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Research Article

Role of social media in promoting environmental advocacy and climate change awareness

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Abstract

As social media is the new norm acting as the powerful tool to manipulate the user's minds, the present study investigates the effect of social media on environmental advocacy and climate change awareness in youth to address the issues more strategically. Data to conduct the present study was collected from 256 social media users, using the social media platforms on a daily basis. The collected data was analyzed using multiple techniques, such as chi-squared test, one-way analysis of variance, and descriptive analysis to inspect the interconnection among different multiple variables. The descriptive statistics were computed to understand the central tendency of the data while the chi-square was employed to explore the relationship between the categorical data. The results showed no significant relation between the education levels that affect social media usage leading to environmental awareness, the usage of social media and seeing the environment-related posts, gender and environmental advocacy as well as social media usage per week. The findings may prove valuable in optimizing social media platforms to promote sustainable behaviors, designing corporate social responsibility initiatives, and contributing to public discourse to encourage young people to advocate for sustainable practices through social media platforms.

Keywords: Awareness, Climate Change, Environmental Advocacy, Social Media, Sustainability, Youth.

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Introduction

Owing to the information dissemination on social media, the human population is now more aware of the discourse surrounding climate change awareness and environmental consciousness [1].

It is a well-known fact that social media significantly impacts juveniles' lives because, other than infotainment services, it has deeply penetrated a vast majority of educational processes and practices [2]. Contrary to the traditional one-way communication of transmission outlets that broadcast information, social media allows people to interact online via multidirectional communication [1]. Social media has vastly contributed to the social space to facilitate human social interaction

and collaboration over the last few years [3]. Communication through social media allows users across the globe to connect by interacting and exchanging information that consists of news, entertainment, and personal messages [4]. Anyone with Internet and a device can operate social media [5]. That being the case, businesses and public organizations are also active users, in addition to individuals [1].

Being omnipresent, social media is now a crucial part of the everyday practices of each individual. This lifestyle is paving the way for digital activism, an emerging activist movement [6]. Marketers and activists utilize social media to handle societal, economic, and environmental matters, together with pro-environmental behaviors [7].

Communication through Social Media platforms is used in the critical domain of sustainability: Meeting current needs while also considering the ability of future generations to meet their needs [8]. Organizations and individuals use social media to promote an array of topics, including *Climate Change awareness and Sustainability and Adopting Green Initiatives* to meet public demand [9].

Social media sites vary vastly, as Twitter has a stronger tendency toward politics, whereas Instagram and Facebook are for communicating with friends and family. YouTube facilitates online learning by providing tutorials, whilst LinkedIn is inclined towards professional networking, and these have been proved to be a precious asset for the learners [10]. Literature based on the link between social media and sustainability has emphasized the promotion of environmental activism through means of digital channels, in addition to its impacts on the adoption of sustainable products, and lastly its function as a source of information to quantify urban behaviours that affect our environment [2].

As social media is inexpensive and interconnected, it is also a popular preference of individuals committed to instigate within the field of sustainability. [11, 12]. A research study on green bloggers endorsed the concept of sustainability, concluding that they serve as ordinary non-experts as intermediaries of information on subjects including food, cosmetic items, and sustainable living [13]. These influencers ought to bring about voluntary behavioural change in their devoted supporters and impart eco-awareness to conserve water or recycle waste [1].

With surging public cognizance of climate change, public figures have become an increasingly important community of that influence action and discourse, hence formulating an evolving climate science–policy–celebrity complex [14]. Facebook, Instagram and Twitter have also given the general public a medium to converse and exchange information instantly with vast cross-border networks [10]. This soft power can play a pivotal role in the discourse on the topic of climate change as well as current international political mechanisms [15].

Self-reported data being abundant, social media communication on sustainability has been predisposed to greenwashing—misrepresenting actual sustainability activities to build a fictitious image of responsibility [16]. Information asymmetry is the common characterization of data regarding sustainability, rendering the audience devoid of reasonable sustainability statistics and, hence, lower credibility. Consequently, as stakeholders find themselves dependent on the marketing of the company itself, organizations can present themselves as sustainability stewards [1].

