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Climate Change Literacy among the Social Media Users of Pakistan: A Quantitative Analysis

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ABSTRACT
Climate change is one the most crucial issues of modern times grappling with the harms for instance rising temperatures, unpredictable weather patterns and glacier melting. It is calling for an immediate action to mitigate its harmful impacts to humanity and planet earth. The segregation of awareness between global north and global south regarding the climate related issues is clear and loud. The media plays a vital role in creating awareness regarding contemporary issues including climate change and the environment. Social media being the most modern tool of creating a social change in terms of behaviors and attitudes of consumers can be significantly used to evaluate climate literacy in the global south mainly in Pakistan. The objective of this study is to analyze the climate change awareness, perception and attitude of social media consumers of Pakistan. By using a quantitative survey method, the responses of sample population aging from 18 to 55+ years are analyzed through SPSS statistics. Purposive sampling technique has been used. The mediatization theory is used to analyze the linkage between media and society. How modern media influence its consumers is also studied in the framework of this research. The findings of this research strongly emphasize the importance of mass media consumption in climate literacy in the global south. It also addresses the need of improving climate change communication to enhance the environmental knowledge of audiences. The results of this study will also help policy makers and media professionals in effective climate change communication.

Keywords: Climate Change Literacy, Mediatization, Social Media, Environmental Communication, Global Warming

Introduction

Climate change is a global challenge that continues to reshape the environmental, social, and economic landscapes of the world (Karl and Trenberth 2003, Richardson, Steffen et al. 2011). While the global north exhibits advanced literacy on climate change due to better access to resources and education, the global south, particularly Pakistan, lags significantly behind. Pakistan, a nation acutely vulnerable to the impacts of climate

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change, faces recurring challenges such as erratic monsoons, rising temperatures, glacial melting, and extreme weather events(Farooqi, Khan et al. 2005). These environmental disruptions underscore the urgency for a well-informed population capable of understanding and mitigating climate risks (Schollaert Uz, Ackerman et al. 2014). Social media, an influential communication platform, has emerged as a powerful tool in shaping public attitudes, behaviors, and awareness of climate change. In Pakistan, where traditional media often prioritizes political and economic issues, social media provides an alternative space for climate discourse, enabling engagement and information sharing among diverse demographics (Ejaz, Ittefaq et al. 2023).

This study investigates the role of social media in enhancing climate change literacy among Pakistani users. Employing mediatization theory as a conceptual framework, it explores how social media usage impacts awareness, perception, and behavior related to climate change. By analyzing quantitative survey data from users aged 18 to 55+, this research evaluates the degree of climate literacy fostered through social media platforms. The findings will shed light on the effectiveness of social media as a channel for climate communication and identify potential gaps in its utilization. This study also aims to provide actionable insights for policymakers, educators, and media practitioners, emphasizing the need for improved strategies to amplify climate change literacy in Pakistan and, by extension, the global south.

Significance and Rationale

The significance of this research lies in its focus on bridging the climate literacy gap between the global north and the global south, specifically in Pakistan. Despite being one of the most climate-vulnerable countries, Pakistan has a low climate literacy rate, with only a small fraction of the population understanding the implications of climate change (Jan, Khan et al. 2020) . This lack of awareness not only exacerbates the nation's vulnerability to climate impacts but also hinders effective policy implementation and community-driven action. By exploring the role of social media, this study addresses a critical gap in understanding how modern communication technologies can foster climate literacy in resource-constrained settings.

Social media's accessibility and reach make it a promising tool for spreading awareness and encouraging behavioral change (Kashif, Zareen et al. 2025). Platforms like Facebook, Twitter, and Instagram have the potential to democratize information, enabling users to access climate-related knowledge, engage in discussions, and participate in advocacy. This study's rationale stems from the need to examine whether social media's potential is being effectively harnessed in Pakistan for climate education and awareness. Moreover, the research aligns with global efforts to meet Sustainable Development Goal 13, which emphasizes improving knowledge and institutional capacity to combat climate change.

By highlighting the intersection of climate literacy and social media, this study contributes to the broader discourse on environmental communication in the global south. Its findings will provide valuable insights for stakeholders, including government agencies, non-governmental organizations, and educators, to design targeted interventions that leverage social media's power to enhance public understanding of climate change. This research thus holds significance not only for Pakistan but also for other developing nations facing similar challenges.

