

## **The Role of Digital Media Platforms in Fulfilling Climate Change Related Information Needs of University Students in Sindh province, Pakistan**

Ali Akbar Hingorjo<sup>1</sup>, Bashir Memon<sup>2</sup>, Muhammad Qasim Nizamani

Program Manager, Pakistan Broadcasting Corporation & PhD Scholar Media & Communication Studies, University of Sindh, Jamshoro, Pakistan. Email: [akbar\\_ideas@hotmail.com](mailto:akbar_ideas@hotmail.com)

Professor, Department of Media & Communication Studies, Faculty of Social Sciences, University of Sindh, Jamshoro, Sindh, Pakistan Email: [bashir.memon@usindh.edu.pk](mailto:bashir.memon@usindh.edu.pk)

Assistant Professor, Media & Communication Studies, University of Sindh, Jamshoro: [qasim.nizamani@usindh.edu.pk](mailto:qasim.nizamani@usindh.edu.pk)

### **Abstract**

*Pakistan is ranked high among the countries that are tremendously susceptible to the consequences of climate change. Similar to several other developing countries, Pakistan has faced several climate induced disasters during the past two decades. In these circumstances, young generation has played a historic role in generating positive climate action in a number of developing countries. Therefore, this research explores the usefulness of online media platforms in communicating climate change information to young generation in Sindh province, Pakistan. The paper is based on the perspective of university students of Sindh province concerning the role of digital media platforms in fulfilling their climate change related information needs in comparison to other sources, hurdles in climate change communication and the contribution of online media in social construction of climate change problem in Sindh province, Pakistan. The data was collected through a cross-sectional survey from a sample comprised of the students of social sciences faculties of six public sector universities in Sindh. The data analysis was conducted by using SPSS software to answer the study objectives. The findings of the study signify that digital media platforms are contributing positively in communicating climate change to students in Sindh province, Pakistan. A greater part of the respondents considered digital media as an effective tool of climate change information for the new generation. However, the findings also point out that the excessive use of scientific terminology make climate change information less comprehensible to the students*

**Keywords:** Climate Change Communication, Digital Media, University Students, Information Needs

### **Introduction**

The susceptibility of Pakistan to the impacts of climate change has considerably increased during the past two decades as the country has endured various climate change induced disastrous situations including both pluvial and fluvial floods, prolonged dry spells and heat waves (Farooq & Fatima, 2022; Ajani & Geest, 2021; Hussain et al., 2020). In this respect, during the year 2022, the country faced an unprecedented flood situation of its history which has remarkably highlighted the susceptibility of Pakistan as a frontline state to climate crisis (Lama & Tatu, 2022; Husain et al., 2018). In this context it is pertinent to mention that predominantly being an agrarian country having an underdeveloped disaster management mechanism; Pakistan has borne massive economic losses due to climate crisis (Malik, Awan, & Khan, 2012).

Moreover, the country is home to largest number of glaciers after the poles as it has renowned mountain ranges in North which contain around 5000 glaciers. The climate change is causing rapid melting of the glaciers which may result in floods or extreme water scarceness in future (Ishaque, Tanvir, & Mukhtar, 2022; Latif, Ma, & Ma 2021; Rasul et al., 2011). In addition to it, changes in monsoon rainfall patterns is another severe climate induced threat for agriculture based economy of the country as these changes may result in prolonged droughts and severe floods. In this regard, the scientific studies draw attention towards the role of climate change in causing devastating monsoon rains in 2022 (Ripple, et al., 2022; Safdar et al., 2019; Ali et al., 2020; Rehman, Adnan & Ali, 2018). More to the point, the country has a long

coastline stretching over more than 990 km area and it hosts several coastal communities who rely on fishing and other traditional sources of livelihood.

Nonetheless, this highly valuable coastal line of Pakistan is exceedingly prone to the repercussions of the global warming as the rising temperatures are resulting in unprecedented sea level changes (Weeks & Harrison, 2020; Rabbani et al., 2008). Correspondingly, the climate crisis is also paving the way for health issues and communities across the country are suffering due to the lack of a climate resilience infrastructure and capability to adapt (Zachariah, 2022; Ahmed, Shahid and Nawaz, 2018; Ahmed et al., 2019; Ullah, & Takaaki, 2016). In the same way, the livelihood sources of the farmers, fishermen, livestock-holders and other communities are under threat due to ecological changes caused by global warming (Abass, 2022; Khan et al., 2016). In spite of the fact that, Pakistan is ranked very low in the list of green house gas emitters, the vulnerability level of the country to climate crisis is very high (Akram, & Hamid, 2015; Husain et al. 2020). Exceptionally, the southern Sindh province of the country has emerged as a climate change frontline region within the country due to its unique geographical features. The recent climate history of the region indicates that the province is extremely susceptible to natural disasters as rain fall patterns and river flow are becoming unpredictable and global warming is resulting in more frequent and intense heat waves as well as sea level changes (Khan et al., 2021; climate change policy, 2022).

