WhatsApp use and student's psychological well-being: Role of social capital and social integration

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ABSTRACT

The aim of the study is to explore whether and how WhatsApp interactions can improve students' psychological well-being by focusing on the mediating role of bonding social capital (BOC) and bridging social capital (BRC). The present study also investigates the moderating role of social integration in association with WhatsApp use and psychological student well-being. Data were collected from 266 college and university students from Islamabad, Pakistan. Results showed that time spent on WhatsApp positively influenced student psychological well-being and that social integration significantly affected the mediation of BOC in association with WhatsApp use and student psychological well-being but insignificantly affected the mediation effect of BRC in association with WhatsApp use and student psychological well-being. The study also discusses the implications and future directions.

1. Introduction

In the current environment of saturated online media, the rapid development of social networking sites has transformed the social interaction and online behavior of individuals (Vromen, Xenos, & Loader, 2015). The adoption of social media enables people to instantly create profiles, accumulate friends in life, and participate in computer-based communications by transmitting, publishing, and commenting on different information (Ali, Wang, & Khan, 2019; Lee, Chung, & Park, 2018; Pang, 2017). Members from different social, cultural, and geographical regions currently use social media applications in a variety of ways to meet different individual needs (Ali, Wang, Khan, Pitafi, & Amin, 2019; Gil de Zúñiga, Jung, & Valenzuela, 2012). The use of social media by the younger generation has led to a range of psychological and social consequences, including increased satisfaction with university life, increased participation, and maintaining social relationships (Zhan, Sun, Wang, & Zhang, 2016). On the other hand, excessive use of social media also has negative consequences such as stress, exhaustion and information overload (Tussyadiah & Zach, 2013). However, the positive and negative aspects of social networks have not changed the fact that these tools are rapidly gaining popularity, occupying an important place in our lives and beginning to have a place in education. Among young people, instant messaging apps that can be identified as mobile-based social networks have been popular since the last decade

(Xiongfei, Khan, Zaigham, & Khan, 2019; Ko & Kuo, 2009; Zhang, Moe, & Schweidel, 2017). While many instant messaging applications run on mobile devices, WhatsApp is one of the most popular mobile-based applications, especially among college students (Anglano, 2014). WhatsApp provides a variety of features that make it easy for users to send text, images, and videos of their contacts, and they can use the app to call each other (Anglano, 2014). The number of WhatsApp users is increasing, from > 200 million active users in April 2013 to 700 million in January 2015 and > 1 billion active users in January 2016 (Statista, 2016). The effectiveness of different instant messaging platforms in education can be determined by maintaining different aspects of these applications, which may increase learning opportunities (Smith, 2010) and learners' enthusiasm in learning (Cifuentes & Lents, 2010) interactions between students in personal, school, and curriculum related areas (Smith, 2010), and create a sense of belonging (Sweeny, 2010). To this end, a question arises, whether the time students spend on WhatsApp can increase the social capital of students, which in turn leads to an increase in students' mental health?

Therefore, the current study attempts to examine the impact of time spent on WhatsApp and students' psychological wellbeing through social capital. In addition, this study also explores the role of social integration in WhatsApp time usage and BOC, WhatsApp time usage and BOC relationships.

Previous studies found that students spend a lot of time and energy

on social media applications, mainly to maintain their original relationships and initial social relationships during academic life (Wen, Geng, & Ye, 2016). Therefore, in an academic environment, understanding the social and psychological implications of WhatsApp in relation to student well-being is necessary. In this regard, the role of the underlying mechanisms has become very important in determining the impact of WhatsApp use on individual psychological health, as such; establishing direct links is not so simple. Many studies have used social capital as an intermediary mechanism to establish the use and performance of social media (Pitafi, Kanwal, Ali, Khan, & Waqas Ameen, 2018; Ali-Hassan, Nevo, & Wade, 2015; Bassani, 2006; Valenzuela, Park, & Kee, 2009) and social media use and behaviors (Hofer & Aubert, 2013; Li & Chen, 2014). However, a knowledge gap still exists in terms of establishing the link between WhatsApp use and student psychological wellbeing through the mediation of social capital. Thus, this study strives to address this corresponding gap in existing research (Lee et al., 2018; Sheer & Rice, 2017; S. Yang, Liu, & Wei, 2016) and investigates potential mechanisms for how time is spent on new digital communication technologies and how it can affect the students' ability to maintain and build social capital in their daily lives. Furthermore, the study explores the impact of social capital perception on student psychological well-being and distinguishes the categories of social capital such as bridging social capital (BRC) and bonding social capital (BOC) (Ellison, Steinfield, & Lampe, 2007), and then evaluates social capital's intervening role in the relationship between WhatsApp interactions and student well-being.

