Beliefs and Intentions to enact Positive Environmental Change: A Study of Undergraduates of the University of Ibadan, Nigeria

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Abstract: This study assessed beliefs and intentions of the undergraduates of the University of Ibadan, Nigeria, to enact positive environmental change using a quantitative survey research design. Data was analyzed using simple percentage, and Mann Whitney U and Kruskal Wallis.

Among other findings, results showed moderately high beliefs (3.97 mean) and intentions (3.56 mean), established a correlation between beliefs and intentions (r(399)=0.265, p=0.000), no significant difference between the beliefs according to gender (p=0.647), and no significant difference between the intentions according to gender (p=0.931). We concluded that the undergraduates believed in the occurrence of climate change, and its adverse implications on the environment.

Keywords: Beliefs, Climate Change, Environmental Change, Intentions, Undergraduates

I. INTRODUCTION

A cross the world, change in the environment is a critical issue that requires urgent and collective effort as adverse weather conditions affect the survival of sensitive species and habitats (Nickerson & Moray, 1995), especially in recent times, stakeholders have grown huge concerns about the future harm that environmental change poses if it continues unhalted. Stakeholders across the world are not oblivion of the implications of man-made climate change, and these implications are widespread (United Nations, 2015).

Environmental changes are global/universal issues, especially as the world is witnessing global warming with various degrees of negative implications (Barnett, 2009). According to scale Mendelsohn & Williams (2006), climate change poses environmental, social, and economic challenges across the globe, and encompasses a significant shift in the pattern of wind, precipitation, temperature, among other climatic implications (Knutson, 2011). Climate change translates into environmental change (AkinyoadeAkinwande, 2016). Environmental changes are seen as having social implications, and the social class of the people determines how susceptible they are to the climate and environmental change implications.

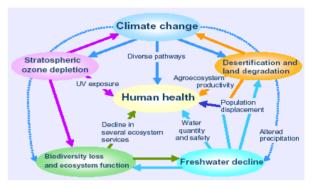


Figure 1: Global Climate Change and Human Health (World Health Organization, 2021)

Human activities are enormous, we are the largest user and explorers of the environment among all other living things and organisms. However, the natural process of altering the environmental order is less-destructive than human activities (Vitousek et al, 1986). Citing McMichael et al. (2008), human destructive pressures and activities on the environment have enormous effects on biophysical and ecological systems in the world. The climate systems, as well as the natural environmental systems, are being tampered with by human activities and actions These systems are integral to life processes and fundamental to human health, and their disruption and depletion make it more difficult to address health inequalities (see Fig. 2.3).

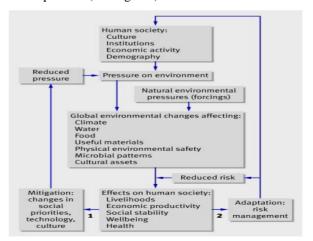


Fig. 2: Risks to population health from environmental change and strategies

From a theoretical perspective, Ajzen (1991) posits that human behaviour (see Fig. 3) is predictable, such behaviours, in this case, environmental behaviour may be connected to human beliefs and intentions towards the environment.

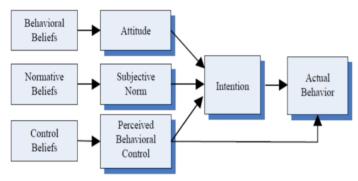


Figure 3: Theory of Planned Behaviour by Ajzen (1991)

From the Theory of Planned Behaviour, the research model (see list of figures) for this study is presented below:



Figure: 4: Research Model

From an empirical perspective, a survey among teachers in Ondo State, Nigeria indicated a low awareness level of climate change among teachers, and that there is variation by gender. A related study among two universities' undergraduates (University of Ibadan and LAOTECH, Ogbomoso in Oyo State of Nigeria, reported that students' high level of awareness results from their level of exposure and access to information, especially through the Internet. In a similar survey, Akinyoade and Akinwande (2016), reported that students and elites are not significantly aware (low level of awareness) of the implications of individual micro activities, and how its future consequences will impair individuals' normal lives. Also, a 2019 survey reported among senior high school students in the Philippines, a moderate to a high awareness level on climate change, and they are not oblivion of their roles in addressing the implications of climate change (Lopez and Malay, 2019).