Research studies on online engagement of users with pro-environmental campaigns

and acquiring green habits are still primitive, irrespective of the apparent prominence of social media in environmentalism [7]. There is an information gap about the influence of social media on perceptions of sustainable entrepreneurship and its significance in reinforcing its values [2].

Contemporary digital marketing campaigns are configured with environment-related emotional and informational content in a matter that encourages users to interactively care for the environment as well as assume responsibility for protecting it, leading to fruitful outcomes for their own selves and augment supplementary pro-environmental behaviors [7].

Fostering environmental consciousness is one of the prerequisites for imparting change in public sentiment and general demeanour towards the environment and ultimately protecting the natural world in the face of accelerating global warming and impeding climate change [3].

Research objectives

Accordingly, our research aims to answer the following questions.

- To assess the interconnection between social media and the impact it has on awareness regarding climate change.
- To analyze the level of awareness in youth in terms of the environment of our planet.
- To assess the factors of education in social media creating impact regarding climate change.

The results will allow a better comprehension of the prospective impact of social media on instigating Climate Change Awareness and Environmental Advocacy.

Literature Review

Conundrum of climate change

Climate change has been one of the most contentious issues over the past couple of decades, yet numerous obstructions have sabotaged the cultivation of practical strategies and rigorous policies on an international scale [15].

Research suggests that comprehending the escalating climate change and its effects is the most notable impediment for human beings across the globe as it profoundly influences public health, human rights, and socio-economic benevolence [17].

The pertinent phenomenon of climate change anxiety (CCA) has been documented and defined as negative cognitive, behavioral and emotional responses concerned with their agitation regarding climate change [18].

Explosion of social media and its green benefits

Communication through social media enables users to connect and engage with content, be it personal messages, news, or entertainment. This digital mode of interaction is also effectively deployed in the vital domain of Sustainability [1].

Another study stated that renowned social media sites like Facebook, Instagram, and Twitter have facilitated people conversing about the topic of climate change and sharing their ideas in an unprecedented manner [15].

Browsing and scrolling through social media have a pivotal constructive linkage [19]. The study proposed that the drive for environmental responsibility and perceived environmental effectiveness is brought about by trust in social media browsing.

Social media data reconceptualize sustainability science [20]. Nonetheless,

hurdles like ethical concerns about potential misuse of data and constraints in data accessibility have jeopardized this nascent field. If optimized, social media can contribute in a revolutionary manner to achieving the Sustainable Development Goals (SDGs) of the United Nations. It can be done by analyzing the co-construction of environmental values, interpreting the processes of social-ecological change, and researching the nuanced comprehension of human-nature interactions at scale.

Role of influencers and stakeholders' participation

The impact of influencers' decisions on our lives cannot be disregarded. A research study evidenced the knowledge of the internalization of consumers by social media influencer marketing (SMIM) and invigorated their backing of sustainable edibles [21]. The results of this research examined the repercussions of continuous personal disclosure of social media influencers, their reservations concerning the environment, their discipline in buying sustainable food, and their assessment of the mediation role of market value.

A study published the initial research to investigate how companies communicate the Sustainable Development Goals through social media to identify which SDGs are most relevant and encourage greater stakeholder participation [22]. Social media, which depends on information and communication technologies, serves as a news outlet for stakeholders to disseminate information and contribute to increased stakeholder engagement.

Similar studies

In the last few years, multiple research articles have been published emphasizing the significance of social media platforms in environmental advocacy and environmental awareness promotion. These researchers have also remained focus in exploring the platforms that are playing their key roles in environmental activism. Researchers have studied network dynamics controlling the spread of information related to environmental activism and environmental protection [23]. The major focus of his study was to analyze the contribution of multiple social media platforms in crafting the general public's opinion. Network analysis was also employed, to explore the mechanism answering, "How the environmental information spreads and which type of people are responsible for this act?" The results provided evidence that such sort of information is more likely to spread when the content goes viral or when people are more connected, supported by the eigen-vector values. According to a research study, the most liked, followed, and the influential content creators are the significant personnel that act as the backbone in spreading the information and make people more aware [23]. The effectiveness of social media platforms has also been confirmed through this research, hence making it easy to create environmental movements online. Another study has reported a strong correlation between people's engagement with environmental protection campaigns and development of pro-environmental behavior [7]. The study also suggests that people consuming content related to environmentalism on social media are more prone to develop a sense of environmental protection as well as pro-environmental behavior in their future. In this research a model encompassing the data of around 581 people was developed that assisted in understanding the social media user engagement. The results showed that the consumption of environment related content had caused the caring behavior towards the surrounding environment fostering pro-environmental behavior.