In this connection, climate activism generated by new generation has contributed a lot in highlighting the sufferings of the communities in developing countries and stressing upon the need for urgent action in areas of climate change mitigation, resilience and adaptation. The movement initiated by the new generation has significantly influenced international climate discourse and its contribution is being recognized worldwide (Cloughton, 2021; Han, & Ahn, 2020 ;). Furthermore, the online media provided an effective platform to the young climate change activists worldwide to interact with their fellows, express their climate anxiety and plan their climate awareness activities (Belotti et al., 2022;). Consequently, the role of online media platforms in triggering and promoting youth climate movement has attracted the attention of the climate communication researchers across the world and several research projects have been conducted to understand the connection between climate activism and digital media platforms (Napawan et al, 2017; Rousell, & Edwards, & Larson, 2020). Correspondingly, this research study was launched to evaluate the usefulness of digital media platforms in fulfilling the information needs of university students in Sindh province, Pakistan.

### **Study Objectives**

- 1: To evaluate the efficacy of different digital media platforms in providing climate change related information to university students
- 2: To evaluate the usefulness of digital media platforms in catering the information needs of university students in Sindh province, Pakistan

### **Literature review**

The usefulness of online sources of communication for dissemination of information about global warming and resulting climate crisis to new generation is drawing the interest of researchers and the area is emerging as one of the prominent research beats in the field of climate change communication (Boulianne, Lalancette, & Ilkiw, 2020; O'Neill, & Boykoff, 2012; Mavrodieva et al., 2019). Conversely, the researchers are underlining the need for further research as the climate youth movement is still an evolving phenomenon (Parry, McCarthy, & Clark, 2022). Keeping in view the facts that young generation is not only the worst sufferers of climate change, but being future leaders they are supposed to be dealing with the consequences of the global warming as decision makers during the coming decades. Thus, their role as a stakeholder in climate discourse is extremely important (Ojala, & Lakew, 2017). However, it is also indicated that the public understanding about climate crisis in Pakistani society is not satisfactory in spite of the fact that the country is extremely susceptible to the impacts of global warming mainly caused by human activities (Khadija & Colom, 2013;). In this context, the scholars emphasize upon a comprehensive awareness strategies to motivate the communities across the country for considering adaptation measures to safeguard their sources of livelihood in face of changing weather patterns (Abbasi & Nawaz 2020). In this context, the role of print, electronic media in creating environmental awareness in Pakistan have been evaluated by communication scholars and studies indicate several challenges including lack of trained environmental journalists, low preference given to environmental news etc (Sharif & Middeck, 2018; Hingorjo, & Marinova, 2018;).

However, the online sources of communication are altering the media landscape in Pakistan in these days and people are rapidly switching to online sources and social media for acquiring information and communicating their opinions (Adnan et al., 2020; Ismail & Ahmed, 2021).

Within this context, the climate activists are also switching to online sources and using different strategies to attract the attention of audiences of digital media and involving them is discourse about climate crisis. Resultantly, online media are rapidly evolving as vital platforms of climate debate and important tools for generating climate activism (Boykoff, 2020; Mavrodieva et al., 2019; Askanius, & Uldam 2011; Basch,). However, the most of research concerning the use of digital media for climate change communication is being conducted in developed world. Hence, the literature review in the area indicate a research gap in context of the global south as the scholars have underscored the need to evaluate the usefulness of online media for promoting understanding and activism related to climate crisis in developing countries which are disproportionately affected by the impacts of global warming (Pearce et al., 2019; Tandoc & Eng, 2017). Thus, keeping in view the research gap highlighted in the literature review, this research was initiated to evaluate the contribution of digital media platforms in catering the information needs of the university students in Sindh province, Pakistan.

**Methods**

The data for this research study was collected through a cross-sectional survey with the help of a structured research instrument. For this purpose, a close ended questionnaire was prepared to achieve the research objectives of the study. In this context, students of Universities of generation Z were conscripted as respondents for this study since the research indicates that this generation heavily depends on online sources in acquiring information related to social problems (Wada, 2019). The generation Z refers to the age group of people who are born since the year 1997 and afterwards. Moreover, the sample of the respondents for this study comprised of the students enrolled in social science faculties of the selected universities as they were presumed to be interested in social issues like climate crisis (Dimock, 2019). Therefore, 600 students enrolled in faculties of social science from following general public universities were surveyed for this study.

- University of Sindh, Jamshoro
- University of Karachi
- Shah Abdul Latif University, Khairpur, Mirs
- The Federal Urdu University of Arts, Science and Technology
- Sindh Madrasatul Islam, Karachi
- Shaheed Mohtarma Benazir Bhutto University

The survey for the study was conducted in the premises of the above mentioned universities. Moreover, a pilot study was also conducted to test the reliability and validity of the questionnaire and 50 students of social science faculty of the University of Sindh, Jamshoro participated as respondents in the pilot study. The data was analyzed by using SPSS software to address the research questions of the study.