Some scholars have pointed out that interaction integration mechanisms (Brown & Eisenhardt, 1997) are very effective in improving the use of social media for the benefit of students. Other scholars have distinguished between formal and informal coordination and integration of social mechanisms to enhance individual psychological empowerment (Adachi, 2011; Tsai, 2001) through the use of digital devices. Therefore, this study seeks to deepen understanding of how social integration can help students use social media to manage and maintain social capital, ultimately leading to their psychological well-being. Based on the academic evidence, the present study examines the moderating role of social integration in the relationship between WhatsApp use and student psychological well-being through social capital (see Fig. 1). In this regard, this research extends the scope of previous research by demonstrating how new social media applications (i.e. WhatsApp) can enhance student psychological well-being and how the intermediary role of social capital in an academic environment can be strengthened.

2. Literature and hypotheses

2.1. Association between WhatsApp use and student psychological well-being

The concept of virtual communities is becoming more and more popular around the world. Students are encouraged to use social media applications frequently in order to cope with challenging academic tasks and busy schedules that sometimes hinder physical interaction with classmates and teachers. In this regard, WhatsApp is a powerful medium that helps students communicate and form an online network group where they can share information, update academic information, and help each other complete their academic tasks quickly (Johnston et al., 2015). Roblyer, McDaniel, Webb, Herman, and Witty (2010) articulate the value of social media applications, such as WhatsApp, which encourages learners to learn by predicting needs, conduct effective and effective collaborative learning, and build relationships that motivate learners to engage in consistent and progressive learning. Considering the psychological costs associated with emotional suppression caused by limited social support (Withey, Daft, & Cooper, 1983), the importance of social media in strengthening social relationships has increased. It can be argued that the consequences of the adoption of social media tools for young people must be investigated and understood fully. There are diverse opinions of the scholars regarding the impact of social media applications on individual psychological health. (Cao & Yu, 2019) argue that excessive use of social media can affect students' physical and mental health. Students postpone eating and can't rest properly; instead, they consume too much tea or coffee to stay alert and active. This kind of daily activities has a negative impact on students' physical and mental health. Overuse of WhatsApp also prevents students from having face-to-face relationships with people (Johnston et al., 2015). On the other hand, several scholars argue that social media helps to develop a virtual community that provides instant and timely support in any difficult situation, which creates a sense of pleasure for the users (Madge, Meek, Wellens, & Hooley, 2009). The trend toward using the WhatsApp is growing among young people, indicating that students are happy and mentally calm using WhatsApp because it is considered user-friendly, it allows communication within the team, and keeps a record of communication for further use as a learning content (Johnston et al., 2015). With a flattened hierarchy and reduced human barriers, WhatsApp provides easy, efficient and effective communication between group members, which leads to ease and less fatigue (Johnston et al., 2015). Junco, Heiberger, and Loken (2011) studied the role of Twitter for educational purposes
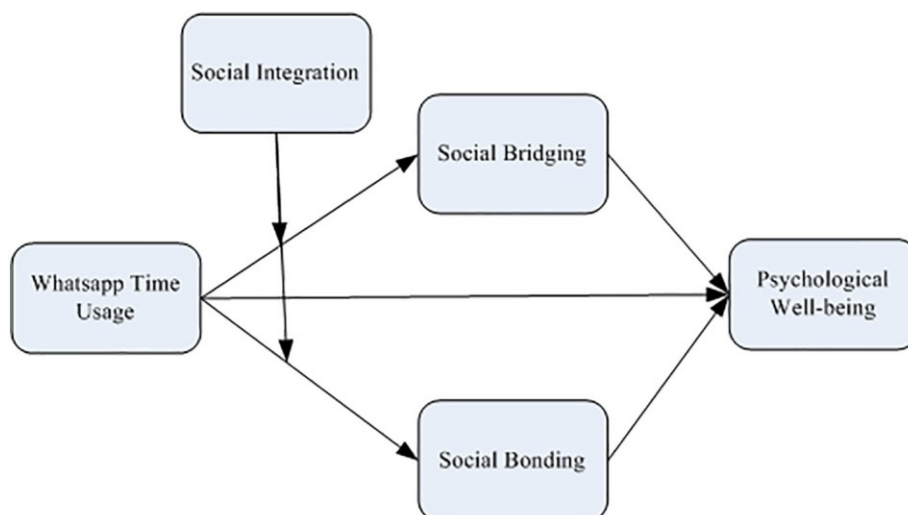

Fig. 1. Study Model.

