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Why New Media app during the Healthcare Crisis? WhatsApp Based Study

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Abstract

WhatsApp is one of the most popular mobile applications providing instant messaging and ease of access. It uses web-based systems to send and receive texts, calls, and videos and even offers video chat. However, during the current healthcare crisis, WhatsApp's role is comparatively more prominent and needs more consideration. In this context, we conducted this research to examine the factors motivating students to rely more on WhatsApp during the Covid-19 pandemic. Based on the Uses and Gratifications Approach, we adopted a cross-sectional design and gathered data from university students in Islamabad, Pakistan. Findings from *n*= 302 university-level students affirmed communication *(p≥ .000)*, learning *(p≥ .002)*, Teamwork *(p≥ .041)*, and information sharing *(p≥ .000)* as the motivating factors behind increased WhatsApp usage *(p≥ .011)* during the healthcare crisis. Similarly, path analysis results also validated a strong correlation between the variables, further affirming the strength of the proposed conceptual framework. Thus, WhatsApp not only provided ease of communication during Covid-19 but also helped sustain educational activities. Here we recommend more studies to examine other different factors, especially personality factors that can affect one's WhatsApp usage.

Keywords: Covid-19, WhatsApp, social media, wireless communication, education, mobile application

1. Introduction

Covid-19, as a significant crisis, challenged financial and healthcare services; also affected other daily social life activities. Today, billions of people are confined inside the four walls of their homes, trying to sustain their daily activities, and cope with the increased healthcare challenges (Ali and Khalid 2020). Similarly, the impacts of Covid-19 on educational activities are also hindered, raising immense challenges for both instructors and students. Globally due to the sudden closure of educational institutions and lockdown, a majority of institutions began to look for favorable substitutes. Even teachers also showed increased consideration, as the main concern was to resume the academic journal in a better possible manner (Shahzad et al. 2020)**.** For this purpose, educational stakeholders and policymakers started brainstorming about the possible resource to sustain the educational activities. Now, it was time to take the underrepresented and debatable role of Computers and Information Communication Technology under serious consideration. (Elareshi et al. 2022)After much debate and consideration, educational institutions eventually agreed to adopt an instant transition from their conventional educational system. As a result, Covid-19 has become a factor behind Digital Learning adoption and dependency among students and institutions (Abu-Hudra and Mohamed, 2022; Conto, Akseer, and Dreesen 2020). An increased ICT adoption and integration in learning not only helped to sustain educational activities; but also, remarkably increased the supply and demand of ICT equipment, goods, and services both in educational institutions and on the domestic level (Nikdel Teymori and Fardin 2020). Here it is also notable that, besides the greater adoption from ICT users such as institutions, instructors, and students, manufacturers, and services providers also experienced a rapid boom in sales, demanding improved services.

For instance, most countries also started free-of-cost services to their students as the objective was to sustain educational activities possibly. Consequently, local Information Technology (IT) services providers are also confronted with a brisk improvement in their technical services as the aim was to support the governments in providing a digital pathway to education (Stocktaking 2020). Her critics also anticipated Covid-19 as an accelerating agent of Digital Learning adoption in the future. As noted, during the current battle against healthcare challenges, the switch to Information Communication Technology (ICT) has become an advanced solution to increase and sustain economic and social resilience. Technologies like Machines Learning, Artificial Intelligence, Robotics, 3D printing, Internet of Things, and others are preferred worldwide (Derindag, Yarygina, and Tsarev 2020; Fortune Business Insights 2020)

Furthermore, resorting to ICT for education and learning is common among both developed and developing countries. During Covid-19, innovative technology was needed to optimize educational activities (Almarzooq, Lopes, and Kochar 2020). For this purpose, web-based applications such as Zoom, Skype, WhatsApp, and others play a prominent role. A study conducted by (Shahzad et al. 2020) also validated web-based applications' role to facilitate academic activities during Covid-19. The cross-sectional design also revealed more excellent support regarding adopting web-based applications for learning and teaching purposes. Here (Khan 2020) cited an example concerning web-based applications used for learning purposes at The Institute of Pharmaceutical Science (IPS), University of Veterinary and Animal Science, Lahore, Pakistan.