Inadequacy of study

Deductions by *a study* predict that pro-environmental campaigns on social media enable supportive user engagement and render the users likely to interpret their own contributions as responsible and considerate individuals and to activate their pro-social identities [7].

A research study recognized that university students of today can access content from numerous social media sites, however despite that, the study of the interrelation between social media exposure of students and their regard for Sustainability in environmental and social care as well as entrepreneurship is a novice [2].

Regardless of whether environmental sustainability is a topic that dominates conversations, little is known about how social media influences environmental sustainability awareness and fosters sustainable attitudes [3]. Nonetheless, it is evident that social media usage and browsing have a significant positive association in imparting sustainable purchasing practices besides partially regulating the need for social accountability towards the environment [19].

Methodology

Research design

A cross-sectional survey design was employed to investigate public opinion, specifically youth. The survey instrument was administered using a web-based survey tool, Google Forms, to ensure widespread accessibility and ease of data collection.

Sample

A convenience sample of 256 respondents was collected through social media platforms, specifically WhatsApp and Facebook. The participants were included on the basis of the convenience sampling consisting of only those participants belonging to the age bracket of youth. Participants eligible for inclusion in the study were limited to individuals in the youth category, as defined by the specified age range. Before engaging in the survey, participants were edified regarding the research objectives, and their consent was obtained before proceeding further.

Survey instrument

The survey questionnaire was designed using Google Forms, incorporating a mix of closed-ended and open-ended questions regarding demographics and social media consumption. The questions were designed to assess the repercussions of social media on Environmental Awareness and Activism, covering key aspects such as the frequency of encountering content related to Climate Change on social media and the temporal pattern of participation in Environmental Advocacy Activities promoted through social media. The survey underwent pre-testing on a small sample to ensure transparency and relevance.

Data collection

The survey link was distributed via WhatsApp in September 2023. The participants had the liberty to provide feedback at their discretion. Data collected through Google Forms was exported to Microsoft Excel for profound analysis.

Results

Demographic profile

A prevalent portion of participants fall under the age category of 18-24 years old, demonstrating valuable contributions from youth.

Out of the collective sample of 256 respondents, the sample was characterized

by a distinct gender distribution consisting of 95 male respondents and 161 female respondents.

The gender composition is noteworthy as it provides valuable insights into the demographics of our study participants. Comprising a greater representation of females, the distribution reflects the composition of the broader population under investigation as the gender balance in our sample may have implications for the generalizability of our findings to an augmented populace. The differences in the number of male and female respondents proved to influence the interpretation of our research results.

The frequency of this gender is also depicted in Figure 1.

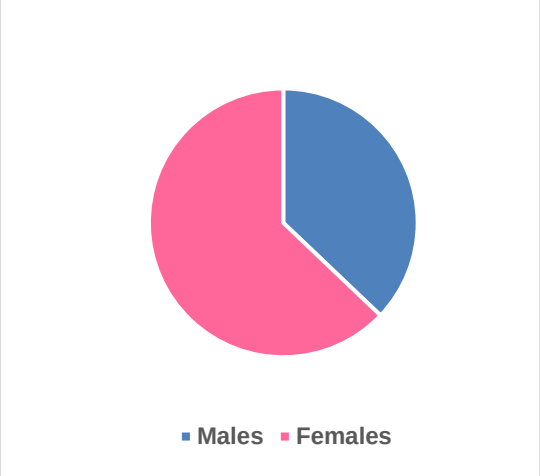

Figure 1: Gender proportion

The sample was marked by the majority of Pakistani participants, comprising responses from Netherlands, India, Hungary, and Australia.