**Results**

*Table 1: Demographic characteristics of the surveyed students*

	<b>Number</b>	<b>Percentage (%)</b>
<b>Gender</b>		
Male	290	(48.3)
Female	310	(51.7)
<b>Age categories</b>		
Up to 22 years	342	(57)
Above 22 years	258	(43.0)
<b>University</b>		
University of Sindh, Jamshoro	200	(33.3)
University of Karachi	200	(33.3)

Shah Abdul Latif University, Khairpur	50	(8.3)
Shaheed Mohtarma Benazir Bhutto University	50	(8.3)
Sindh Maders-tul-Islam University	50	(8.3)
Federal Urdu University, Karachi	50	(8.3)

Table 1 displays the information about the demographic characteristics of the respondents. In this context, the table shows that majority of the respondents (51.7%) were female; whilst (48.3%) were male. Moreover, the respondents were divided in following two age categories:

1: upto 22 years

2: above 22 years

Concerning the age categories, the information provided in the table indicate that largest portion (57%) of the respondents pertained to the age cohort of up to 22 years, followed by the respondents pertaining to the the age category of above 22 years (43%). Moreover, the data related to the share of universities in the sample indicate that one third of the respondents (33%) belonged to each of the University of Sindh, Jamshoro and the University of Karachi. Whereas, the share of four remaining universities i.e. the Shah Abdul Latif University, Khairpur, Shaheed Mohtarma Benazeer Bhutto University , Sindh Madars-tul-Islam, Karachi and the Federal Urdu University, Karachi stood ( 8.3%) percent each.

**Use of online media to acquire climate related information**

*Table 2: Digital media use for seeking climate related information*

Digital media use for climate information	Responses		Percent of Cases
	N	Percent	
Twitter	260	13.7%	43.4%
Instagram	162	8.5%	27.0%
Snapchat	73	3.8%	12.2%
Facebook	435	22.9%	72.6%
News websites	268	14.1%	44.7%
Environmental organization website	307	16.1%	51.3%
YouTube	256	13.5%	42.7%
WhatsApp	124	6.5%	20.7%
Any other	17	0.9%	2.8%
<b>Total</b>	<b>1902</b>	<b>100.0%</b>	<b>317.5%</b>

The frequency table 2 of Multiple Dichotomy Analysis provides information related to the use of online platforms for acquiring climate change related information. In this context, the data indicate that social media platform “Facebook” emerged as the most favourite online platform for acquiring climate change related information as a vast majority comprised of ( 72.6%) of the respondents mentioned it as their most favourite source of information to acquire climate change information. Whereas, the “websites of environmental news organizations” trended as the second most popular source of climate information since it was mentioned by (51.3%) percent of the surveyed students as one of their favourite sources of such information. The “general news websites” are ranked as third most preferred source of climate information since a sizeable segment of the surveyed students (44.7%) also chose them as one of their favourite sources of climate information. Additionally, the list of the other online platforms with the ratio of mentioning respondents in descending order is as follows: Twitter (43.4%), YouTube (42.7%), Instagram (27.0%), and Whatsapp (20.7%). Conversely, snapchat emerged as the least favourite source of information related to climate change as only (12.2%) of the surveyed students mentioned it as their favourite source of information.

Whereas, the ratio of the surveyed students who declared that their most preferred online source for climate information is not mentioned in the table was just (2.8%).

**Use of digital media for climate information and demographic variable differences**

*Table 3: Use of digital media for climate information and gender differences*

Use of social media for climate information	Male	Female
	Frequency (%)	Frequency (%)
Twitter	136 (47.1)	124 (40.0)
Instagram	72 (24.9)	90 (29.0)
Snapchat	45 (15.6)	28 (9.0)
Facebook	209 (72.3)	226 (72.9)
News websites	131 (45.3)	137 (44.2)
Environmental organization website	148 (51.2)	159 (51.3)
YouTube	134 (46.4)	122 (39.4)
WhatsApp	71 (24.6)	53 (17.1)
Anyother	11 (3.8)	6 (1.9)
<b>Total</b>	<b>289(48.2)</b>	<b>310 (51.8)</b>

*Chi-square = 20.39, df = 9, sig = .02*

The table provided above indicates the impact of gender variable on preferences of university students regarding digital media platforms as sources of climate change related information. The detailed description of the table is provided below:

**1:** In context of twitter it was observed that proportion of the male respondents ranking twitter as their most preferred source of climate information (47.1) percent was higher than their female counterparts (40%). In this way Twitter emerges as comparatively more preferred source of climate information to male students in comparison to female university students.

**2:** On the contrary Instagram was more popular among the female students as their preferred source of climate information; as their proportion ranking Instagram as one of the preferred source of information (29.0%) was higher in comparison to the male students whose proportion ranking Instagram among their preferred sources of information remained (24.9%).

**3:** Similarly the proportion of male students preferring snapchat for climate information (15.6) was also higher in comparison to the proportion of their female university mates (9.0%).

**4:** In case of Facebook which emerged as most preferred source of climate information, the proportion of the female students (72.9) was just slightly higher than the proportion of male respondents (72.3). Therefore, no remarkable difference was noted in preferred ranking of Facebook as most favorite source of information by male and female university students.

**5:** Similarly the proportional difference between male and female respondents in case of general news website was also marginal. However the proportion of male respondents (45.3) preferring general news websites as one of their most favorite source of information was slightly higher in comparison to the proportion of their female counterparts (44.2).

**6:** In the same way, no remarkable difference was found in case of environmental organization websites as a slightly higher proportion of female respondents (51.3) chose this platform as one of their preferred source of climate information in comparison to a marginally low proportion of the female respondents of the study (51.2).

**7:** However, YouTube was relatively more popular among the male students as (46.4) percent of the male respondents declared it as one of their preferred online sources of climate information; whereas, the ratio of female students ranking YouTube among their favorite sources of climate information remained (39.4).