Students from the relevant institutions were motivated by their institutions and instructors to switch to applications like Zoom, WhatsApp, Skype, Facebook Live, and Google meet, as these applications widely offer real-time, face-to-face interaction between classmates and instructors. By using services like live sessions, students directly communicate with their peers and teachers to sustain their educational activities. (Alhumaid, Habes, and Salloum 2021) In this regard, WhatsApp is one of the leading and most preferred applications that is serving communication and learning purposes today. When the Higher Education Commission Pakistan declared the institutions' closure, stakeholders motivated the students and teachers to rely more on web-based applications to gratify their educational and informational needs (Tallal Javed et al. 2020). As noted by (La Hanisi et al. 2018), besides communication, learning is another primary service offered by WhatsApp for students. Now, students can communicate with each other and be involved in collaborative learning activities through extended WhatsApp features. Students are encouraged to stay connected with their classmates, teachers, and educational institutions to stay updated about ongoing academic activities.

Thus by keeping in view the ever-increased role of WhatsApp for students, the current study also focuses on the factors influencing WhatsApp usage during the current healthcare emergency (Ramos-Morcillo et al. 2020; Whitelaw et al. 2020). Despite several studies conducted to examine WhatsApp adoption for learning purposes and its impacts during Covid-19, we do not have any study to examine these factors responsible for WhatsApp usage, particularly in Pakistan. In this context, this investigation will fill the gap concerning **(i)** WhatsApp usability among students during Covid-19 and **(ii)** technology usage in Pakistan. For this purpose, we have divided our study into four primary sections: In the **first section,** we highlighted the educational consequences raised during Covid-19 in a general context and their impacts, especially on Pakistan, leading to ICT adoption for learning purposes. In the **second section**, we highlighted WhatsApp's role, its adoption as a leading concern both during the past few years, and Covid-19 for learning and communication purposes. The third section contains a brief yet comprehensive overview of the research methods we executed in this study. **The fourth section** contains data analysis and results of the study. **The fifth section** contains two prominent parts, (i); first, we discussed the study results to highlight the consistency between this research and previous investigations. (ii), Secondly, we have highlighted relevant theoretical implications based on the student's educational needs and further made the conclusions accordingly.

2. Literature Review & Hypotheses Development

WhatsApp- An Overview:

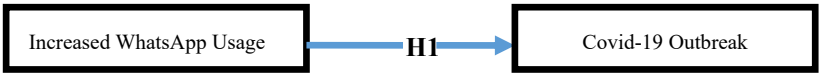
Kustijono and Zuhri (2018) defined WhatsApp as an instant messaging-based cross-platform, proprietary, facilitating communication between its users. It primarily uses the internet to share and receive written texts, voice files, documents in different forms, videos, and user location through standard cellular mobile devices (Wilson 2018). The fact can estimate WhatsApp messenger's popularity is that it is today one of the topmost preferred social networking platforms among users of different ages, gender, and geographical locations (Garimella and Tyson 2018). According to (Kircaburun et al. 2020), WhatsApp was developed as an alternative pathway to the standard messaging process. Today, it is gratifying the communication needs of more than two billion people all over the world. Moreover, during the initial days of Covid-19, people were spending a total of 15 billion minutes on WhatsApp daily. However, after the lockdown, and closure of workplaces and educational institutions, this usage remarkably increased (Andjelic 2021). By the end of March 2021, 54.0% of WhatsApp are millennials, and more than a third (36.0%) of WhatsApp are baby boomers (Bucher 2020). Likewise, as internet penetration remarkably increased (11 million) between 2019 to 2020, the number

of WhatsApp users also increased by 9.6 (6.2%) million from January 2019 to January 2020 (Kemp 2020). Consequently, today Pakistan ranks prominent among the list of countries where WhatsApp is most frequently preferred for communication, information, entertainment, and other relevant purposes [20] [22].