Questionnaire

The participants were interrogated on a range of inquiries, including:

i. How often do they use social media in a typical week
ii. If they have engaged with or shared content related to environmental issues or climate change on social media
iii. If social media increased their awareness of environmental issues and climate change
iv. If they believe social media is an effective platform for promoting environmental advocacy and climate change awareness
v. If social media made them more inclined to support environmental causes
vi. If they have participated in environmental advocacy activities promoted through social media
vii. If they frequently come across environmental or climate change-related content on social media
viii. If social media has motivated them to engage in environmental activism.

The graphical representations in Figures 2 - 9 illustrate the responses.

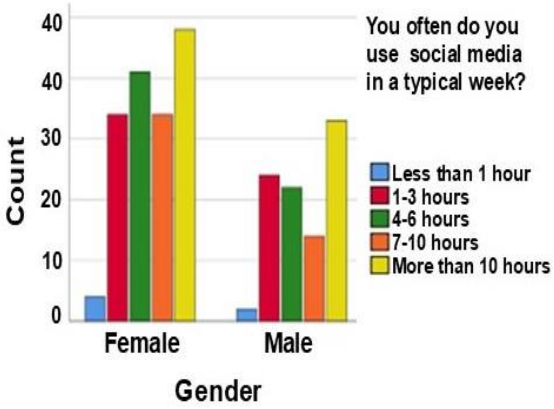

Figure 2: Responses to question i

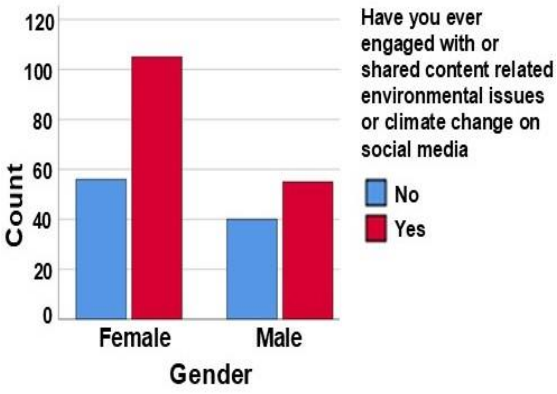

Figure 3: Responses to question ii

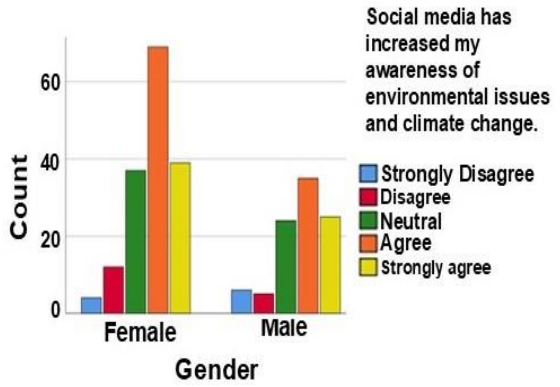

Figure 4: Responses to question iii

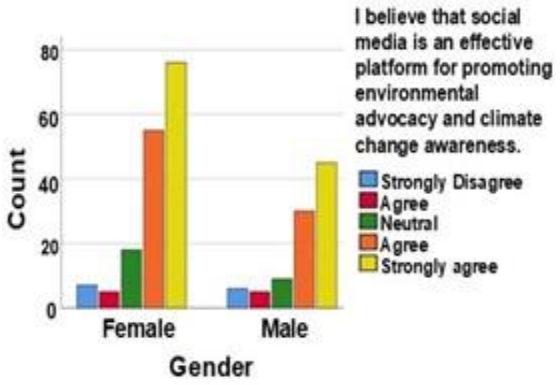

Figure 5: Responses to question iv

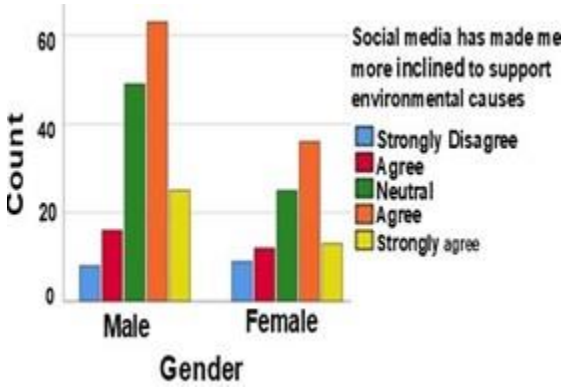

Figure 6: Responses to question v

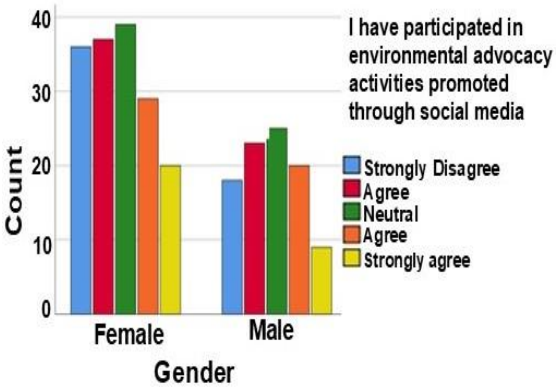

Figure 7: Responses to question vi

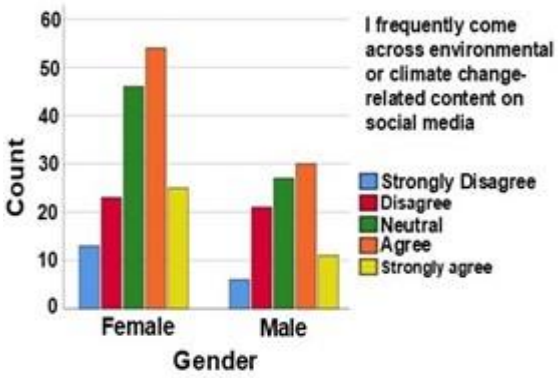

Figure 8: Responses to question vii

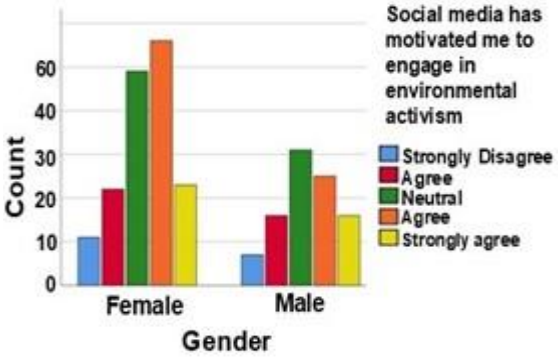

Figure 9: Responses to question viii

Discussion

Descriptive Analysis

