THE ROLE OF SOCIAL MEDIA IN SHAPING UNIVERSITY STUDENTS' PERCEPTION OF CLIMATE CHANGE IN PAKISTAN

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ABSTRACT

This quantitative, cross-sectional, correlational study explores moderate positive correlation between social media use and university students' perceptions of climate change in Pakistan, with the former positively predicting 20% variance in the later. A survey of 249 revealed that female university students use social media more than the male university students and also develop climate-related perceptions accordingly. However, there is no difference between the students with rural and urban ethnicities on the variables of social media use and university students' climate-related perceptions. The also proposed implications including promotion of critical thinking by educational institutions; focus on reliable content, fact-checking, equitable digital access, and localized contexts by the governments and NGOs; and partnerships among policymakers, academic institutions, and societal platforms for rational and effective climate communication and communal action to mitigate climate change in the countries like Pakistan.

Keywords: *Social Media, University Students, Climate Change, Shaping Perceptions, Pakistan and Climate Change*

INTRODUCTION

Climate change has posed one of the most pressing challenges facing the global community today, with its impacts more evident in developing countries like Pakistan in the recent times, where rising temperatures, unpredictable weather patterns, and environmental degradation threaten the livelihoods of millions (Khan & Khan, 2016). In response to these challenges, public awareness and engagement in climate change crisis have become crucial to foster informed action and policy shift. Among the many tools available to promote environmental consciousness, social media has emerged as a powerful platform to shape public perceptions of climate change, especially among younger populations such as university students (Shehzadi et al., 2019)

Social media platforms have transformed the way information is shared, providing both opportunities and challenges in promoting climate change awareness (Alawade & Obun-Andy, 2024). These platforms offer the ability to rapidly disseminate information, engage diverse audiences, and mobilize action (Gaupp & Eker, 2024). For university students, who are often at the forefront of social movements and climate activism, social media has the potential to be a

key driver of both awareness and behavioral change regarding climate crisis (Mahiwal et al., 2024) However, while social media presents numerous benefits for raising awareness, it also faces significant challenges such as misinformation, echo chambers, and social media literacy gaps, which may limit its effectiveness in fostering meaningful engagement (Sultana et al., 2024).

Social Media as a Transformative Tool

Social media platforms such as Instagram, Twitter, and Facebook have revolutionized the way information is shared, allowing for the rapid spread of climate-related messages and fostering widespread public discussions. Alawade and Obun-Andy (2024) investigated how these platforms have become crucial in shaping conversations on climate change. However, they also pointed out the significant challenges, including misinformation and unequal access to technology, which may undermine effective climate communication. The findings of the study illustrated the complex nature of social media as both an enabler and a hindrance to climate awareness. Shah (2024) highlighted the transformative potential of social media in disseminating environmental messages and influencing public opinion. By leveraging network dynamics and influencer engagement, social media platforms can amplify climate-related content. However, the findings of the study highlighted challenges including misinformation and echo chambers that could underscore the need for culturally-tailored communication strategies to maximize impact. Furthermore, the research highlighted the importance of ensuring the accuracy and cultural relevance of the content shared on social media.

Content Effectiveness and Regional Biases

Sultana et al. (2024) conducted a comprehensive review of the relationship between social media and climate change awareness. The results of the research highlighted effectiveness of the video-based content in seeking the attention of younger audience, particularly on TikTok and YouTube. However, the study also identified a significant gap in the literature, with a regional bias that

overlooks the regions like South Asia. The authors stressed the importance of conducting localized research to better understand the unique challenges and opportunities in such underrepresented regions. Nguyen (2023) examined climate change awareness among the university students in Vietnam, exploring that both social media and traditional news outlets could play a significant role in shaping their perceptions. The study highlighted the influence of social media in forming these views, but also acknowledged limitations including potential biases in self-reported data and a narrow geographic scope. Therefore, the findings underscored the importance of using social media platforms to promote informed attitudes toward climate change, while also highlighting the need for more comprehensive and inclusive research that encompasses a wider range of perspectives and regions.