Increased WhatsApp Usage & Covid-19:

WhatsApp is today one of the most prominent communications and information-sharing web-based applications. Information shared through WhatsApp is now a part of our everyday life. Especially during the Covid-19 pandemic, WhatsApp usage and dependency have remarkably increased for communication purposes. Due to lockdown and social distancing worldwide, WhatsApp provides a quick communication facility without any external or interior barriers (Tallal Javed et al. 2020; Youssef 2020). A cross-sectional study conducted in Singapore also validated an increased WhatsApp usage for communication purposes. The data gathered from *n*= 151 participants indicated that WhatsApp is mainly used to share information related to Covid-19, educational matters, and official information, and communicate with family, friends, and classmates. Some users excessively use WhatsApp for long hours, and some use it to share and receive a few messages a day (Tan et al. 2020). As noted by (Agustin Mawarni et al. 2020), WhatsApp largely facilitated accessibility, increased collaboration, and interaction among students during the current healthcare crisis. Youngsters mainly prefer WhatsApp during Covid-19 to stay connected with their peers and teachers to stay updated about the ongoing academic proceedings. Like today, when formal socialization and real-time face-to-face interaction are nearly impossible, WhatsApp as a primary social networking tool is facilitating the communication process. This usage is supporting communication on almost every level. Be it family relations, communication between friends, or sustained educational activities, WhatsApp provides access and ease of usage to everyone across the world (Obi-Ani, Anikwenze, and Isiani 2020). Even this communicational feasibility is also helping telemedicine, where those who are unable to visit their doctors physically are in touch with the healthcare providers (Sabirli et al. 2020).

H1: There is a significant relationship between increased WhatsApp usage and the Covid-19 outbreak Covid-19

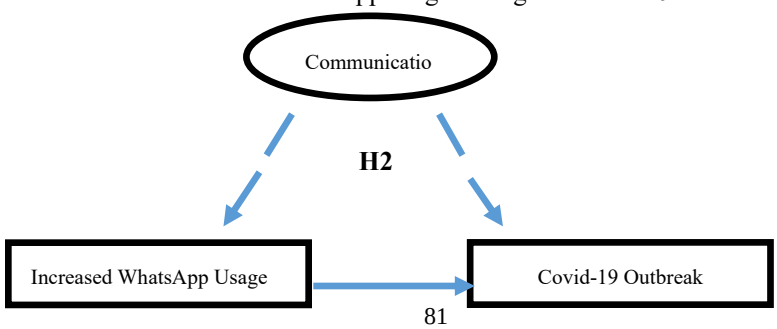


WhatsApp Usage & Communication:

Due to the increased number of social networking sites and applications, it is difficult for users to select the most suitable ones. As a result, they choose an application that facilitates all their needs, such as communication, information, education, and entertainment. Here among all of the applications, WhatsApp is one of the most popular and preferred social networking applications serving all the previously mentioned purposes (Minhas 2016). Especially, communication is one of the essential services that distinguishes WhatsApp from its fellow social media applications. As a result, WhatsApp is a center of attention for users of all ages. Even it is significant for marketers and learners to use it for personal development (education) and commercial purposes. Indeed WhatsApp is an integral part of our daily life, primarily services communication with ease of access, usefulness, and availability (Urien, Erro-Garcés, and Osca 2019; Safori, 2018). WhatsApp's increasing popularity is its user-friendly service, flexible terms and conditions, and regular updates that sustain communication effectively and smoothly. Consequently, not only mobile users prefer WhatsApp; computer users also use WhatsApp for communication purposes as it has created a sense of interactivity, relationships, and belongings among its users (Kumar and Sharma 2017)**.**

A survey further validated the role of WhatsApp in facilitating communication in Malaysia. Data gathered from employing the survey method revealed that students from Malaysian Higher Education institutions prefer WhatsApp for communication and interaction purposes. Moreover, its usage factors are perceived usefulness and ease of use which makes WhatsApp preferable for potential users (Chan, Yong, and Harmizi 2020). Thus, WhatsApp is a pioneer in introducing and facilitating a two-way virtual communication process. Its text-based chat, voice call, and video call functions provide clear, barrier-free communication opportunities to its users (Rautela and Yerpude 2018)**.**

H2: Communication mediates the increased WhatsApp usage during the Covid-19 outbreak