The Role of Media in Climate Literacy

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

Media's role in enhancing climate literacy is well-documented in academic literature, particularly in the context of developing countries. Studies emphasize that media coverage along with academia and other major pillars of society shapes public understanding and engagement with climate issues (Stibbe 2015). In Pakistan, print media has historically focused on episodic framing, which highlights isolated events such as floods or heat waves without providing contextual information that fosters a deeper understanding of climate change (Sharif and Medvecky 2018, Ejaz, Ittefaq et al. 2022). (Saleem and Rahman 2023) found that 87% of climate-related news in Dawn and 99% in Jang utilized episodic framing, thereby limiting their potential to enhance climate literacy. This lack of thematic framing—which provides background, causality, and solutions hinders the public's ability to connect individual events to broader climate patterns.

On the other hand, social media's real-time, interactive nature offers a platform for disseminating thematic content. (Cooper 2011) argues that media literacy, coupled with access to credible sources, can empower individuals to critically evaluate climate information and take informed actions. Social media platforms, by fostering two-way communication, allow users to engage with experts, access diverse perspectives, and participate in climate advocacy. This study builds on existing literature by investigating whether social media's interactive potential is being utilized effectively in Pakistan to promote climate literacy.

Social Media's Influence on Environmental Awareness

Social media's growing influence on environmental awareness is particularly significant in the youth population, where traditional education systems and mainstream media often fail to prioritize climate change (Cordero 2012). (Hakimi, Safi et al. 2024) highlighted the transformative role of public awareness campaigns in Afghanistan, which leveraged social media to inspire local action and drive sustainable practices. Similarly, in Pakistan, platforms like Twitter and Facebook have been used to share climate-related content, though their impact on actual awareness and behavior remains under-researched.

Social media campaigns focusing on positive narratives and actionable solutions have been shown to resonate with audiences. For instance, campaigns that emphasize community-led initiatives or highlight success stories can motivate individuals to adopt sustainable practices. However, (Luís, Vauclair et al. 2018) caution against overemphasizing solutions without addressing structural challenges, as this may lead to normalization of risk and complacency. This study explores how Pakistani social media users perceive and interact with climate-related content, assessing whether it leads to increased awareness and proactive engagement.

Barriers to Effective Climate Communication

Climate literacy is a way of understanding critical global climatic risks, creating an ecological awareness ecosystem, to inform the people and adapt climate resilient adaptation strategies(Raj and Amin 2024). Despite its potential, social media faces several barriers in effectively communicating climate issues in the global south. Limited digital literacy, misinformation, and a lack of localized content are significant challenges. The prevalence of misinformation, in particular, undermines trust in climate science and hinders constructive dialogue. (Boykoff and Yulsman 2013) noted that biased media narratives and unverified claims can distort public understanding of climate issues. In Pakistan, these challenges are compounded by socioeconomic disparities, which limit access to digital platforms for large segments of the population (Ittefaq, Kamboh et al.

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

2023). The importance of capacity building of journalists is also being discussed as the major barrier to achieve effective environmental communication (Kamboh and Ittefaq 2023).

Addressing these barriers requires a multi-faceted approach that includes improving digital literacy, promoting credible content, and encouraging collaborations between media professionals and climate scientists. This study examines how these barriers manifest in the Pakistani context and proposes strategies to overcome them, thereby enhancing the effectiveness of social media as a tool for climate communication.

Theoretical Framework

Climate change is one of the most pressing global challenges, yet awareness and understanding of it vary significantly between the Global North and the Global South (Kamboh and Ittefaq 2023). In many developing nations, including Pakistan, climate literacy remains low due to gaps in education, media representation, and public discourse(Finnemann 2011). Given the critical role of media in shaping perceptions, this study explores how social media influences climate literacy among users in Pakistan.

This research is grounded in mediatization theory by Iain Macpherson, which explains how media deeply integrates into and reshapes societal processes(Hjarvard 2008, Macpherson 2022). According to this theory, modern media does not merely report on events; it actively transforms public discourse, attitudes, and behaviors. In the context of climate change, social media serves as a powerful tool for information dissemination, engagement, and activism. Unlike traditional mass media, social media allows for two-way communication, enabling users to interact with climate content, share opinions, and participate in discussions.

Social media platforms provide an accessible space where users encounter diverse perspectives on climate change, ranging from scientific facts to misinformation. Therefore, analyzing climate literacy requires understanding how digital media influences knowledge acquisition, perception, and attitudes towards climate change.