Socio-demographic characteristics were identified as correlates of climate change awareness and students' climate change informedness in Bangladesh (Rahman, Tasmin, Uddin, Islam and Sujauddin, 2014). Nkwusi, Adeaga, Ayejuyo, and Annuk (2015) established a disparity in the understanding of the climate change concept between younger farmers and older farmers in Lagos as a result of educational inequalities.

The ecological implications of environmental change are orchestrated by human activities (Wang, Blondeel, Baeten, Djukic, De Lombaerde & Verheyen, 2019). Climate change induced environmental change impacts the trajectory of people's lives in Nigeria, especially, in industrialized cities such as Ibadan, the third-largest in Nigeria, and the capital of

Oyo State. Being a growing economic hub, waste generation in Ibadan is massive, and calls for scholarly concerns, especially among learners in the academic environment where climate change consciousness is expected. Based on this premise, this study assesses the beliefs and intentions of the undergraduates on the University of Ibadan, Nigeria, to enact positive environmental change.

The following research questions guided this study.

- i) Is there any significant difference between the beliefs of the students towards climate change according to Gender?
- ii) Is there any significant difference between the intention of the students towards climate change according to Gender?
- iii) Is there any significant difference between the beliefs of the students according to Faculty?
- iv) Is there any significant difference between the intention of the students towards climate change according to Faculty?
- v) Is there any significant difference between the beliefs of the students towards climate change according to grade?
- vi) Is there any significant difference between the intentions of the students towards climate change according to grade?
- vii) Is there any significant difference between the beliefs of the students towards climate change according to age?
- viii) Is there any significant difference between the intentions of the students towards climate change according to age?

II. METHODS

This study adopted a quantitative survey research design. Elicited data from a randomly selected 450 undergraduates, using the standardized Climate Change Attitude Survey questionnaire designed by Christensen & Knezek, 2016)-CCAS 2.0, was analyzed using the SPSS. The descriptive statistics were done using simple percentages, while the non-parametric tests – Mann Whitney U (for two groups) and Kruskal Wallis (for two groups) were used to test relationship between variables, and differences across age, and gender, faculty and grade at level of significance p-value 0.05.

III. RESULTS

This section contains the results as presented below.

Table 1: Distribution descriptive characteristics (n=400)

Variables	Number (n)	Percentage (%)						
Gender								
Male	186	46.5						
Female	214 53.5							
Age								
16-20 years	195	48.8						

21-25 years	157	39.3		
26-30 years	29	7.3		
31-35 years	15	3.8		
36-40 years	4	1		
Face	ulty			
Arts	39	9.8		
Education	41	10.3		
Social Science	40	10.0		
Science	40	10.0		
Veterinary Medicine	40	10.0		
Medicine	40	10.0		
Agriculture	40	10.0		
Technology	40	10.0		
Law	40	10.0		

Human Nutrition	40	10.0						
Academic Level (Grade)								
100L	81	20.3						
200L	112	28.0						
300L	97	24.3						
400L	54	13.5						
500L	30	7.5						
600L	19	4.8						
700L	7	1.8						

Socio-demographics variables of the surveyed undergraduates re shown in Table 1. The majority (53.4%) of the surveyed undergraduates were female, while the majority (48.8%) are between the ages of 16-20 years.

The results generated from the study data are presented in Table 2 and Table 3

Table 2: Climate Change Beliefs

	CLIMATE CHANGE BELIEFS	SD	D (9/)	U	A (%)	SA (9/)
		28	(%) 8	(%) 22	166	(%) 176
1	I believe our climate is changing	(7)	(2)	(5.5)	(41.5)	(44)
2	I am concerned about global climate change.	5 (1.3)	35 (8.8)	53 (13.3)	193 (48.3)	114 (28.5)
3	I believe there is evidence of global climate change	13 (3.3)	11 (2.8)	55 (13.8)	183 (45.8)	138 (34.5)
4	Global climate change will impact our environment in the next 10 years.	7 (1.8)	9 (2.3)	53 (13.3)	172 (43)	159 (39.8)
5	Global climate change will impact future generations.	12 (3)	14 (3.4)	57 (14.3)	165 (41.3)	152 (38)
6	The actions of individuals can make a positive difference in global climate change.	10 (2.5)	20 (5)	30 (7.5)	186 (46.5)	154 (38.5)
7	Human activities cause global climate change.	10 (2.5)	19 (4.8)	38 (9.5)	170 (42.5)	163 (40.8)
8	Climate change has a negative effect on our lives.	12 (3)	35 (8.8)	89 (22.3)	146 (36.5)	118 (29.5)
10	I can do my part to make the world a better place for future generations.	22 (5.5)	11 (2.8)	34 (8.5)	174 (43.5)	159 (40)
11	Knowing about environmental problems and issues is important to me.	18 (4.5)	15 (3.6)	44 (11)	202 (50.5)	121 (30.3)
16	I believe that I can contribute to the solution of environmental problems by my actions.	26 (6.5)	39 (9.8)	44 (11)	181 (45.3)	110 (27.5)
17	Environmental problems can be solved without big changes to our way of life.	43 (10.8)	93 (23.3)	80 (20)	120 (30.3)	63 (15.8)
18	I think each of us can make a significant contribution to environmental protection.	15 (3.8)	18 (4.5)	46 (11.5)	148 (37)	173 (43.3)