The descriptive statistics of the data collected are illustrated in table 1. Table 1 displays the mean, minimum, maximum, skewness, and kurtosis of all the questions form each group.

One-way analysis of variance

One-way Analysis of Variance or ANOVA was calculated to identify the difference between the levels of education affecting the awareness of the environment gained due to social media usage. The reason for choosing this test was one independent variable, i.e. the education level.

The details are given in Table 2, illustrating no significant difference between the education levels which affect the social media usage leading to environmental awareness.

Table 1: Descriptive statistics displaying minimum value, mean value, maximum value, and distribution of the data.

Descriptive statistics of Social Media Usage and Environmental Awareness Variables	N	Range	Min	Max	Mean	Std. Deviation	Variance	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Gender	256	4	0	4	0.39	0.556	0.31	1.749	0.152
Education	256	3	1	4	2.22	0.713	0.509	0.764	0.152
Social media usage per week	256	4	1	5	3.55	1.217	1.48	-0.156	0.152
Sharing of CC related stuff	256	1	1	2	1.62	0.485	0.235	-0.519	0.152
SM increasing awareness of CC	256	4	1	5	3.76	1.026	1.053	-0.76	0.152
SM motivated to engage in EA	256	4	1	5	3.33	1.118	1.25	-0.328	0.152
Come across environmental or CC related content on SM	256	4	1	5	3.29	1.132	1.281	-0.309	0.152
Participation in environmental advocacy through SM.	256	4	1	5	2.76	1.293	1.672	0.178	0.152
Social media has made more inclined to support EC.	256	4	1	5	3.44	1.079	1.165	-0.555	0.152
SM is an effective platform for CC awareness.	256	4	1	5	4.14	1.085	1.177	-1.426	0.152