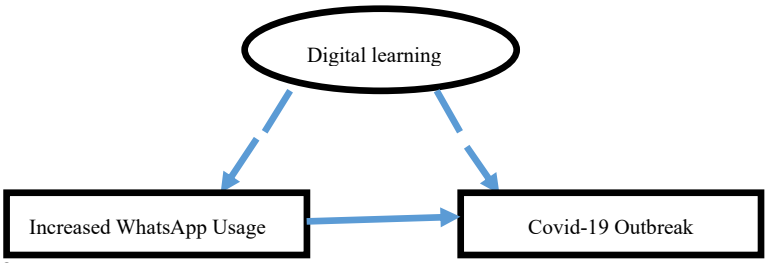


WhatsApp Usage & Digital Learning:

Today, mobile applications are widely used for learning and education purposes worldwide. These applications offer students advanced choices and opportunities for online learning purposes. Even formal education-based institutions also offer online courses through web-based platforms to provide maximum accessibility and benefit to their students. These applications provide their students with communication and knowledge-sharing opportunities with cost-effective learning opportunities (Barhoumi 2015). As noted by (Cetinkaya 2017), after the successful adoption of online communication platforms such as WhatsApp, institutions motivate their students to take full advantage. As a result, these applications are deeply rooted in modern educational institutions, leading to providing education regardless of geographical boundaries. One of WhatsApp's most prominent benefits is that, even without a formal Wi-Fi or broadband internet connection, even with simple mobile service, WhatsApp works well, providing cost-effective solutions to students even from weak financial backgrounds. Consequently, users can access real-time information and get educational guidance and support from their instructors (Gon and Rawekar 2017).

For example, learning through the WhatsApp application is much more familiar among higher education Indonesian students. Since students use it to receive educational material, communicate with their classmates and instructors, share academic information, and stay updated about the ongoing activities in their institutions, they now consider it a fundamental component of the educational journey. Thus, students use WhatsApp to enrich learning experiences with greater access and usability in general (Kustijono and Zuhri 2018).

H3: Digital learning mediates the increased WhatsApp usage during the Covid-19 outbreak

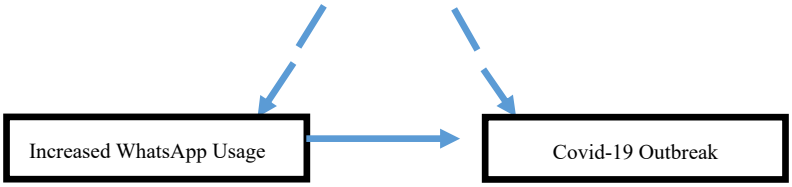


WhatsApp Usage & Teamwork:

The analysis of the information that the media disseminates to the public and its impacts is a major focus of media studies (Alzyoud & Makharesh, 2023). According to Makharesh (2018), news that would not be available without this journalistic engagement is given emphasis in addition to the news that is already out there. According to (Vom Brocke, Richter, and Riemer 2009), two primary factors motivate Social Networking usage today, **(i)** managing real-world contacts through virtual meetups where participants do not meet every day yet stay connected, and **(ii)** the curiosity to explore new things with information gathering. Managing real-time contact and curiosity for information-gathering work as the primary dynamics of using social media today. That is why a mobile application for educational purposes is highly trending today (Barhoumi 2015; Sharadga, Tahat & Safori, 2022). As students widely rely on social media networks and consider them effective, enjoyable, and enriched with ease of use and greater accessibility, they also find social networking applications capable of gratifying their educational needs. Here both private and group chatrooms on WhatsApp provide the students with an opportunity for collaborative learning. In such an environment where students can learn and work collaboratively, WhatsApp essentially enhanced students' learning experiences (Conde et al. 2017).

Makharesh, Alharethi, and Campbell (2022) revealed that media has a convoluted connection with the public, and as a result, it has made it harder for individuals to tell the difference between fiction and truth. According to Alzyoud (2022), “the media plays an important role in societies in making and directing public opinion” (p. 195). A study in Sheffield, United Kingdom, also validated the role of WhatsApp in facilitating collaborative learning. The case study results indicated that students explicitly acknowledge the use of WhatsApp for virtual collaboration for educational purposes. Respondents also valued the role and availability of smartphones in facilitating their academic journey (McKinney and Sen 2016). Thus, in a collaborative learning environment, WhatsApp also develops students' critical skills and provides them with equal opportunities to participate and share their opinions with them. As a result, it improves their learning capabilities and boosts their morale in general (La Hanisi et al. 2018)**.**