Results presented in Table 2 show that of the surveyed undergraduates belief in climate change, as its (global climate change) evidence and implications abound, and will impact our environment in the next ten years, and impact future generations. Results also indicate that global climate is a result of human activities, and can be better addressed through individual actions to make a positive

difference in global climate change. Furthermore, results showed human life is being affected negatively by climate change, and the knowledge of the environmental challenges occasioned by climate change will help to address the problems make the world a better place for future generations, and engender environmental protection.

Table 3:	Climate	Change	Intentions

	CLIMATE CHANGE INTENTIONS	SD (%)	D (%)	U (%)	A (%)	SA (%)
9	We cannot do anything to stop global climate change.	99 (248)	112 (28)	66 (16.5)	80 (20)	43 (10.8)
12	I think most of the concerns about environmental problems have been exaggerated.	70 (17.5)	141 (35.3)	84 (21)	78 (19.5)	27 (6.8)
13	Things I do have no effect on the quality of the environment.	104 (25.9)	128 (32)	76 (19)	66 (16.5)	26 (6.5)
14	It is a waste of time to work to solve environmental problems.	159 (39.8)	133 (33.3)	47 (11.8)	46 (11.5)	15 (3.8)
15	There is not much I can do that will help solve environmental problems.	117 (29.3)	127 (31.8)	65 (16.3)	63 (15.5)	29 (7.3)

Research Question 1: Is there any significant difference between the beliefs of the students towards climate change according to Gender.

The Mann-Whitney U test was used to achieve the result for the difference in belief according to gender. The p-value of the test statistic is p=0.647. Since the p-value is greater than our chosen significance level ($\alpha=0.05$), thus, we can state that there is no significant difference between the beliefs of the students towards climate change according to gender.

Research Question 2: Is there any significant difference between the intention of the students towards climate change according to Gender?

The Mann-Whitney U test was used to achieve the result for the difference in intention according to gender, The p-value of the test statistic is p=0.931. Since the p-value is greater than our chosen significance level ($\alpha = 0.05$), thus, we can state that there is no significant difference between the intention of the students towards climate change according to gender.

Research Question 3: Is there any significant difference between the beliefs of the students according to Faculty?

To find the difference between the belief of the students according to faculty, the **Kruskal Wallis** test was first used to calculate the differences in the mean rank for each pair of the faculty followed by the Mann Whitney-U to test the level of significance at (p>.05). Results are presented in Table 4.

2 3 4 7 9 10 1 8 Social Human Faculties-Beliefs Vet. Med. Med. Arts Science Agric. Tech. Edu. Law Science Nutrition sig. no sig. diff. 1 Arts no sig. diff. diff. diff. diff. diff. diff. diff. diff. 5>1 sig. no sig. no sig. no sig. sig. diff. no sig. sig. diff. **Social Science** diff. diff. diff. diff. 7>2 diff. 10 > 25>2 sig. no sig. no sig. sig. diff. no sig. sig. diff. 3 Science diff. diff. diff. 7>3 diff. 10>3 5>3 sig. sig. diff. no sig. sig. diff. no sig. Vet. Med diff. 7>4 10>4 diff. diff. 5>4 sig. diff. no sig. no sig. 5 Med. no sig. diff. diff. diff. 5>9 no sig. no sig. 6 Agric. no sig. diff. diff. sig. diff. 7 Tech. no sig. diff. 7>9 sig. no sig. no sig. no sig. no sig. no sig. no sig. 8 Edu. diff. no sig. diff. diff. diff. diff. diff. diff. diff. 5>8 sig. diff. 9 Law

Table 4: Kruskal Wallis Test of difference in Beliefs

Research Question 4: Is there any significant difference between the intention of the students towards climate change according to Faculty?