Table 2: One-way analysis of variance

Impact of Education Level on Social Media-Driven Environmental Awareness		Sum of Squares	df	Mean Square	F	Sig.
SM increasing awareness of CC	Between Groups	1.556	4	0.389	0.37	0.833
	Within Groups	266.909	251	1.063		
	Total	268.465	255			
SM motivated to engage in EA	Between Groups	2.638	4	0.66	0.52	0.718
	Within Groups	316.139	251	1.26		
	Total	318.777	255			
Come across environmental or CC related content on SM	Between Groups	0.809	4	0.202	0.16	0.96
	Within Groups	325.8	251	1.298		
	Total	326.609	255			
Participation in environmental advocacy through SM.	Between Groups	4.209	4	1.052	0.63	0.645
	Within Groups	422.256	251	1.682		
	Total	426.465	255			
Social media has made more inclined to support EC.	Between Groups	0.127	4	0.032	0.03	0.999
	Within Groups	296.994	251	1.183		
	Total	297.121	255			
SM is an effective platform for CC awareness.	Between Groups	1.484	4	0.371	0.31	0.87
	Within Groups	298.731	251	1.19		
	Total	300.215	255			

Correlation

The correlation between social media surfing and engaging with environmental posts through answers to queries in our questionnaire viz. “How often do you use social media?” and “How often you see environment related posts?” was calculated. The results of this are given in table 3. This shows that there is no statistically significant correlation between the usage of social media and seeing environment-related posts.

Table 3: Pearson Correlation between frequency of social media usage and interaction with environment related content.

Pearson Correlation Between Social Media Usage Frequency and Exposure to Environmental Content		How often do you use social media in a typical week?	I frequently come across environmental or climate change-related content on social media.
How often do you use social media in a typical week?	Pearson Correlation	1	0.004
	Sig. (2-tailed)		0.945
	N	256	256
I frequently come across environmental or climate change-related content on social media.	Pearson Correlation	0.004	1
	Sig. (2-tailed)	0.945	
	N	256	256

Moreover, the correlation between the gender and the environmental advocacy was also calculated, and the results are depicted in the table 4.

The purpose of our study was to analyze whether there is a meaningful correlation between gender and environmental advocacy. A linear relationship's strength and direction are measured by the Pearson correlation coefficient, which produced a result of 0.74. After evaluating the correlation's significance further, we discovered a p-value of 0.74. According to these findings, there isn't a statistically significant correlation in our sample between gender and environmental advocacy. Stated otherwise, it doesn't seem that a respondent's gender accurately indicates how much of an environmental advocate they are. This finding highlights the intricacy of the relationship between gender and environmental activism in our research population and encourages us to think about other factors that can affect it.

Table 4: Pearson Correlation between the gender and the participation in environmental advocacy.

Variable		Gender	Participation in environmental advocacy through SM
Gender	Pearson Correlation	1	0.021
	Sig. (2-tailed)		0.74
	N	256	256
Participation in environ-mental advocacy through SM.	Pearson Correlation	0.021	1
	Sig. (2-tailed)	0.74	
	N	256	256

Chi square

The chi-square test was conducted to assess the relationship between gender and the frequency of social media usage per week. The cross-tabulation presents a breakdown of the data, revealing patterns within the categories.

The results indicate that there is a significant association between gender and social media usage (χ^2 = [chi-square value], df = [degrees of freedom], $p < 0.05$). Female respondents tend to spend more time scrolling on social media across all usage categories, with the highest concentration in the 4-6 hours per week bracket. In contrast, male respondents show a more varied distribution, with a peak in the 1-3 hours per week category.