and how it affects student engagement and performance. They found that students who use Twitter for education are more engaged and have higher grades. Roblyer et al. (2010) found that students were more likely to use Facebook than teachers and were more open to the possibility of using Facebook and similar technologies to support classroom assignments. Another study found that the use of social media is positively related to their academic participation and satisfaction (Han, Volkova, & Corley, 2016). According to Smith (2010), WhatsApp is a virtual platform for interaction and information exchange, where issues are discussed and defined, especially among students, which will lead to psychological comfort and wellbeing for students. Therefore, the use of WhatsApp is deeply rooted in the lifestyle of young people, especially among college students who use social media applications and online social networking sites (Madge et al., 2009). These arguments provide the basis for the development of the following hypothesis.

H1. The time spent by students on WhatsApp is predicted to enhance student psychological wellbeing.

2.2. The link between WhatsApp use and social capital

Lin, Cook, and Burt (2001) define social capital from a resource perspective, which is developed as people invest in relationships with others in social networks. (Putnam, 2000) distinguishes between Bonding social capital and bridging social capital. The former is related to the close relationship of exchangeable emotional support (Ellison et al., 2007), which has weaker links with people we know through social interactions that can bring benefits such as access to new information and different perspectives. Moreover, social capital generally refers to tangible or intangible property that arises from an individual's social relationships that can be obtained or used for instrumental and performance yields containing mutuality, harmony, and cooperation (R. Putnam, 2001). Starting from the theoretical orientation of describing social capital, the core elements of this concept are interactive relationships and reciprocal values (Ellison et al., 2007). As one of the most commonly used concepts in several academic areas, social capital has extended its reach to online spaces to highlight the optimistic consequences of various online social media applications (Gil de Zúñiga et al., 2012; Hofer & Aubert, 2013; Petersen & Johnston, 2015; Valenzuela et al., 2009; Valtonen, Dillon, Hacklin, & Väisänen, 2010). WhatsApp, as an alternative platform, is particularly suitable for cultivating social capital at the individual level because it reinforces permanent connections in different social relationships. Traditionally, the resources available for personal social networks are divided into connections and communication linkages (Chen & Schulz, 2016). Thus, two parameters of social capital can be distinguished by two basic fundamentals: the power of the relationship and the form in which the resources are provided (Na, 2015). In general, BRC reveals the values and benefits of diverse personal relationships, including more relaxed social network linkages, such as temporary associates, peers, and even outsiders, providing access to emerging thoughts and rich information. BOC relations mean prospective resources in a homogeneous group that represent close, emotionally important connections with like-minded people, including relatives, neighbors, and close friends providing psychological or material help and rare resources (Ellison et al., 2007; Park, Kee, & Valenzuela, 2009). Whether weak or powerful networks, people can not only obtain actual resources from these networks but also gain intangible individual benefits from other people, such as mutual trust, emotional support, and friendship (Zimet, Dahlem, Zimet, & Farley, 1988). A series of experimental investigations have also established the use of computer-based communication, especially the adoption of social networks, to support loose and frail social relationships and help users build new relationships and sustain prevailing relationships. For example, Liu and his team acknowledged that the more people use SNS, the more obvious the communication and connection dimensions they may have (Liu, Shi, Liu, & Sheng, 2013). Past

studies on social capital and Facebook usage found that using Facebook can raise the level of social capital (Ellison, Vitak, Steinfield, Gray, & Lampe, 2011). Abbas and Mesch (2018) also argue that as Facebook's usage increases, it will lead to higher bridging and social capital. Another study found that the relationship between WhatsApp attitudes and bridging and linking social capital is positive. Based on this analogy, this study assumes that:

H2. The time spent by students on WhatsApp positively associated with BOC.

H3. The time spent by students on WhatsApp is positively associated with BRC.

Informal and formal social networks are important components of "social capital", a source of resources that people generate when they work together for the common goal. Social capital includes the characteristics, norms (including reciprocity), and trust of social life networks that enable people to collaborate in more effective ways (Putnam, 2001). Social capital refers to a network that provides the foundation for cooperation, trust, and safety (Nahapiet & Ghoshal, 1998). Pang (2018) investigated the mediating effect of social capital in the relationship between WeChat use and psychological well-being of Chinese student and he found a significant mediating effect of social capital. A recent empirical study by Raza and colleagues also confirmed that soial meia in education may add to a higher degree of social capital, including close and loose network-based consequences by making actual intentions to use them endure (Raza, Qazi, & Umer, 2017). Several researchers have focused on the link between the US or worldwide social media use and a person's perceptions of social capital (Gil de Zúñiga et al., 2012; Tsai & Ghoshal, 1998) and have generally overlooked the potential impact of social media local interactions, particularly WhatsApp, on the capital bridging and linkage categories. Based on the results of earlier studies, this research proposes that the number of WhatsApp exchanges will help bridge the social capital gap among university students. Therefore, the following hypothesis can be formulated as:

H4. BOC mediates the association between the time spent by students on WhatsApp and student psychological wellbeing.