By employing a quantitative survey method, this study assesses how social media exposure correlates with climate literacy in Pakistan. The findings will contribute to understanding the role of digital media in climate education and inform policymakers and media professionals on improving climate communication strategies. Ultimately, this research underscores the need for effective climate communication in the Global South, where digital platforms can bridge knowledge gaps and foster informed action

Research Questions

RQ1 What is the impact of social media usage on climate change literacy of consumers in Pakistan?

RQ2 Whether or not social media usage influences the climate change awareness among social media users of Pakistan

RQ3 Whether or not social media literacy influences the climate change activism among consumers in Pakistan

Hypotheses

H1 There is a significant relationship between social media usage and climate change awareness in Pakistani consumers

H2 There is a significant relationship between social media usage and climate change literacy in Pakistani consumers

H3 There is a significant relationship between social media literacy and climate change activism in Pakistani consumers

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ISSN Online: 3007-3154
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DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

Research Methodology

This research used the quantitative survey methodology to analyze data and driving results about climate change awareness, literacy and activism. The responses from the research questionnaire are collected online on *Google Forms* and analyzed on *SPSS* statistical software.

Population & Sampling

Social media being the tool of students (Akakandelwa and Walubita 2018, Zachos, Paraskevopoulou-Kollia et al. 2018, Cortés-Ramos, Torrecilla García et al. 2021). This research used Pakistani student internet users as the primary population for sampling. The students ranging from matriculation to doctorate are the population of our study which shows wide range of age exists. That is why the sample is aging from 18 years to 55+ years of population. The sample is collected from public, private educational institutes from all over Pakistan. Mainly from, PU, GU, IIU and IUB

The questionnaire was designed to collect the data from 385 students (N=385) based on the total population of students in Pakistan given by PAKISTAN EDUCATION STATISTICS 2021 22. The sample size is calculated through the sample size calculator online. The survey consists of 43 questions including those of demographics. To analyze the statistical wavelength of the hypothesis, all the concerned questions are scaled under the likert scale having options from strongly disagree (1) to strongly agree (5).

Reliability and Validity

To ensure the reliability and validity of the research instrument, the questionnaire was reviewed by experts in the media and communication research. Their feedback was incorporated to improve the clarity and relevance of the measurement items. The review process helped establish the instrument's validity and enhanced its overall consistency for data collection.

Findings and Analysis

Table 01: Demographics of the Respondents

Variables		Frequency	Percentage
Gender	Male	203	49.2%
	Female	182	44.1%
	Other	1	0.2%
Age	15 - 24	293	70.9%
	25 - 34	82	19.9%
	35 - 45	9	2.2%
	46 - 55	1	0.2%
	55+	1	0.2%
Education	Matriculation	28	6.8%
	Intermediate	165	40.0%
	Graduate	142	34.4%
	Post Graduate	50	12.1%
	Doctorate	1	0.2%

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

The demographics are shared in the form of the table having ratios for gender, age and occupation. A majority of male respondents participated with a ratio of 49.2% having 203 respondents, whereas female respondents were 44.1% in ratio and 82 in number. 1 respondent of the other gender also participated with 0.2% of the ratio. The majority of respondents were from the age group of 15 - 24 years with a ratio of 70.9% having 293 respondents while 19.9% respondents were in the 25 - 34 age group with the frequency of 82. The age group of 35 - 44 years also responded with the ratio of 6.8% with 28 in number. Frequency 1 is of the 55+ age group with the ratio of 0.2%.

Majority of respondents are on an intermediate level of education with a ratio of 40.0% with 165 in number whereas 34.4% ratio graduate education respondents having frequency of 142. Post graduate respondents were 50 having 12.1% ratio while 3.3% and 2.3% ratio of Matriculation and Doctorate respondents having frequency of 13 and 9 respectively.

Table 02: Correlation between social media usage and climate change awareness

			Social Media Usage	**Climate Change Awareness**
Spearman's rho	**Social Media Usage**	Correlation Coefficient	1.000	.464**
		Sig. (2-tailed)	.	.001
		N	385	385
	Climate Change Awareness	Correlation Coefficient	.464**	1.000
		Sig. (2-tailed)	.001	.
		N	385	385

It is evident from the results that there is a significant relationship between social media usage and climate change awareness. Spearman's correlation was used to analyze if social media usage has a significant relationship with climate change awareness of Pakistani social media users. The value of correlation coefficient R is .464. The results suggested that there is a significant correlation found as the P value is .001. The finding suggests that the taken hypothesis is approved. Consequently, it is certain that there is a significant relationship between social media usage and climate change awareness. This indicates that those who use more social media are more aware about climate change.