Table 5: Description of social media usage per week on gender basis

Distribution of SM usage per week based on Gender			Less than 1 hour	1-3 hours	4-6 hours	7-10 hours	More than 10 hours	
Gender	Female	Count	4	34	41	34	48	161
		% within Gender	2.50%	21.10%	25.50%	21.10%	29.80%	100.00%
		% within How often do you use social media in a typical week?	66.70%	58.60%	65.10%	70.80%	59.30%	62.90%
		% of Total	1.60%	13.30%	16.00%	13.30%	18.80%	62.90%
	Male	Count	2	24	22	14	33	95
		% within Gender	2.10%	25.30%	23.20%	14.70%	34.70%	100.00%
		% within How often do you use social media in a typical week?	33.30%	41.40%	34.90%	29.20%	40.70%	37.10%
		% of Total	0.80%	9.40%	8.60%	5.50%	12.90%	37.10%
Total		Count	6	58	63	48	81	256
		% within Gender	2.30%	22.70%	24.60%	18.80%	31.60%	100.00%
		% within How often do you use social media in a typical week?	100.00%	100.00%	100.00%	100.00 %	100.00%	100.00%
		% of Total	2.30%	22.70%	24.60%	18.80%	31.60%	100.00%

These findings suggest that gender influences how much time individuals allocate to social media activities, emphasizing the importance of considering gender-specific trends when examining social media usage patterns.

Table 6: Chi-Square test indicating a relationship between gender and the social media usage.

Chi-Square between Gender and SM usage	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.374[a]	4	0.667
Likelihood Ratio	2.41	4	0.661
Linear-by-Linear Association	0	1	0.996
N of Valid Cases	256		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.23.

Limitations

Cultural specificity

The opinions collected may be specific to the cultural and contextual factors present in Pakistan; therefore, extrapolating these findings to youth in different cultural contexts might not be appropriate.

Homogeneity issues

The respondents encompass a majority of females, Pakistanis and undergraduates, which may lead to homogeneity in the sample, limiting the variability of opinions and potentially overlooking the diversity of perspectives outside these groups.

Age bracket

As the study comprised a majority of undergraduates, an exclusion of younger or older youth populations whose opinions

may differ significantly might be possible. Consequently, the study may not capture the full spectrum of youth perspectives.

Educational level

Limiting the study to undergraduates may exclude the opinions of youth not pursuing higher education, potentially neglecting the perspectives of a significant portion of the youth population.

Social desirability bias

Rather than sharing their authentic viewpoint, participants may have provided responses that align with societal expectations and perceived norms; hence, the validity of results can be dubious.

Temporal factors

Opinions can change over time; thus, the findings may be time-sensitive and might not depict the dynamic nature of youth opinions in the long term accurately.

Implications

The results of this study have implications in Environmental Sciences, offering valuable insights that could inform researchers in academia and policymakers in the corporate or government sector. Future research could dwell more profoundly into the evolving opinions of younger generations.

Social media platforms

Insights from the study could lead to discussions on how these platforms can be optimized to promote sustainable behaviors and information. Social media platforms may consider the implications for their features and algorithms.

Research direction

The study may identify research gaps and can guide further study on the intersection of youth opinions, social media, environmental advocacy and climate change.

Public discourse

Findings may contribute to public discourse on Sustainability. Discussions and debates fueled by the study can enhance public awareness and encourage dialogue on the function of social media in promoting or hindering climate change awareness and sustainable practices.

Advocacy and activism

Youth opinions can serve as a foundation for advocacy efforts; therefore, the study may encourage young people to advocate for sustainable practices through social media platforms to avert climate change, leveraging their opinions to bring about positive change.

Corporate social responsibility (CSR)

Companies and organizations can use evaluations to shape their CSR initiatives because understanding how youth perceive corporate sustainability efforts on social media can influence the design and communication of these projects.

Conclusion

In conclusion, this study sheds light on youth's opinions regarding impacts of social media on Environmental Advocacy and Climate Change Awareness, utilizing Google Forms as an effective tool for data collection. The findings contribute to the growing body of knowledge in the multidisciplinary field of Environmental Sciences and offer practical implications for all relevant stakeholders.

List of abbreviations

- ANOVA: One-Way Analysis of Variance
- CCA: Climate Change Anxiety
- CSR: Corporate Social Responsibility
- SDGs: Sustainable Development Goals
- SM: Social Media
- SMIM: Social Media Influencer Marketing

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