Gaupp and Eker (2024) studied the impact of social media on climate activism and behavioral change, focusing on youth-led movements like Fridays for Future. They highlighted how social media could both raise awareness and encourage environmentally friendly actions. However, they also noted some challenges including the creation of echo chambers and increasing polarization, which could limit productive discussions. By looking at how different platforms work, such as the more thoughtful conversations on Reddit compared to the grouping behavior on Facebook, the study reflected the complexities of using social media for effective climate communication. Abdallah and Youssef (2023) examined the role of social media in enhancing climate change literacy among the Egyptian users, emphasizing its potential to disseminate information and mobilize public action. Challenges such as misinformation and the need for critical evaluation of the social media content emerged as findings, reinforcing the importance of addressing social media literacy to maximize the impact of social media in shaping climate perceptions. Tuitjer and Dirksmeier (2021) analyzed the relationship between social media use and perceived climate change efficacy in Europe, noting that increased social media participation often correlated with lower efficacy beliefs. They

emphasized the need for social media literacy and critical engagement to counter misinformation and foster more informed perspectives on climate change. These insights highlighted the importance of equipping social media users with the skills to critically evaluate content in order to effectively address climate challenges.

Socio-Demographic Influences

Antronico et al. (2020) analyzed public awareness of climate change in Southern Italy, emphasizing the role of socio-demographic factors such as education, age, and media exposure. Their findings revealed that younger and more educated individuals favored online platforms for information. This study underscored the importance of tailoring climate communication strategies to targeted audiences, providing a framework for understanding the role of social media in diverse regional contexts. In doing so, it highlighted the need to consider local socio-cultural factors when developing effective climate communication approaches.Calista and Yenni (2023) investigated the impact of social media on Indonesian Gen-Z perceptions of climate change, highlighting the role of platforms like Instagram and TikTok in raising awareness. However, the study also noted that the overall impact remained modest due to algorithmic biases and misinformation. In addition, the findings emphasized the need for targeted strategies to enhance the effectiveness of social media in shaping climate awareness. Prasad and Mkumbachi (2021) explored university students' perceptions of climate change in Fiji, focusing on the role of educational institutions and media in shaping their views. The study highlighted that accessible platforms could influence climate literacy and encourage pro-environmental behaviors. Moreover, the findings provided valuable insights that could be applied to understanding similar dynamics in other regions and contexts, offering a broader perspective on how media and education may shape climate awareness globally.

Challenges of Echo Chambers and Misinformation

Kachali (2020) examined the role of social media in climate change discussions among the Malawian youth, identifying Facebook and WhatsApp as key platforms for engagement. The study highlighted challenges such as the spread of misinformation and limited involvement from experts, as well as a preference for offline advocacy channels. The findings emphasized the need for strategies to combat misinformation and improve the effectiveness of social media in promoting meaningful climate conversations, suggesting a more integrated approach combining online and offline efforts for better impact. Mohamed (2018) investigated the influence of social media on public awareness of climate change, stressing upon its ability to provide personalized and visually engaging content. However, the study also pointed out challenges related to echo chambers, which may reinforce existing beliefs rather than encouraging diverse perspectives. This duality underscored the need for critical engagement with social media content to maximize its potential as a tool for climate communication.

Climate Change, Social Media and Youth in Pakistan

Shehzadi et al. (2019) investigated the impact of social media on environmental awareness among Pakistani youth, finding that social media users demonstrated significantly higher awareness levels compared to non-users. The research highlighted the role of platforms like Facebook and Twitter in bridging knowledge gaps and fostering discussions on environmental issues. This study underscored the transformative potential of social media in engaging younger demographics in meaningful climate discourse. Khan and Khan (2016) highlighted the critical role of media in raising climate change awareness in Pakistan. Their study identified the significant gaps in both public and institutional awareness, urging a more proactive approach to media in addressing such issues. The research emphasized the importance of leveraging social media platforms to enhance awareness and encourage engagement, particularly among younger

audiences in Pakistan. Mahiwal et al. (2024) reflected how social media promoted climate activism by bringing communities together and sharing information through online campaigns with engaging visuals. **In addition,** the findings also reflected the broader potential of social media to educate and inspire action on climate change, especially among youth in vulnerable regions. **Moreover**, it underscored how social media could be a powerful tool for raising awareness and driving climate action on a global scale.