H4: Teamwork mediates the increased WhatsApp usage during the Covid-19 outbreak

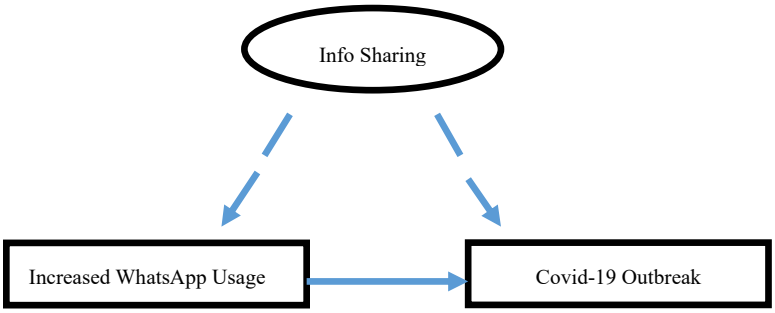


WhatsApp Usage & Information Sharing:

Technically, WhatsApp is one of those social networking applications that provides rapid access to information. As mentioned earlier, it provides ease of use; WhatsApp is suitable for both information sharing and receiving for everyone, with an overall cost of 1$ per year. Consequently, WhatsApp is not only considered for the current generation; the next generation will also attain benefits from its ever-improved services and features (Mefolere 2016). As noted by (Adomi and Solomon-Uwakwe 2019), knowledge and information sharing are among the most popular activities. Thanks to the rise and proliferation of Information Communication Technology, we can access information and share it with others. For instance, WhatsApp helps Nigerian university professors and students to stay in touch. When professors have some important announcements to make or share information with the students, they prefer WhatsApp due to its limitless information-sharing capabilities.

A case study conducted by (Garimella and Tyson 2018) also affirmed WhatsApp's usability regarding information sharing purposes. Data gathered from a longitudinal analysis of WhatsApp users revealed that many users mainly used WhatsApp for information-sharing purposes. However, compared to one-to-one, individual conversations, group messages were more likely to contain information for the other members. Primarily, students consider WhatsApp to share and receive their academic information as they use it to enhance their communication capabilities and keep each other updated about their educational journey and institutional activities in general (Hassan 2020).

H5: Information sharing mediates the increased WhatsApp usage during the Covid-19 outbreak



3. Research Methods

We employed a cross-sectional design as this study is short-term with highly generalizable results. We also utilized IBM Statistics Package for Social Sciences (SPSS) and AMOS for the data analysis process. As the current study involved both descriptive and inferential analyses, we adapted both software to carefully dig out the relevant findings (Al-Skaf et al. 2021). However, we used *n*= 280 close-ended questionnaires for the data gathering purposes, based on Five-Point Likert Scale items (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree). Moreover, regarding the measurements scales selection, we chose the following primary sources:

Increased WhatsApp Usage & Covid-19:

We selected this scale from the study conducted by (Khan 2020) as the researcher assessed increased WhatsApp usage during Ovid-19. We selected *n*= 5 statements based on Five-point Likert Scale, with the affirmed Cronbach Alpha Value of .778.

WhatsApp for Communication Purposes:

We selected this scale from the analysis conducted by (Nuray ZAN 2019) as they examined WhatsApp's role as a channel of communication between users. We selected n= 5 items from this study and validated their reliability through Cronbach Alpha Value of .817.

WhatsApp for Digital Learning Purposes:

We selected this scale from the research conducted by (Barhoumi 2015), as the researchers analyzed WhatsApp usage

for Digital Learning purposes among students. We selected *n*= 5 scales from this study and validated them through Cronbach Alpha Value of .808.

WhatsApp for Teamwork Purposes:

We opted for this scale from the research conducted by (Conde et al. 2017), as the researchers examined WhatsApp's role in facilitating Teamwork regarding educational purposes. We select *n*= 5 items from this study and further validated their status through Cronbach Alpha Value of .734.

WhatsApp for Information Purposes:

We selected the relevant scale from the study conducted by (La Hanisi et al. 2018), as they examined WhatsApp's role in terms of students' collaborative working purposes. We selected *n*= 5 items from this scale and affirmed their reliability through the Cronbach Alpha value of .795.