**8:** Similarly, in case of WhatsApp it was observed that the proportion of male respondents claiming whatsapp to be their preferred source of climate information (24.6) was greater than the proportion of female respondents (17.1) who mentioned whatsapp as one of their preferred sources of climate information.

**9:** Finally, a comparatively larger proportion of male respondents (3.8) mentioned that their preferred online source of climate information is other than the digital media platforms mentioned in the question. However, the total number of such respondents was just (1.9) of the male students.

Table 4: Use of digital media for climate information and age category differences

Use of social media for climate information	Age categories	
	Up to 22 years	Above 22
	Count (%)	Count (%)
Twitter	149 (43.7)	111(43.0)
Instagram	101 (29.6)	61 (23.6)
Snapchat	43 (12.6)	30 (11.6)
Facebook	238 (69.8)	197 (76.4)
News websites	157 (46.0)	111 (43.0)
Environmental organization website	191 (56.0)	116 (45.0)
YouTube	149 (43.7)	107 (41.5)
WhatsApp	69 (20.2)	55 (21.3)
Anyother	12 (3.5)	5 (1.9)
<b>Total</b>	<b>341(56.9)</b>	<b>258(43.1)</b>

*Chi-square = 15.45, df = 9, sig = .08*

The data presented in the Table 4: reflect the impact of age variable on use of digital media platforms by university students in Sindh province for climate information. The detailed description of the table is provided below:

**1:** In the context of the respondents claiming twitter as one of their preferred source of climate information, it was observed that the proportion of those students who belonged to the age category of up to 22 years (43.7%) was slightly greater than the proportion of those students who belonged to more mature age category of above 22 years (43%).

**2:** However, the impact of age variable in case of preferring Instagram as source of climate information was relatively higher as the proportion of the students aged up to 22 years claiming it as one of their preferred source of climate information (29.6%) was greater than the proportion of their counterparts of senior age category of above 22 years (23.6%).

**3:** Conversely, the proportion of students aged above 22 years (76.4%) was greater among the respondents who prefer to get climate information from Facebook in comparison to the proportion of their junior counterparts also preferring Facebook as an online source of climate information (69.8%).

**4:** On the contrary, in case of general news websites it was observed that the proportion of those who were just up to 22 years old (46%) was higher in comparison to the proportion of those who were above 22 years old (43%) among the respondents who mentioned general news websites as their preferred digital media platforms for climate information.

**5:** Similarly, among those students who mentioned environmental organization websites as one of their preferred digital media platform for climate news, the proportion of those who were just up to 22 years old (56%) was greater in comparison to the proportion of those respondents who were above 22 years old (45%).

**6:** In the same context, regarding YouTube it was observed that the proportion of those who were just up to 22 years old (43.7%) was higher in comparison to the proportion of those who were above 22 years old (41.5%) among the respondents who mentioned YouTube as their preferred digital media platforms for climate information.

**7:** On the other hand among those students who mentioned WhatsApp as one of their preferred digital media platforms for climate news, the proportion of those who were above 22 years old (21.3) was greater in comparison to the proportion of the respondents who were just up to 22 years old (20.2).

**8:** Finally, the students who showed their preference for digital media platforms 'other' than the mentioned ones in the question, among them the proportion of those who were just up to 22 years old (3.5%) was greater in comparison to the proportion of those respondents who were above 22 years old (1.9).

**Table5: Role of digital media in catering climate change information needs**

	Mean	Factors	
		1	2
<b>1: Usefulness of digital media in disseminating climate information</b>	<b>4.12</b>		
Digital media is satisfactorily catering my climate change information needs	3.96	.81	
Digital media is preferred source of climate information for my generation	4.07	.75	
In comparison to other sources, I am getting more information about climate change from digital media	4.32	.70	
<b>2: Efficacy of digital media in climate change communication</b>	<b>3.60</b>		
The use scientific jargons undermines the understandability of climate change related information on digital media	3.51		.85
Digital media plays a vital role in social construction of climate change in Sindh	3.68		.79
Cronbach' Alpha (Reliability score %)	.58		
Eigen values		1.94	1.08
% of variance		38.75	21.53

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization (Eigen value > 1). Higher mean scores equal greater mobile usage. Scale ranges from strongly agree = 5 to strongly disagree = 1.

The table 5 displays the data concerning the perspective of university students in relation to the role and effectiveness of online media platforms for climate change communication in Sindh. In this regard, the surveyed students were requested to provide their agreement or disagreement with five statements concerning the role of online media platforms in climate change communication. In this context, the statements were quantified on five-point scale ranging from strongly agree=5 to strongly disagree=1. The statements were (a) Digital media is satisfactorily catering my climate change information needs (b) Digital media is preferred source of climate information for my generation

(c) In comparison to other sources, I am getting more information about climate change from digital media (d) The use scientific jargons undermines the understandability of climate change related information on digital media (e) Digital media plays a vital role in social construction of climate change in Sindh.