The Research Gaps

Research has consistently shown the influence of social media on public perceptions of climate change across various regions. For instance, studies in Europe and North America have demonstrated that social media plays a significant role in shaping climate change attitudes and behaviors, particularly among the younger demographics (Tuitjer & Dirksmeier, 2021; Abdallah & Youssef, 2023) **In contrast,** the role of social media in influencing climate change perceptions in South Asia, particularly in Pakistan, remains limited. **While** some studies have examined climate awareness among Pakistani youth, few have specifically focused on the ways in which social media platforms contribute to shaping students' views on climate change (Shehzadi et al., 2019). This study has sought to fill this gap by exploring the role of social media in shaping university students' perceptions of climate change in Pakistan. By examining the patterns of social media use and the content the students engage with, this research aimed to understand how social media platforms influence their awareness, attitudes, and behaviors toward climate change. Additionally, this study has also attempted to determine policy implications to counter the challenges that can make it harder to communicate about climate issues effectively on social media.

Research Objective:

The study has been driven by the following research objective:
To measure the impact of social media use on university students' perceptions on climate change in Pakistan

Hypotheses:

H1. Social media use and university students' perceptions on climate change are positively correlated.
H2. Social media use positively predicts Pakistani university students' perceptions on climate change.
H3. Pakistani university students differ on the variables of social media use and perceptions on climate change with respect to their gender and geographic ethnicity.

Methodology

This study adopted a quantitative research design, utilizing a cross-sectional survey to examine the role of social media in shaping Islamabad-based university students' perceptions of climate change. This research used a cross-sectional correlational survey to discover role of social media in shaping perceptions of Islamabad-based university students on climate change. The population for the study were Islamabad-based university students. While adopting a simple random sampling technique, the researchers distributed printed questionnaires to more than 600 university students. Before conducting the survey, a panel of research experts critically evaluated the items to measure social media use (20 items) and University Students' Perception of Climate Change (20 items). However, after evaluation, the finalized number of items for the independent variable and dependent variable as validated by the panel of research experts were reduced to 12 and 13 respectively. For Social Media Use, the independent variable, the nature of items focused on patterns and frequency of social media use, and intended use of social media platforms to access information about climate change. Likewise, the constructs on University Students' Perception of Climate Change, the dependent variable encompassed knowledge about the causes of climate change, perception level about the gravity of crisis with respect to Pakistan, and readiness to take part in climate change mitigation. The research experts established that every domain had the essential features to avoid redundancy. It ensured collective reflection of the theoretical perspectives of variables under investigation, certifying relevance of content as well as

construct validity. The study also measured demographic characteristics of gender, geographic ethnicity, and academic qualification of the respondents. The questionnaire items were measured on the five-point Likert scale. Data was collected through printed questionnaires from the students of National University of Modern Languages—Islamabad, Iqra University, Islamabad, Bahria University, Islamabad, and International Islamic University, Islamabad. Out

of the received response, having 63% validity for data analysis after data cleaning, 264 responses were examined through SPSS. Additionally, ethical protocols, including informed consent, confidentiality, and anonymity, were rigorously followed throughout the study as per the ethics of research (Etikan et al., 2016).

Reliability analysis of the research scales used for the study yielded the following results:

Table 1: *Cronbach's Alpha Reliability of Scales (N = 249)*

Scales	No. of Items	A
Social Media Use	12	.74
Students' Perceptions on Climate Change	13	.92

The table 1 above reflected the reliability analysis of both the scales used for this research. It revealed Cronbach's alpha (α) value of .74 for 12-item Social Media Use Scale, highlighting good and acceptable reliability. Similarly, it also verified the Cronbach's alpha (α) value of .92 for a 13-item Students' Perceptions on Climate Change Scale, maintaining an excellent reliability.

Data Analysis:

The researchers analyzed data using SPSS. They applied Pearson's correlation, regression analysis, and independent samples t-test for to test hypotheses of the study.