Convergent & Discriminant Validity Analyses

Convergent Validity Analysis:

To establish and affirm the research instrument's validity and facilitate the path to conduct the Structural Equation Modelling, we conducted Convergent and Discriminant Validity analyses. (Salloum et al. 2021) We performed a convergent validity assessment, as visible in **Table 1** below, which contains Factor Loading, Average Variance Extracted, Composite Reliability, and Cronbach Alpha Values. In this regard, we can observe that the Cronbach Alpha Values range from .720 to .808, indicating that the research instrument is reliable as these values are higher than the threshold values of .671 (Chin and Yao 2014; Al Olaimat et al. 2022). Similarly, Composite Reliability values are ranging from .754 to .967, which are also higher than the threshold value of .7, showing that Composite Reliability is also established. Furthermore, we also tested the values of Factor Loading and Average Variance Extracted. As we can see, factor loading values range from .711 to .965, and the Average Variance Extracted values range from .785 to .945. These are higher than the threshold value of .5, indicating that the convergent validity is firmly established.

Table 1. Convergent Validity & Reliability Analysis

Variables	Items	FL	AVE	CA	CR
WhatsApp Usage	WAU1	.957	.945	.778	.967
	WAU2	.961			
	WAU3	.919			
	WAU4	.943			
Covid-19 & WhatsApp	CWA1	.914	.899	.817	.900
	CWA2	.835			
	CWA3	..912			
	CWA4	.938			
Communication	COM1	.965	.842	.808	.788
	COM2	.958			
	COM3	.711			
	COM4	.734			
Digital Learning	DLG1	.955	.858	.720	.799
	DLG2	.782			
	DLG3	.827			
	DLG4	.868			
Teamwork	TWK1	.735	.785	.734	.961
	TWK2	.794			
	TWK3	.890			
	TWK4	.722			
	ISG1	.744			

	ISG2	.759			
Information Sharing	ISG3	.909	.836	.795	.754
	ISG4	.933			

Discriminant Validity:

According to Elareshi, Habes, Ziani, et al. (2022), two criteria, i.e. Fornell-Lacrker and Heterotrait-Monotrait, are essential to affirm the discriminant validity in Structural equation Modelling based studies. Similarly, in this investigation, we also conducted both analyses. First, as visible in table 2 below, the Average Variance Extracted square root values are higher than the other correlation-based constructs, and the discriminant validity is partially established. Moreover, regarding table 3, we can observe the correlation values that are further calculated to determine the Heterotrait-Monotrait Ratio value. After the calculation, we found the HTM Value (.300) as less than the threshold value of .85, and discriminant validity is successfully established.

Table 2. Fornell-Larcker Scale (Discriminant Validity Assessment)

	WHU	**CWU**	**COM**	**DLG**	**TMK**	**ISG**
WHU	**.893**					
CWU	.022	**.808**				
COMM	.673	.029	**.708**			
DLG	.174	.034	.115	**.736**		
TMK	.085	-.090	.262	.573	**.616**	
ISG	.408	.006	.492	.013	.386	**.698**

Table 3. Heterotrait-Monotrait Ratio Scale (Discriminant Validity Assessment)

	WHU	**CWU**	**COM**	**DLG**	**TMK**	**ISG**
WHU						
CWU	.022					
COMM	.673	.029				
DLG	-.174	.034	.115			
TMK	.085	-.090	.262			
ISG	.408	.006	.492	1.013	.386	

Sampling & Demographical Data of the Respondents:

As this study examines the students' WhatsApp usage during Covid-19, the population involves students currently enrolled in educational institutions all over Pakistan. However, due to research criteria, we randomly selected a sample of *n*= 302 students currently studying in two higher education institutions in the capital Islamabad. We visited the selected educational institutions for data gathering purposes and received a 100% response rate from the potential participants (Habes, Salous, and Al Jwaniat 2022; Salloum et al. 2021) After the gathering process, we calculated the frequencies and percentages of respondents'' demographical data and found that *n*= 131 (34.5%) respondents were males, and *n*= 171 (45.5%) were females (*M= 1.57, SD= .503*). Similarly, *n*= 180 (47.4%) of respondents were 18-22 years old, *n*= 67 or 17.6% were 23-26 years old, *n*= 44 or 11.6% were 27-30 years old, and *n*= 11 (2.9%) were 31 years or above (*M= 1.62, SD= .865*). Furthermore, regarding the educational level of the participants, *n*= 179% (47.1%) were undergraduate level students, *n*= 81 or 21.3% were graduate levels, and *n*= 42 (11.1%) were post-graduation level students (*M= 1.55, SD= .726*). Finally, according to the residence of the participants, *n*= 225 (74.5%) were urbanized, and *n*= 76 (25.1%) were from rural areas (*M= 1.26, SD= .446*). Furthermore, to examine any potential differences in participants' responses, we conducted an Analysis of Variance (ANOVA) (Habes, Ali, and Pasha 2021)However, according to the number of variables, we found On-Way Analysis of Variance as the most suitable to examine the potential discrepancies. Therefore, **table 4** represents the results of the One-Way Analysis of Variance. As visible, based on the gender *(p≥ .039**),* age (*p≥ .080**),* and qualification level (*p≥ .039**),* we found no differences among the responses. Nonetheless, based on the significant value of *p≥ .139*, we found clear differences regarding the locality of respondents. Thus, the One-Way Analysis of Variance highlighted the similarities and differences based on participants' demographical characteristics:

Table 4. Test of Homogeneity of Variances

Variables	Constructs	*Levene Statistics*	*f*	*Sign.*
	Male	11.928	2.376	.039
Gender	Female			
	18-22			
Age	23-26	8.034		
	27-30		1.988	.080
	31 or Above			
	Under Graduation	11.092	2.381	.039
Qualification Level	Graduation			
	Post-graduation			
	Diploma/Certification			
	Rural	6.001	1.701	.134
Locality	Urban			

Hypotheses Testing: Coefficients of Determination R^2 & Path Analysis

We examined the predictive accuracy of the study model by conducting the Coefficients of Determination R^2. As summarized in **Table 5** below, the R^2 values range from .845 to .952, affirming our conceptual framework's predictive accuracy. Further, to examine the proposed relationships and study model, we conducted path analysis which also highlighted the regression values (Stein et al. 2012). **Table 6** summarizes path analysis results indicating the path values are significant along with the regression, *t*-values, and *f*-values. In this context, we can observe a significant relationship between WhatsApp, Increased usage during Covid-19 (*t= 17.112, p≥ .011*), communication (*t= 13.177, p≥ .000*), digital learning (*t= 27.256, p≥ .002*), Teamwork (*t= 23.308, p≥ .041*), and information sharing (*t= 19.281, p≥ .000*).

Table 5. Coefficients of Determination R^2

Variables	R^2 Value	Strength
CWU	.845	Strong
COMM	.952	Strong
DLG	.874	Strong
TMK	.885	Strong
ISH	.866	Strong

Table 6. Path Analysis, Linear Regression Analysis:

S/R	Relation	*path*	*t*-value	Sign.
H1	**WHU>CWU**	.919***	17.112	.011**
S/R	***Relation***	***path***	***Indirect Effect***	***Sign.***
H2	**WHU>CWU>COM**	.869***	.115	.072*
H3	**WHU>CWU>DLG**	.178***	.016	.054*

H4	**WHU>CWU>TWK**	-.187***	.104	.028*
H5	**WHU>CWU>ISG**	.731***	.246	.000***

Results indicated a significant relationship between WhatsApp usage, communication, learning, Teamwork, and information sharing as primary motives behind WhatsApp usage during the healthcare crisis. With a significance value of $p \geq .011$, we found a moderately significant relationship between WhatsApp usage during Covid-19 among university students. These results are compatible with the study conducted by (Obi-Ani et al. 2020), as the researchers also found increased social media, particularly WhatsApp usage, during the Covid-19 outbreak. Likewise, we also found a strong, significant ($p \geq .000$) moderating role of communication regarding WhatsApp usage. These results are also consistent with the study previously conducted by (Kumar and Sharma 2017; Ahmad, 2022; ahmad et al., 2023)**.** As back in 2017, Kumar and Sharma also found WhatsApp as their primary communication source among its users in India.

