub>**

Total N	557
Test Statistic	4.113 <sup>a</sup>
Degree of Freedom	3
Asymptotic Sig. (2-sided test)	.250
<sup>a</sup> There are 0 cells (0%) with expected values less than 5. The minimum expected value is 139.250.	



**Figure 7: One-sample Chi-Square test summary for  $H_2$**

The Chi-Square goodness-of-fit test shows that  $H_0$  cannot be rejected ( $N=557$ ,  $DF=e$ ,  $p=0.25$ ), i.e. there is a relationship between students' belief in CC and their year of study (Table 11; Figure 7).

### Findings

The research findings suggest that majority of students are aware of climate change. Students acknowledge that climate change is the world's biggest problem. Large countries, governments, large corporates, businesses and individuals are seen as the major causes of climate change. The rise in the planet's temperature is a major challenge created by climate change. Most respondents became aware of climate change through TV

### Discussions

The majority (92%) of students are to some level aware of CC. The results show that students do not fully realise the impact of CC on humans and the planet, which is in agreement with Salehi et al.'s (2016) findings that students have a moderate awareness of the CC phenomenon.

It can be concluded that students who are aware of CC, even if it is only to some extent, perceive CC as one of the world's biggest challenges. Rocklöv et al. (2021) agree with the study's findings that CC is a well-known 21st century global problem.

Students suggest that an individual's background contributes to the awareness of CC, and that this plays a role in CC awareness. Nguyen et al. (2016) report that variations in students' CC awareness are influenced by personal background, socio-cultural and institutional contexts, as well as their views on the perceived impact of CC and their understanding of the factors that play an important role in the CC awareness, as CC is attributed to human actions.



The first finding states that most students became aware of CC by watching television (TV), which, in their opinion, is a preferred and good source for conveying the message of CC awareness. This supports Chukwuji et al. (2019) finding that television is a major source of CC information.

It was found that students in the Business Faculty are more aware of CC than students in other faculties. This is surprising, as Business faculties are usually teaching CC or environment related matters the least, while Science students are usually more informed. This is contrary to the findings of Blackmore et al. (2018), who argue that students in Business and Management are taught the least about CC-related problems, while students in General Sciences and Environmental Science are more exposed to information on CC.

The finding that the year of study increases students' level of CC awareness is not surprising, as it is expected that the more a student progresses, the more the student becomes knowledgeable on CC. It is not clear which levels of study include CC in the curriculum. According to Ajuang et al. (2016), one's level of education has a huge impact on CC awareness.

CC of the general public has become a political matter. Some citizens regard CC as a myth, while other are politicising it as non-existent. CC is polarising politics throughout, where right-wing political parties and agendas have been linked to a lack of concern about CC. As a result, right-wing populism in various regions and nations, such as the United States, Australia, and Europe, appears to be anti-climate policy (McCright et al., 2015). However, regardless of this political polarisation, the findings of this research show that students are concerned about CC as they regard it as the world's biggest problem. This is evident by the renewed activism of students, as, since 2018, millions of students in the world took the struggle of CC to the streets, protesting against governments and requiring them to take action (Von Storch et al., 2021). This generation of students has made their voices heard, clearly raising their concerns about CC challenges that will ultimately affect their future (Wallis & Loy, 2021). Today's younger students' future lifestyles and pro-environmental behaviour will be a critical factor in reducing the severity of predicted CC (Lehnert et al., 2019). For students and youth to comprehend CC and its expected consequences, they need to be educated on CC.

The findings show that students are particularly concerned about the increase in temperature as an effect of CC. Student thinking on the CC system is significantly linear, i.e., human activity triggers global rising temperatures, which eventually has an effect on humans themselves (Handayani & Putra, 2019). The average global temperature is slowly rising and is expected to increase by 2oC by the year 2100, resulting in a major climate crisis (Malhi et al., 2021).

## **Conclusion**

The study was conducted at one the Universities of Technology in the Western Cape, South Africa. The majority of this university's students are aware of climate change, according to the results of the study. Notwithstanding the restriction of conducting the study at only one university, which is not representative of all South African universities, it provided sufficient exposure to CC knowledge among the university's students. CC awareness can play an important role in shaping students' pro-environmental attitudes and empowering them to fight the negative effects of CC in the country and throughout the globe.

## **Recommendations**

A coordinated national strategy is needed in all tertiary institutions. The current curriculum should be reviewed to include CC. Universities should appoint environmental officers to seat in all their curriculum decision making forums. An introduction of weekly CC awareness campaigns is necessary. Universities should introduce special modules dealing with CC at all levels, or integrate CC into existing modules.

## **Suggestions for further research**

This study focused only on students of one University of Technology. Future research is needed to assess the CC level of awareness of students at other universities in South Africa. There is also a need for research on the relationship between CC and the curricula offered by universities. Further research could also be done with TVET college students as participants to expand the scope to all tertiary institutions.

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