H5. BRC mediates the association between the time spent by students on WhatsApp and student psychological wellbeing.

2.3. Moderating role of social integration

Well-being refers to a person's overall perception, awareness, and evaluation of one's living conditions or certain areas of life (Felfe & Yan, 2009). As a multi-factor construct, student psychological wellbeing is composed mainly of different dimensions that perceptive judgments on life satisfaction and effective evaluation of emotions (Chan, 2015; Goswami, 2012). Because the different dimensions of this concept reflect a person's psychological view of life experience, happiness is generally defined as psychological happiness. Traditionally, this term has often been linked with the quality of the interactive network and the insights on social capital acquired from social networks (Ko & Kuo, 2009), which is the result of interactions that have a positive impact (Kim & Lee, 2011). Empirically, many studies have presented reliable evidence that social capital can affect individual health and student psychological well-being (Ellison et al., 2007; Guo, Li, & Ito, 2014). Nabi, Prestin, and So (2013) argued that the tools of social support and emotion types may be related to overall well-being, as it can reduce the pressure on SNS users, thereby increasing their positive physical effects. Similarly, Zhu, Woo, Porter, and Brzezinski (2013) also argued in their investigation of the method of name generation that social networks can affect the development of student psychological well-being of individuals by increasing perceived constructive social support. Computer-based communication enhances the student psychological well-

being of young Japanese (Ishii, 2017). Several scholars have investigated the moderating effect of social integration, for instance, Schwarzer, Bowler, and Cone (2014) have also found the buffering effect of social integration in the context of 9/11 terrorist attack in the US. In the educational context, social integration has also been used as a moderator in the relationship between Satisfaction and Students' Retention (Ganesh, Haslinda, & Raghavan, 2017). Moreover, previous research has attempted to determine the underlying mechanisms of social capital's positive impact on people's well-being, in the WhatsApp context, the limited focus has been given to the subtle effects of different perspectives of social capital on psychological student well-being. In addition, social media, particularly WhatsApp, can help college and university students by fostering associations with intimate and new friends, promoting accessibility to numerous information sources and providing social support (Wen et al., 2016). Therefore, it will eventually help to improve their psychological student well-being.

H6. Students' acquired social integration moderates the association between WhatsApp use and BOC.

H7. Students' acquired social integration moderates the association between WhatsApp use and BRC.

In general, social integration is the extent to which subjects participate in various social links (Heng, Bartram, Karimi, & Leggat, 2016; Scuzzarello, 2012). To establish social solidarity under different cultural conditions, it is crucial for individuals of different experiences to share similar social concepts (Goswami, 2012). In essence, the concept of social integration emphasizes the person's intrinsic need to belong, including support from colleagues and the subsequent enhanced personal communication (Montoya, Massey, Hung, & Crisp, 2009). In addition, social integration has gradually become an important issue in the reconstruction of social relationships and the establishment of individuals engagement (Madge et al., 2009; Scuzzarello, 2012). In fact, the possible impact of web-based platforms on personal social integration has attracted widespread attention in academia. Computer-based social media can play a vital role in the social integration process (Ewart & Snowden, 2012), a robust connection between the use of blogs and the social integration concepts of bloggers. Students share their inner views and outlooks with others through blogs, and they can get more support from society and increase their social integration (Ko & Kuo, 2009). Bellair (1997) argued the key role of social integration in the relationship between neighbor networks and community crime in youth. Cho, Seeman, Kiefe, Lauderdale, and Irwin (2015) have investigated the moderating role of social integration and social isolation in the relationship between sleep disturbance and risk of inflammation among youth. The link between computer-assisted interaction and social integration can be explained by the likelihood that the technology and social outreach of SNS reduce the time and money costs of social associations, thereby providing strangers a unique opportunity to adapt (Yang & Lee, 2018). Thus, social integration role on the mediation of social capital can be assumed as follows:

H8. Students' acquired social integration moderates the relationship in H3 in such a way with the increasing the level of social integration will strengthen the positive relationship and vice versa.

H9. Students' acquired social integration moderates the relationship in H5 in such a way with the increasing the level of social integration will strengthen the positive relationship and vice versa.