Moreover, with a significance value of $p \geq .002$, this research explored a strong relationship between digital learning and WhatsApp usage during Covid-19. We affirmed this consistency with the study carried out by (Cetinkaya 2017) as his study also validated the use of WhatsApp for digital learning purposes. Here, it is also notable that Cetinkaya's study respondents indicated their increased reliance on WhatsApp to resume their academic activities. They also demanded more modifications in WhatsApp to improve their learning experiences in general.

According to (Barhoumi 2015), WhatsApp provides a strong learning community and provides a powerful platform for learning to the existing student communities. Besides digital learning, conventional learning is also confronting a rapid yet pleasant change in learning patterns. In this regard, this investigation is also consistent with Bahroumi's assumptions. With a significance value of .041, we found that Teamwork moderately mediates the relationship between WhatsApp usage and the Covid-19 crisis. Lastly, the statistical analysis showed a significant role of information sharing as one of WhatsApp usage's primary motives during the healthcare crisis. These results are compatible with the study conducted by (Adomi and Solomon-Uwakwe 2019). They also found both knowledge and information sharing as primary reasons behind WhatsApp usage, especially among the students. Thus, today Asia has a prominent number of WhatsApp users with more than 922.3 million, speaking to 45.0% share of the world's internet usage. This usage is not only a unidimensional phenomenon; instead, this increased usage indicates several reasons behind it. Here, besides communication and entertainment, information, learning, and even sustaining financial activities, all are actual uses of WhatsApp, particularly among students (Kite et al. 2018).

5. Theoretical Relevance

During the past few years, mass media dependency has remarkably increased. People comparatively rely more on media resources for information and entertainment purposes (Raacke and Bonds-Raacke 2008). However, today with the rise and integration of ICT, we are availing several communicational, entertainment, informational, and educational advantages. Here, the users actively select the platforms and content of their choice to meet their relevant needs (Ali 2019). According to (Kircaburun et al. 2020), the use of Social Networking Sites is among the most popular social behaviors due to the different opportunities and ubiquities they offer. Recently, studies revealed more than one-third of the world's population is using social networking platforms daily.

Similarly, under the Uses and Gratifications perspective, selecting a particular social networking platform, i.e. WhatsApp, serves to facilitate communication, interaction, education, and information sharing. In this regard, Uses and Gratifications theory application to social media-based research is of greater significance (Whiting and Williams 2013). A study conducted by (Musa, Azmi, and Ismail 2016) also validated this relevance as they investigated the use of social networking sites under the Uses and Gratification Approach in Nigeria. The results also revealed that respondents mainly preferred WhatsApp and Facebook to acquire information, communication, and share personal opinions. In this context, the use of WhatsApp can be determined by the fact that (Al-Maroof et al. 2021) revealed its usage as beneficial for collaborative learning among the n= 372 university-level students in the United Arab Emirates. Hence, WhatsApp's role in socialization, learning, information sharing, and collaborative efforts is well supported by the Uses and Gratification theory of mass media.

6. Conclusion & Limitations

In his article, we examined the factors mediating and strengthening WhatsApp usage among the young generation. As mentioned earlier, Covid-19 has dramatically hampered daily life activities; resorting to social networking platforms was the only option to sustain these activities. Consequently, the role of digital platforms, particularly WhatsApp, not only provided ease of communication but also possibly helped to sustain educational activities. Like other countries, students in Pakistan also adopted WhatsApp as a source of learning, communication, and information sharing during the Covid-19 outbreak (Al-Sarayrah et al. 2021; Khadija Alhumaid 2020). These results highlighted the potential of social media in general and indicated how powerful social media could be to facilitate the different aspects of our life.

However, although this study weighs much value during the peak of Covid19, it also has some fundamental limitations. First, we only focused on WhatsApp as a communication source as many other social media Applications are facilitating students to continue their education, communication, and information sharing. Second, we selected a limited number of students from only one city in Pakistan which can question the generalizability of results in general. Third, many studies assumed WhatsApp usage based on individual characteristics rather than the application's services (Figueiredo Filho, Silva Júnior, and Rocha 2011). However, we made every possible effort to highlight WhatsApp's potential benefits as a part of crisis management. We also recommend more studies to examine the role of other different factors, especially personality factors that can affect one's WhatsApp usage.

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