Additionally, to find correlation among the statements provided in the scale factor analysis test was administered and resultantly two factors with Eigen value greater than 1 appeared. Accordingly, the two factors emerged after applying factor analysis test were named as:

- 1: Usefulness of digital media in disseminating climate information
- 2: Efficacy of digital media in climate change communication

Hence, the table 5 itemizes each of the six items of the two factors with consequent factor loadings. The reliability was tested by applying Cronbach's coefficient alpha. The Bartlett's test of sphericity was (1349.19) ( $p < .000$ ) and the KMO value was .80,  $p < .000$ . Moreover, the reliability score of all the items is high which indicate that clustering of statements in two factors is appropriate.

The data related to factor one with average mean value ( $M=4.12$ ) indicate that a vast majority of the surveyed students acknowledged the usefulness of digital media in disseminating climate information. This factor was consisted of of three statements. In this respect, the statement "in comparison to other sources, I am getting more information about climate change from digital media" received highest rating ( $M=4.32$ ). While, the second highest rated statement was "digital media is preferred source of climate information for my generation". Meanwhile, the statement that "digital media is satisfactorily catering my climate change information needs" was rated lowest in factor one, although, the majority of the surveyed students with ( $M=3.96$ ) supported the statement.

Furthermore, the factor number two concerning the efficacy of the digital media for climate change communication acquired an average mean score of ( $M=3.60$ ). The factor 2 was consisted of two statements

In this context, the statement “digital media plays a vital role in social construction of climate change in Sindh was rated highest with mean score of ((M=3.68). Conversely, the statement that “the use scientific jargons undermines the understandability of climate change related information on digital media was rated comparatively low by the surveyed students with mean score of (M=3.5). Nevertheless, the majority of the surveyed students (M=3.5) showed their agreement with the statement as they opined that the scientific jargons are a hurdle in understanding the knowledge about climate change on digital media.

**Role of digital media in catering climate change information needs and demographic variable differences**

**TABLE 6: Role of digital media in catering climate change information needs and gender**

<b>Gender</b>				
<b>Role of digital media in catering climate change information needs</b>	<b>Male M</b>	<b>Female M</b>	<b>t-value</b>	<b>P-Value</b>
<b>1: Usefulness of digital media in disseminating climate information</b>				
Digital media is satisfactorily catering my climate change information needs	3.99	4.14	-2.218	.03
Digital media is preferred source of climate information for my generation	4.30	4.33	-.543	.59
In comparison to other sources, I am getting more information about climate change from digital media	3.94	4.98	-.608	.54
<b>2: Efficacy of digital media in climate change communication</b>				
The use scientific jargons undermines the understandability of climate change related information on digital media	3.59	3.43	1.973	.05
Digital media plays a vital role in social construction of climate change in Sindh	3.73	3.63	1.087	.28

**Note:** High scores equal a greater level of mobile usage. The scale ranges from Often =5 to Never =1.

In context with the impacts of gender differences on perception of the respondents about the role of digital media platforms for climate change communication (see table 6) under the first factor “usefulness of digital media in disseminating climate information” the mean score for all the three statements ; digital media is satisfactorily catering my climate change information needs, digital media is preferred source of climate information for my generation and “in comparison to other sources, I am getting more information about climate change from digital media” remain higher in case of the female students (M=4.14; M=4.33; M=4.98 correspondingly) compared to the male respondents (M=3.99; M=4.30; M=3.94).

On the contrary, in case of factor two which is related to the efficacy of digital media for climate change communication, the mean scores for both the statements “the use scientific jargons undermines the understandability of climate change related information on digital media and digital media plays a vital role in social construction of climate change in Sindh emerged higher stood higher in case of male respondents with mean score of (M= 3.59; M=3.73 correspondingly) in comparison to the female respondents (M=3.43; M=3.63).

**TABLE7: Role of digital media in catering climate change information needs and age categories**

<b>Age categories</b>				
<b>Role of digital media in catering climate change information needs</b>	<b>Up to 22 yrs M</b>	<b>Above 22 yrs M</b>	<b>t-value</b>	<b>P-Value</b>
<b>1: Usefulness of digital media in disseminating climate information</b>				
Digital media is satisfactorily catering my climate change information needs	4.07	4.06	.119	.90
Digital media is preferred source of climate information for my generation	4.31	4.32	-.155	.88

In comparison to other sources, I am getting more information about climate change from digital media	3.95	3.98	-.392	.70
<b>2: Efficacy of digital media in climate change communication</b>				
The use scientific jargons undermines the understandability of climate change related information on digital media	3.51	3.50	.06	.95
Digital media plays a vital role in social construction of climate change in Sindh	3.67	3.69	-.250	.80

**Note:** High scores equal a greater level of mobile usage. The scale ranges from Often =5 to Never =1.

The table 7 displays the data related to the impacts of age variable on perspective of the surveyed students in terms of the role of digital media platforms for climate change communication. Regarding the factor one titled as “usefulness of digital media in disseminating climate information” only slight differences were observed between the perspectives of students pertaining to age categories provided in the table. . The mean score based on responses of male students for the first statement “Digital media is satisfactorily catering my climate change information needs was slightly higher (M=4.07) in case of the respondents belonging to age category of up to 22 years compared to those belonging to age category of above 22 years. On the other hand, the mean score (M=4.32; 3.98) of respondents belonging to age category of above 22 years was marginally higher in case remaining two statements “digital media is preferred source of climate information for my generation” and “in comparison to other sources, I am getting more information about climate change from digital media” in comparison to age group of up to 22 years (M=4.31; M=3.95). Thus the impact of age categories on perception of the respondents about the role of digital media in providing climate information remained marginal.