To find the difference between the intention of the students according to faculty, the **Kruskal Wallis** test was first used to calculate the differences in the mean rank for each pair of the

Human

Nutrition

10

10>9

faculty followed by the Mann Whitney-U to test the level of

Significance at (p>.05). Results are presented in Table 5.

Table 5: Kruskal Wallis Test of difference in Intentions

		1	2	3	4	5	6	7	8	9	10
	Faculties- Intentions	Arts	Social Science	Science	Vet. Med.	Med.	Agric.	Tech.	Edu.	Law	Human Nutrition
1	Arts		no sig. diff.	no sig. diff.	no sig. diff.	sig. diff. 5>1	no sig. diff.	sig. diff. 7>1	no sig. diff.	sig. diff. 1>9	sig. diff. 10>1
2	Social Science			no sig. diff.	no sig. diff.	sig. diff. 5>2	no sig. diff.	sig. diff. 7>2		sig. diff. 2>9	sig. diff. 10>2
3	Science				no sig. diff.	sig. diff. 5>3	no sig. diff.	sig. diff. 7>3		sig. diff. 3>9	no sig. diff.
4	Vet. Med					no sig. diff.	no sig. diff.	no sig. diff.		sig. diff. 4>9	no sig. diff.
5	Med.						sig. diff. 5>6	no sig. diff.		sig. diff. 5>9	no sig. diff.
6	Agric.							no sig. diff.		sig. diff. 6>9	no sig. diff.
7	Tech.									sig. diff. 7>9	no sig. diff.
8	Edu.		no sig. diff.	no sig. diff.	no sig. diff.	no sig. diff.	no sig. diff.	no sig. diff.		sig. diff. 8>9	no sig. diff.
9	Law										sig. diff. 10>9
10	Human Nutrition										

Research Question 5: Is there any significant difference between the beliefs of the students towards climate change according to grade?

There is no significant difference concerning grade as a variable for the beliefs (p>.05).

Research Question 6: Is there any significant difference between the intentions of the students towards climate change according to grade?

There is no significant difference concerning level as a variable for the intentions (p>.05).

Research Question 7: Is there any significant difference between the beliefs of the students towards climate change according to age?

There is no significant difference concerning age as a variable for the beliefs (p>.05).

Research Question 8: Is there any significant difference between the Intentions of the students towards climate change according to age?

There is no significant difference concerning age as a variable for the intentions (p>.05).

IV. DISCUSSION

The discussion of the findings are presented in this section.

1 Climate change beliefs of the undergraduates

Our study found that the surveyed undergraduates believed in climate change, are concerned about global climate change,

believe there is evidence of global climate change, believe that global climate change will impact our environment in the future. Our findings corroborates a 2013 survey that reported a large percentage (63%) of American adults' belief in climate change existence (Leiserowitz, Maibach, Roser-Renouf, Feinberg & Howe, 2013). This shows that climate change is a global phenomenon and there is increasing awareness across populations.

The study established that the undergraduates high beliefs about climate change and this is consistent with findings of an American study which established that American adults have positive mindsets that drive higher values in beliefs on climate change (Duchi, Lombardi, Paas & Loyens, 2020). The beliefs, as identified among our respondents drive their positive intentions towards climate change and environmental issues. Our study further established that the actions of individuals can make a positive difference in global climate change believe that human activities cause global climate change, that climate change harms our lives, and that they can make a significant contribution to environmental protection. Consistent with our findings, it was reported that climate beliefs influence the thinking of people about climate change (Ding et al. 2011; Weber 2016).

Furthermore, our findings on the high beliefs on climate change among undergraduates are corroborated by a study that reported that strong pre-existing values and climate change beliefs are pivotal to addressing environmental conditions (Kate, Emmanouil, Sally, Yasmina, 2021). Our finding also corroborates a 2015 survey which reported that

respondents have high beliefs in climate change and would address the implications for the safety of all living things (Dienes, 2015). Also consistent with our findings, Dienes (2015) reported that students of the Faculty of Medicine, University of Nigeria possess a higher knowledge of climate change.