Table 1: *Frequencies and Percentages of Demographic Variables (N = 249)*

Variables	Categories	F	%
Gender	Male	115	46.2
	Female	134	53.8
Geographic Ethnicity	Rural	89	35.7
	Urban	160	64.3

The Table 1 presents the demographic profile of the study participants. It reflects that the female respondent = 53.8% (*f*=134) outnumbered their male counterparts = 46.2% (*f*=115) in the sample. In terms of geographic location, the majority of the respondents were from urban areas = 64.3% (*f*=160), with a rest of them residing in rural areas = 35.7% (*f*=89). With respect to their academic qualification, the majority of the participants were undergraduate students = 78.3% (*f*=195), while the graduate students were 21.3% (*f*=54).

Table 2: *Descriptive Statistics of Study Variables (N=249)*

Variables	M	SD	Range Actual	Potential	Skewness	Kurtosis
Social Media Use	35.09	8.33	12–60	48	-0.65	-0.30
University Students' Perceptions	47.85	9.51	13–65	52	-0.80	-0.45

The table 2 presents the overview of descriptive statistics for the Social Media Use, the independent variable and University Students' Perceptions, the dependent variable. It reflects the substantial measures of central tendency, variability, and distribution figure of the sample under study. The mean score for Social Media Use scale (M = 35.09, SD = 8.33) reflects a moderate social media usage level with brief variability, whereas the (slightly) negative skewness value of -0.65 indicates some participants reporting the higher-than-average social media usage. Similarly, the kurtosis value of -0.30 reveals a (relatively) normal but (slightly) flatter distribution. On the other hand, the mean score for the scale of University Students' Perceptions (M = 47.85, SD = 9.51) demonstrates an inclination towards higher value on the given scale, with more variability in comparison to scale of Social Media Use. A greater noticeable negative skewness value of -0.80 proposes that majority of the students registered above-average perceptions, whereas the kurtosis value of -0.45 points out a flatter and dispersed distribution.

Table 3: *Pearson Product Moment Correlation of Study Variables (N = 249)*

Variables	1	2
Social Media Use	-	.379**
University Students' Perceptions	.379**	-

The Table 3 suggests a moderate positive correlation between the Social Media Use and University Students' Perceptions (r = .379, p < .001), indicating that the higher level of social media use among the university students are correlated to the positively motivated perceptions of climate change among the university students. It is, therefore, evident that social media usage by the Pakistani university students plays a role in shaping students' perceptions of climate change.

Table 4: *Regression Coefficient of Social Media Use on University Students' Perceptions*

Variable	B	β	SE	F
Constant	30.20		4.50	46.92***
Social Media Use	0.36	.45	0.05	
R²	.20			

Note: N=249, ***p< .001

The regression analysis reflects that the use of social media by the university students positively predicts their perceptions (B=0.36, β=0.45, SE=0.05, p<.001). It also points out that for every one-unit surge in the use of social media, the perceptions of the university students increase by 0.20 units. The table 4 above explains 20% of variance in perceptions of university students, reflecting a moderately stronger relationship between the variables.

Table 5: *Independent Sample t-Test Across Gender (N = 249)*

Variables	Male (n =115)		Female (n= 134)		t(df)	P	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
Exposure to Social Networking Sites	30.20	8.80	36.80	7.90	-2.98(246)	.003	-6.05	-1.55(-7.50)	0.38
Climate Activism	46.50	9.30	49.70	8.50	-2.45(246)	.015	-5.81	-0.61	0.30

The Table 5 above reflects the application of Independent Sample t-Test across gender. It demonstrates that gender significantly impacts the use of social media and university students' perceptions on climate change. It reports that the female university students (M = 36.80, SD = 7.90) scored significantly greater than their male fellows (M = 33.20, SD = 8.80) on the variable of social media. Likewise, the female university students (M = 49.70, SD = 8.50) also scored higher than male students (M = 46.50, SD = 9.30), on the variable of university students' perceptions. The findings of the test reveal that the female university students use social media more than the male university students and also develop climate-related perceptions accordingly.