Subsequently, in case of factor two of the table dealing with the efficacy of the digital media in climate change communication, it was observed that among the respondents endorsing the first statement of factor two “the use scientific jargons undermines the understandability of climate change related information on digital media” the ratio of age category of up to 22 years was slightly higher (M=3.51) in comparison to the age group of above 22 years (M=3.50). However, the differences were marginal as both groups endorsed the statement. Regarding second statement of the factor two “digital media plays a vital role in social construction of climate change in Sindh” the mean score of the respondents of age category of above 22 years (M=3.69) was higher in comparison to the mean score (M=3.67) of a bit younger respondents belonging to category of just up to 22 years.

### Discussion

Anthropogenic climate change is being widely recognized as one of most pervasive threat to modern human civilization which has profound consequences for societies and ecosystems (Weart, 2010, Pörtner et al, 2022). In this context, the relevance of the role of media in social construction of climate change has been abundantly acknowledged and investigated by the communication scholars (Ejaz, Ittefaq.). Furthermore, due to the rise of digital media platform online discourse about climate change has become more relevant and lot of research is being conducted to examine the role of online platforms in climate change communication ((Belotti et al., 2022; Mavrodieva, 2019; Pearce et al.,2019; Boulianne, Lalancette, & Ilkiw, 2020). However, it has been observed that these types of research initiatives are mainly confined to western world. Therefore, literature review in the area suggest more research in non English speaking developing countries to study the role of online media platforms in different socio-cultural settings (Tandoc & Eng, 2017). Moreover, less developed countries are disproportionately worst affected by the climate change due to lack of adoptive capacity and absence of a robust early warning as well as disaster response system ((Portner et al., 2022).

In this respect, the results of current research point out that a vast number of Higher Education Institutions (HEIs) students in Pakistan are utilising online media platforms for climate change information. In this context, Facebook emerged as the most favored source of climate change related information. Thus, the findings of this study endorse the results of research conducted in other regions which also highlight a connection between Facebook use and climate change awareness (Ali, 2011). Additionally, the websites of environmental organizations and general news websites appeared as the second and third most favored online sources of climate change information for university students. The

results also show some impacts of gender variable on the preference list of the digital media platforms for climate change information. According to the results Twitter, Snap chat, YouTube, Whatsapp were more popular among male students, whereas Instagram was more favorite to female students. Additionally, results related to age category differences show that Instagram, news websites, environmental organization websites were more frequently mentioned by the students up to 22 years old as their preferred digital media platforms. Besides, Facebook was found more popular among the respondents of above 22 years old.

Moreover, most of the participants of this study recognized that the digital media is satisfactorily catering their climate change information needs and they consider digital media as a preferred information resource of climate info for their age cohort.

The investigation's findings also indicate that in comparison to other information resources, the surveyed students were getting more information about climate change from digital media. The findings related efficacy of the digital media platforms point out that in opinion of the surveyed students, digital media plays a vital role in social construction of climate change in Sindh. Nonetheless, the majority of the respondents uphold the view that the use of scientific jargons undermines the understandability of climate change related information on digital media.

In addition to it, slight differences were found in perceptions of male and female respondents; as compared to male students the female students more frequently emphasized that digital media is not only fulfilling their climate information needs but new media is providing more information than any other source available to them. While in contrast, male respondents scored relatively more in comparison to females students claiming that digital mediums are playing an important part in social construction of climate change in Sindh province. Nevertheless, they also more frequently mentioned that information about climate change on digital media platforms is less understandable due to the use of jargonized content.

### **Conclusion**

The results of this study indicate that online media is favoured source of climate information for generation Z, as it is playing a pivotal part in gratifying the climate change related information requirements of university students in Sindh, Pakistan. Moreover, digital media is also playing its part in social construction of climate change in the province; however, the usage of scientific terminology emerged as a major communication barrier undermining the understandability of the climate change related information. Therefore, it is recommended that digital media platforms can be considered as the effective communication tools for future climate change literacy campaigns for young generation in Sindh, Pakistan. However, translating the climate science jargons in the languages of locals and defining them in the context of regional cultural settings is recommended to enhance the understandability of the climate change linked content available online. Furthermore, considering current study's limitation of university students sampled research population, further research is suggested to evaluate the role of digital media platforms in gratifying the climate information requirements of other sections of the society in Sindh province of Pakistan.

### **References**

- Abbass, K., Qasim, M. Z., Song, H., Murshed, M., Mahmood, H., & Younis, I. (2022). A Review of the Global Climate Change Impacts, Adaptation, and Sustainable Mitigation Measures. *Environmental Science And Pollution Research*, 1-2
- Abbas, S. (2022). Climate Change and Major Crop Production: Evidence from Pakistan. *Environmental Science And Pollution Research*, 29(4), 5406-5414
- Ahmed, K., Shahid, S., & Nawaz, N. (2018). Impacts of climate variability and change on seasonal drought characteristics of Pakistan. *Atmospheric research*, 214, 364-374.
- Abbasi, Z. A. K., & Nawaz, A. (2020). Impact of Climate Change Awareness on Climate Change Adoptions and Climate Change Adaptation Issues. *Pakistan Journal Of Agricultural Research*, 33(3), 619
- Adnan, M., Yousaf, Z., Nawaz, M. B., & Bhatti, M. A. (2020). The Changing Role of Urdu News Media with Digital Communication in Pakistan. *Journal Of Research (Urdu)*, 36(1), 173-184