Table 03: Correlation between social media usage and climate change literacy

			Social Media Usage	**Climate Change Literacy**
Spearman's rho	**Social Media Usage**	Correlation Coefficient	1.000	.445**

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www.thedssr.com

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ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

		Sig. (2-tailed)	.	<.001
		N	385	385
	Climate Change Literacy	Correlation Coefficient	.445**	1.000
		Sig. (2-tailed)	<.001	.
		N	385	385

It is evident from the results that there is a significant relationship between social media usage and climate change literacy Spearman's correlation was used to analyze if social media usage has a significant relationship with climate change awareness of Pakistani social media users. The value of correlation coefficient R is .445. The results suggested that there is a significant correlation found as the P value is <.001. The finding suggests that the taken hypothesis is approved. Consequently, it is certain that there is a significant relationship between social media usage and climate change literacy. This indicates that those who use more social media are more literate about climate change.

Table 04: Correlation between social media literacy and climate change activism

			Social Media Literacy	**Climate Change Activism**
Spearman's rho	**Social Media Literacy**	Correlation Coefficient	1.000	.354**
		Sig. (2-tailed)	.	<.001
		N	385	385

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www.thedssr.com

ISSN Online: 3007-3154
ISSN Print: 3007-3146

DIALOGUE SOCIAL SCIENCE REVIEW

Vol. 4 No. 3 (March) (2026)

Climate Change Activism	Correlation Coefficient	.354**	1.000
	Sig. (2-tailed)	<.001	.
	N	385	385

It is evident from the results that there is a significant relationship between social media literacy and climate change activism. Spearman's correlation was used to analyze if social media literacy has a significant relationship with climate change activism of Pakistani social media users. The value of correlation coefficient R is .445. The results suggested that there is a significant correlation found as the P value is <.001. The finding suggests that the taken hypothesis is approved. Consequently, it is certain that there is a significant relationship between social media literacy and climate change activism. This indicates that those who are more social media literate are more active in participation about climate change.

Conclusion

The findings of this study underscore the significant yet varied relationships between social media usage and climate change awareness, literacy, and activism among Pakistani consumers. The results from the Spearman correlation analysis reveal that while social media usage moderately correlates with climate change awareness (H1) and literacy (H2), its connection to climate change activism (H3) is weaker. These findings highlight social media's potential as a tool for fostering awareness and knowledge, though its role in driving actionable behavior remains less pronounced.

The moderate relationships observed in the first two hypotheses suggest that social media is an effective medium for disseminating climate-related information and enhancing public understanding of environmental issues. This was already established in a prior research(Simpson, Andrews et al. 2021). Platforms like Twitter and Facebook provide opportunities for users to engage with scientific content, share experiences, and participate in discussions that build awareness and literacy. However, the weak correlation between social media literacy and activism indicates that while users may be informed, this does not always translate into tangible climate action. This gap may stem from structural barriers such as socioeconomic constraints, limited digital literacy, and the prevalence of misinformation, which undermine the ability of individuals to transition from awareness to activism.

The study's findings emphasize the need for targeted interventions to maximize the potential of social media in promoting climate literacy and action. Policymakers, educators, and media practitioners must collaborate to design campaigns that not only inform but also inspire and empower users to act. This includes enhancing digital literacy, combating misinformation, and creating localized content that resonates with diverse audiences. By addressing these challenges, social media can evolve into a more effective platform for climate communication, bridging the gap between knowledge and

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action.

In conclusion, this research highlights the pivotal role of social media in shaping climate discourse in Pakistan. While it has made strides in raising awareness and fostering literacy, its impact on driving activism remains limited. Future efforts should focus on leveraging social media's strengths while addressing its limitations, ensuring a more informed and proactive populace capable of tackling the pressing challenges of climate change.

Limitations

Due to lack of resources and time, the study cannot collect the survey data from the whole global south

The results collected from Pakistan are generalized for global southern countries

The survey questionnaire is designed in accordance with the Pakistani social media consumers and cannot be applied to any country having entirely different socio-economic cultures

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ISSN Print: 3007-3146

Vol. 4 No. 3 (March) (2026)

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