2. Climate change intentions of the undergraduates

Our study found that the undergraduates have intentions to take actions and make concerted efforts to stop global climate change, and address its implications to engender a quality environment. Our findings on the positive intentions of the undergraduates corroborate the 1991 Ajzen Theory of Planned Behaviour model which posits that favourable attitudes, by extension beliefs, drive strong and positive behavioural intentions and, in turn, pro-environmental behaviours that can help to address environmental challenges occasioned by climate change (Page & Page, 2014).

In addition, a 2015 survey reported that respondents have high and positive intentions towards pro-climate change issues, and are likely to take actions that will address climate change challenges for a friendly environment (Dienes, 2015). This is in support of our findings which established that the intentions of the undergraduates are targeted towards addressing environmental problems.

3. Difference between the beliefs of the students towards climate change according to gender

Our study found no significant difference between the beliefs of the students towards climate change according to gender among the undergraduates (p > 0.05). Our finding is consistent with Falaye & Okwilagwe (2016) who reported no significant differences in students' beliefs-toward climate change according to their gender. Furthermore, in agreement with our finding, Christensen & Knezek (2015). reported no significant (p = .99) difference between males and females. Also, in agreement with our finding, Oladipo et al.(2020) reported no significant gender difference in attitudes toward climate change among pre-service STM teachers.

Also, our finding validates Ojo & Dimelu (2018) that beliefs-knowledge of climate change between gender is not significantly different. However, our findings in connection with Zawadzki & Bouman & Linda Ste & Bojarskich & Druen (2020) report no significant difference in gender across study samples. This indicates that the undergraduates, irrespective of their gender, have positive and high beliefs about climate change. Also consistent with our findings, Rosidin and Suyatna (2017) found no difference in students' knowledge of global warming across gender.

Contrary to our finding, McMight (2010) reported a difference in concern about climate change across gender lines among the American population. Among other researchers, an American survey identified that female is more knowledgeable and show concern about the climate and the environment more than male (Ballew, Marlon, Leiserowitz,

and Maibach, 2018). This aligns with a report that there is a gender difference in adaption, concern, knowledge of climate change and environment, among the farming population in Ghana (Adzawla, Azumah, Anani & Donkoh, 2019). Contrarily, Fakhrudin, Karyanto & Ramli (2017); Rahman, Shahriar & Tasmin, Sadeka & Maruf, Kawser & Islam, Mohammad & Sujauddin, Mohammad. (2014) reported differences in beliefs-attitude towards climate change across gender among high school students. Gökçe & Sarıyar (2019), as well as Gökmen (2021), also reported contrarily, a significant difference in beliefs-attitude towards climate change across gender.

4 Difference between the intention of the students towards climate change according to gender

We found no significant difference between the intentions of the students towards climate change according to gender (p > 0.05). Our finding corroborates Fakhrudin, Karyanto, & Ramli's (2017) report of no significant link between behavioural intentions and gender among Indonesian students. Contrarily, Braksiek, Thormann, & Wicker (2021), (Dijkstra & Goedhart, 2012), (Archer, DeWitt, Osborne, Dillon, Willis & Wong, 2012), Tosunoglu, 1993). Leppanan et al. (2012) identified gender-specific differences in intentions, beliefs, and attitude towards climate change. These previous studies posit that females have a positive predisposition concerning intentions, beliefs, and attitude towards climate change.

5 Difference between the beliefs of the students according to faculty

Finding the difference between the beliefs of the students according to faculty, the survey took an approach comparing the different faculties in pairs with each other. Consequent upon this, findings were made concerning Science enclined Faculties and Art Faculties, It was observed that there is inherently an evident gap between the students from the faculty of Medicine with other Faculties.

On the other hand, other faculties like Agriculture, Technology, and Human Nutrition showed a relatively moderate belief in climate change. This however maybe be a result of the many related science courses taught in these Faculties. In contrast, faculties of Arts and Law majorly have very little belief in climate change, which cause could be translated to the fact that these two faculties have almost zero science-related courses. In line with our study, (Drebot Christina, Boehner Jenny, Butler Jodi, Smith, Michael Mason & Monica 2017) found that students in the faculties of Science and, Architecture and Planning demonstrated higher levels of awareness, understanding, and concern for climate change than others.