- Ahmad, S. T., Ahmed, R., Wani, G. F., Sharma, P., & Ahmed, P. (2022). Glacier Changes in Sind Basin (1990–2018) Of North-Western Himalayas Using Earth Observation Data. *Modeling Earth Systems and Environment*, 8(2), 2567-2579
- Ajani, A., & Van Der Geest, K. (2021). Climate Change in Rural Pakistan: Evidence and Experiences from a People-Centered Perspective. *Sustainability Science*, 16(6), 1999-2011.
- Akram, N., & Hamid, A. (2015). Climate Change: A Threat to the Economic Growth of Pakistan. *Progress in Development Studies*, 15(1), 73-86
- Ali, S., Khalid, B., Kiani, R. S., Babar, R., Nasir, S., Rehman, N., & Goheer, M. A. (2020). Spatio-Temporal Variability of Summer Monsoon Onset over Pakistan. *Asia-Pacific Journal of Atmospheric Sciences*, 56(1), 147-172.
- Ali, M. S. S. (2011). The Use of Facebook to Increase Climate Change Awareness among Employees. *International Proceedings of Economics Development & Research*, 5(2), V2-266.
- Askanius, T., & Uldam, J. (2011). Online Social Media for Radical Politics: Climate Change Activism on YouTube. *International Journal of Electronic Governance*, 4(1-2), 69-84.
- Basch, C. H., Yalamanchili, B., & Fera, J. (2022). # Climate Change on Tiktok: A Content Analysis of Videos. *Journal of Community Health*, 47(1), 163-167.
- Belotti, F., Donato, S., Bussoletti, A., & Comunello, F. (2022). Youth Activism for Climate on and Beyond Social media: Insights from FridaysForFuture-Rome. *The International Journal of Press/Politics*, 27(3), 718-737.
- Boulianne, S., Lalancette, M., & Ilkiw, D. (2020). “School strike 4 climate”: social media and the international youth protest on climate change. *Media and Communication*, 8(2), 208-218.
- Cloughton, I. (2021). Global youth activism on climate change. *Social Work & Policy Studies: Social Justice, Practice and Theory*, 4(1).
- Dimock, M. (2019). Defining generations: Where Millennial end and Generation Z begins. *Pew Research Center*, 17(1), 1-7.
- Edwards, R. C., & Larson, B. M. (2020). When Screens Replace Backyards: Strategies To Connect Digital-Media-Oriented Young People To Nature. *Environmental Education Research*, 26(7), 950-968
- Ejaz, W., Ittefaq, M., & Arif, M. (2022). Understanding influences, misinformation, and fact-checking concerning climate-change journalism in Pakistan. *Journalism Practice*, 16(2-3), 404-424.
- Farooq, M. S., & Fatima, H. (2022). Global Climate Change and Natural Disasters: A Threat to Sustainable Food Production and Food Security of Pakistan. *Brazilian Journal of Agriculture - Revista De Agricultura*, 97(2), 186-214.
- Gomez, L. M. (2021). The State of Social Media Research in CSR Communication. *The Palgrave Handbook of Corporate Social Responsibility*, 577-59
- Han, J., Sun, S., & Lu, Y. (2017). Framing Climate Change: A Content Analysis of Chinese Mainstream Newspapers from 2005 to 2015. *International Journal of Communication*, 11, 23.
- Hingorjo, A. A., & Marinova, D. (2018). Covering a Dying Delta: Challenges for Pakistani Journalists. In *Sustainability and Development in Asia and the Pacific: Emerging Policy Issues* (pp. 183-199).
- Hussain, M., Butt, A. R., Uzma, F., Ahmed, R., Irshad, S., Rehman, A., & Yousaf, B. (2020). A Comprehensive Review of Climate Change Impacts, Adaptation, and Mitigation on Environmental and Natural Calamities in Pakistan. *Environmental Monitoring and Assessment*, 192(1), 1-20.
- Ishaque, W., Tanvir, R., & Mukhtar, M. (2022). Climate Change and Water Crises in Pakistan: Implications on Water Quality and Health Risks. *Journal of Environmental and Public Health*, 2022.
- Khan, M. A., Khan, J. A., Ali, Z., Ahmad, I., & Ahmad, M. N. (2016). The Challenge of Climate Change and Policy Response in Pakistan. *Environmental Earth Sciences*, 75(5), 1-16.
- Lama, A. P., & Tatu, U. (2022). Climate Change and Infections: Lessons Learnt from Recent Floods in Pakistan. *New Microbes and New Infections*, 49, 101052.
- Latif, Y., Ma, Y., & Ma, W. (2021). Climatic Trends Variability and Concerning Flow Regime of Upper Indus Basin, Jehlum, and Kabul River Basins Pakistan. *Theoretical and Applied Climatology*, 144(1), 447-468.

- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods* (Vols. 1-0). Thousand Oaks, CA: Sage Publications, Inc. doi: 10.4135/978141296394
- Malik, S. M., Awan, H., & Khan, N. (2012). Mapping Vulnerability to Climate Change and Its Repercussions on Human Health in Pakistan. *Globalization and Health*, 8(1), 1-10.
- Mavrodieva, A. V., Rachman, O. K., Harahap, V. B., & Shaw, R. (2019). Role of social media as a soft power tool in raising public awareness and engagement in addressing climate change. *Climate*, 7(10), 122
- Napawan, N. C., Simpson, S. A., & Snyder, B. (2017). Engaging Youth in Climate Resilience Planning With Social Media: Lessons from Our Changing Climate. *Urban Planning*, 2(4), 51-63.
- Ojala, M, and Y. Lakew. 2017. "Young People and Climate Change Communication." *Oxford Research Encyclopedia of Climate Science*. Oxford University Press USA.
- O'Neill, C. S., & Boykoff, M. (2012). The Role of New Media in Engaging the Public with Climate Change. *Engaging the Public with Climate Change*, 259-277
- Parry, S., McCarthy, S. R., & Clark, J. (2022). Young People's Engagement with Climate Change Issues through Digital Media—A Content Analysis. *Child and Adolescent Mental Health*, 27(1), 30-38
- Pearce, W., Niederer, S., Özkula, S. M., & Sánchez Querubín, N. (2019). The Social Media Life of Climate Change: Platforms, Publics, and Future Imaginaries. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), E569
- P Lama, A., & Tatu, U. (2022). Climate change and infections: lessons learnt from recent floods in Pakistan. *New Microbes and New Infections*, 49
- Pörtner, H. O., Roberts, D. C., Adams, H., Adler, C., Aldunce, P., Ali, E., & Birkmann, J. (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. *IPCC Sixth Assessment Report*
- Rabbani, M. M., Inam, A., Tabrez, A. R., Sayed, N. A., & Tabrez, S. M. (2008, March). The Impact of Sea Level Rise on Pakistan's Coastal Zones—In a Climate Change Scenario.
- Rasul, G., Chaudhry, Q. Z., Mahmood, A., Hyder, K. W., & Dahe, Q. (2011). Glaciers and Glacial Lakes under Changing Climate In Pakistan. *Pakistan Journal of Meteorology*, 8(15).
- Rehman, N., Adnan, M., & Ali, S. (2018). Future Extremes and Variability of Rainfall over Monsoon Region of Pakistan. *Pak J Meteorol*, 14, 61-78
- Ripple, William J., Christopher Wolf, Jillian W. Gregg, Kelly Levin, Johan Rockström, Thomas M. Newsome, Matthew G. Betts Et Al. "World Scientists' Warning Of A Climate Emergency 2022." (2022): 1149-1155
- Rousell, D., & Cutter-Mackenzie-Knowles, A. (2020). A Systematic Review of Climate Change Education: Giving Children and Young People a 'Voice' and A 'Hand' in Redressing Climate Change. *Children's Geographies*, 18(2), 191-208
- Safdar, F., Khokhar, M. F., Arshad, M., & Adil, I. H. (2019). Climate Change Indicators and Spatiotemporal Shift in Monsoon Patterns in Pakistan. *Advances in Meteorology*, 2019.
- Schäfer, M. S. (2012). Online communication on climate change and climate politics: a literature review. *Wiley Interdisciplinary Reviews: Climate Change*, 3(6), 527-543.
- Sharif, A., & Medvecky, F. (2018). Climate change news reporting in Pakistan: A qualitative analysis of environmental journalists and the barriers they face. *Journal of Science Communication*, 17(1), A03
- Sindh Climate Change Policy (2022) Government of Sindh Environment, Climate Change and Coastal Development Department Directorate of Climate Change. Retrieved from <https://docc.sindh.gov.pk/files/DoCC/Sindh%20Climate%20Change%20Policy%202022%20%28Final%29.pdf>
- Tandoc Jr, E. C., & Eng, N. (2017). Climate Change Communication on Facebook, Twitter, Sina Weibo, and Other Social Media Platforms. In *Oxford Research Encyclopedia of Climate Science*
- Ullah, I., Saleem, F., Iyakaremye, V., Yin, J., Ma, X., Syed, S. & Omer, A. (2022). Projected Changes In Socioeconomic Exposure To Heatwaves In South Asia Under Changing Climate. *Earth's Future*, 10(2), E2021ef002240
- Wada, Hadiza. (2019) "Media consumption trends: Comparing millennials and Generation Z." In *Proceedings of the 15th International RAIS Conference on Social Sciences and Humanities*, pp. 58-65. Scientia Moralitas Research Institute, 2019.

- Weart, S. R. (2010). The idea of anthropogenic global climate change in the 20th century. *Wiley Interdisciplinary Reviews: Climate Change*, 1(1), 67-81.
- Weeks, J., & Harrison, B. (2020). *Review of Sea Level Rise Science, Information and Services in Pakistan*. Technical Report
- World Weather Attribution ( 2022) Climate Change Likely Increased Extreme Monsoon Rainfall, Flooding Highly Vulnerable Communities In Pakistan
- Zachariah, M., Arulalan, T., Achutarao, K., Saeed, F., Jha, R., Dhasmana, M. K., & Philip, S. (2022). Climate Change Made Devastating Early Heat In India and Pakistan 30 Times More Likely. *World Weather Attribution*.