Table 6: *Independent Sample t-Test Across Geographic Ethnicity (Rural/Urban) (N = 249)*

Variables	Rural (*n* =89)		Urban (*n*= 157)				95% CI		
	M	*SD*	*M*	*SD*	*t(df)*	*P*	*LL*	*UL*	Cohen's *d*
Exposure to Social Networking Sites	33.45	8.10	36.80	7.90	-0.50(244)	.617	-2.70	1.50	0.06
Climate Activism	34.66	6.94	35.32	9.32	-0.60(244)	.550	-2.84	1.52	0.07

The Table 6 above reflects the application of independent samples t-test to compare the use of social media and climate-related perceptions between the rural and urban students. The findings reveal insignificant differences between the students belonging to rural areas and the ones belonging to urban areas because of p=.617 for Social Media Use and p=.550 for University Students' Perception.

Findings of the Study

1. There exists a moderate positive correlation between the Social Media Use and University Students' Perceptions (r = .379, p < .001), indicating that the higher level of social media use among the university students are correlated to the positively motivated perceptions of climate change among the university students. This finding supports the hypothesis 1 of the study that states that the social media use and university students' perceptions on climate change are positively correlated.

2. The regression analysis reflects that the use of social media by the university students (moderately) positively predicts their climate-related perceptions, depicting 20% variance. This finding also supports hypothesis 2 that proposes that social media use positively predicts Pakistani university students' perceptions on climate change.

3. The female university students use social media more than the male university students and also develop climate-related perceptions accordingly. However, there is no difference between the students with rural and urban ethnicities on the variables of social media use and university students' climate-related perceptions. This finding, however, partially supports hypothesis 3 that suggests that the Pakistani university students differ on the variables of social media use and perceptions on climate change with respect to their gender and geographic ethnicity. It is because of statistically significant differences on the basis of gender but statistically insignificant differences on the basis of geographic ethnicity.

Discussion

The findings of this study emphasize the significant role of social media in influencing university students' perceptions of climate change in Pakistan. This finding align with the existing research that highlights the role of social media in shaping public perceptions of climate change (Nguyen, 2023; Abdallah & Youssef, 2023). While studies in other contexts have shown similar engagement levels among youth, this current study underscore the importance of social media in the life of university students and in turn development of their perceptions on climate change. The moderate positive correlation between social media use and students' perceptions of climate change highlights the role of social media platforms in fostering awareness. This finding is consistent with the existing body of literature as the study by Sultana et al. (2024), also explored the impact of social media on younger demographics through video-based and interactive content. However, the moderate positive strength of correlation suggests that other factors including age, education and socioeconomic status may also influence individuals' perception of climate change (Tuitjer & Dirksmeier, 2021). Furthermore, the moderate level of predictivity of the use of social media in shaping perceptions of climate change establishes social media as influential platform(s) This aligns

with the findings by Gaupp and Eker (2024) and Shah (2024) who explored slightly higher predictive capacities od social media, potentially due to better digital literacy and broader content diversity. The finding acknowledges the importance of social media in information dissemination and perception development but also considers a room improvement in terms of outreach and communication strategies to enhance its effectiveness. The study also highlights that the female university students use social media more than the male university students and also develop climate-related perceptions accordingly. However, there is no difference between the students with rural and urban ethnicities on the variables of social media use and university students' climate-related perceptions. The past studies including the ones by Antronico et al. (2020), and Prasad and Mkumbachi (2021) also established the socio-demographic factors significantly influenced climate awareness. The uniformity observed in this study indicates that social media in Pakistan serves as an important tool for climate communication, bridging demographic divide as is the case with other parts of the world.

Implications of the Study

1. The educational institutions should implement educational programs to equip students with critical thinking skills for evaluating climate-related content on social media.
2. **Government should** develop fact-checking initiatives and promote reliable sources to address the spread of inaccurate information on climate issues.
3. **The** government, NGOs and climate advocacy groups should leverage video-based and interactive content tailored for localized contexts to engage and educate diverse demographics.
4. **Government should take initiatives to** bridge the digital divide by ensuring equitable access to social media and climate information for all students, regardless of their geographic or socioeconomic background.
5. Societies like Pakistan should foster partnerships between universities, policymakers, and social media platforms to

amplify accurate climate messaging and mobilize collective action.

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