Generally, our study found that Medicine Faculty amongst many others has a significant difference between the beliefs of students towards climate change, which makes this a major finding regarding the Medicine Faculty

concerning the climate change beliefs of undergraduate students in the University of Ibadan, Nigeria.

6 Difference between the intention of the students according to faculty

Finding the difference between the Intention of the students according to faculty, the survey took an approach comparing the different faculties in pairs with each other. Consequent upon this, findings were made concerning Science enclined Faculties and Art Faculties, It was observed that there is inherently an evident gap between the students from the faculty of Medicine in relation to other Faculties.

On the other hand, Other faculties like Agriculture, Technology, and Human Nutrition showed a relatively moderate Intention in climate Change. This however may be as a result of the many related science courses taught in these Faculties. In contrast, Faculties of Art and Law majorly has very little intention in climate change, which cause could be translated to the fact that these two Faculties has almost zero science-related Courses. In line with our study, (Drebot Christina, Boehner Jenny, Butler Jodi, Smith, Michael Mason & Monica 2017) found that students in the Faculties of Science and Faculty of Architecture and Planning demonstrated higher levels of awareness, understanding, and concern for climate change than the other faculties.

Generally, our study found that Medicine Faculty amongst many others has a significant difference in the intention of students towards climate change, this is a major finding regarding the Medicine Faculty in relation to the climate change Intention of undergraduate students in the University of Ibadan, Nigeria.

7. Difference between the belief of the students according to grade

Our study found no significant difference between the beliefs of the students towards climate change according to grade level (p > 0.05). Contrary to our finding, reported that the beliefs of students differ according to grade level as respondents with higher education report higher values of personal responsibility for climate change (Dias, Vidal, Sousa, Dinis & Leite (2020).

8. Difference between the intention of the students according to grade

Our study found no significant difference between the intentions of the students towards climate change according to grade level (p > 0.05). Contrary to our finding, reported that the intention of students differ according to grade level as respondents with higher education report higher values of personal responsibility for climate change (Dias, Vidal, Sousa, Dinis & Leite (2020).

9. Difference between the belief of the students according to Age

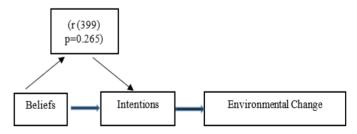
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10. Difference between the intension of the students according to Age

Our study found no significant difference between the intention of the students towards climate change according to grade level (p > 0.05). Contrary to our finding reported that the beliefs of students differ according to Age (Milfont, Zubielevitch, Milojev et. al). Generally, from the discussion of findings above, it can be stated that the belief and Intention of the students are moderately high. However, the faculty of medicine showed a significant difference which indicates that Medicine students inherently have a higher level of belief and intention towards climate change.

Our study found a significant correlation between the Beliefs and the Intentions at 0.01 level (r(399)=0.265 and p=0.000). Thus, there is a positive and weak relationship between the two (Aggarwal & Ranganathan 2016). An increase in the intentions cause an increase in the beliefs or vice versa. Our findings further substantiate the Theory of Planned Behaviour as a fit model for understudying human behavior-beliefs and intentions in behavioural study. According to Ajzen (1991), beliefs is connected to intentions as it presents an anticipated intention to do an action or exhibit a behaviour. Here, we found that the undergraduates of the University of Ibadan have high beliefs and positive intentions about climate change and the environment, thus they have positive intentions toward required positive environmental change which is geared towards environmental preservation and protection (Lawrenz, 1988).



Based on the findings, we concluded the following:

- The undergraduates of the University of Ibadan, Nigeria, have high beliefs and intentions, and there is a correlation between their beliefs and intentions towards climate change.
- ii) There is no significant difference between the beliefs of the students towards climate change according to gender, no significant difference between the intention of the students towards climate change according to gender, no significant difference between the beliefs and intention of the students towards climate change according to grade, no significant difference between the beliefs and

intention of the students towards climate change according to grade, no significant difference between the beliefs and intention of the students towards climate change according to some non-sciences related faculties while there is a significant difference between the belief and intention of the students towards climate change according to Science courses related faculties in comparison with Art related faculties, leaving Medicine Faculty with the most distinguished faculty with both high belief and intention towards climate change.

The findings of this study are trajectory for curriculum development and policy formulation for best environmental practices by individuals and the government to ensure the environment is safe through climate change best practices. Further studies should focus on the informal sector to understand the environmental behavior of artisans, and road users- transporters in cities across the nation.

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