3. Method

3.1. Sample and data collection

To fulfill the goals of this study, a survey was conducted in Fall 2018 at two colleges and two universities in the Islamabad, Pakistan. The data were collected from Islamabad because Islamabad is the capital of

Pakistan. People live in Islamabad almost from all over Pakistan, thus the students belong to these families. The cultural and geographical distinctiveness of this city in term of diverse cultural and ethnic grounds.

To obtain a representative sample of these colleges, the lists of first, and second year's, while in universities, the lists of first year's students of bachelor and master enrolled in the academic year 2017–2018 was obtained from the admission officer and registrar's office of the colleges and universities respectively through an open records request. In total, the name and contact numbers of 3739 were mentioned in the list. In this study, the data were collected in two-wave using the time-lag approach, and the time interval between the two waves was four months. This approach not only helps to control the problems of commonly used methods, but also provides respondents with enough time to think, decide, and act, and then provide their responses. Based on the list of students obtained from the above colleges/university, 450 students (an average of 112 students per educational institution) were randomly selected. These students then contacted by phone to find out if they are using WhatsApp on their mobile phones for academic purposes, and if so, ask if they would like to participate in the survey. As a result of this exercise, 322 students showed their willingness to participate in the survey and informed that they use WhatsApp regularly for academic purposes. This study used a structured questionnaire to collect survey data and designed the questionnaire in English. In the first wave of surveys, questionnaires were distributed to 322 students who expressed their willingness to participate in the survey through student volunteers from their respective colleges and universities. Total of 282 students provided their responses on WhatsApp use, BOC, BRC, and demographics. In the second wave of the study, the questionnaires were distributed to the same 282 students to get the responses on social integration and student psychological wellbeing. However, this time 271 students provided their responses. After removing the incomplete questionnaires, the final study sample was 266 students with a response rate of 59%. Table 1 shows that male respondents were in the majority at 59.8%. Similarly, the age range of the majority of the respondents was 16 to 21 years. Especially in Pakistan, students enter the colleges after completing 10 years of education, and their age is usually between 15 and 18 years old. While 52% of respondents were graduates and most of the respondents have 3 to 4 years of experience of using WhatsApp (see Table 1).

3.2. Measures

3.2.1. WhatsApp use

The present study used Facebook intensity scale developed by Ellison et al. (2007), with modification to measure the use of WhatsApp. Self-reported assessments of WhatsApp behavior in this scale include the purpose of measuring the extent to which participants actively participate in WhatsApp activity such as time spent on WhatsApp

Table 1
Demographics.

Variables	N	Percentage	Variables	N	Percentage
Gender			Class Enrolled		
Male	159	59.80	Under-graduate	43	16.20
Female	107	40.20	Graduate	139	52.20
Age			Masters	84	31.60
Up to 15	34	12.80			
Between 16 and 18	92	34.60	Experience (WhatsApp use)		
Between 19 and 21	95	35.70	Upto- 1 year	26	09.80
Between 22 and 24	41	15.40	1–2 years	61	22.90
Above 24	04	01.50	3–4 years	136	51.10
			Above 4 years	43	16.90

in a day. The sample item of this scale was "I feel out of touch when I haven't logged onto WhatsApp for a while" (α = 0.92). The measure also includes a series of Likert scale attitude questions aimed at exploring the emotional connections between participants and WhatsApp and the integration of WhatsApp in their daily activities.

3.2.2. Social integration

The study used three items of social integration scale adopted by Herrero and Gracia (2007). Some changes were made in this scale to capture individual response because the actual scale is designed to gather community-based response. Sample item of this scale was "I feel like the student community is my own" (α = 0.90). Responses were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly disagree).

3.2.3. BRC and BOC

To measure BRC and BOC, this study used a measurement scale adopted by Williams (2006). Sample item of this scale for BRC was "Interacting with people at college/university makes me want to try new things" (α = 0.91). Similarly, the sample item for BOC was "There are several people at college/university, I trust to solve my problems" (α = 0.94). Responses were rated on a five-point Likert scale ranging from 1(strongly disagree) to 5 (strongly disagree).

3.2.4. Student psychological wellbeing

To measure student psychological well-being, this study used self-esteem scale adopted Rosenberg (1989) and satisfaction with Life scale was adopted (Diener, Oishi, & Lucas, 2003; Pavot & Diener, 1993). The sample of item of this scale was "The conditions of my life at the college/ university are excellent" (α = 0.93). All items were rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

4. Data analysis

4.1. Reliability and validity tests

AMOS 24.0 software was used to examine the confirmatory factor analysis (CFA) and the structural model. SPSS software was used for exploratory factor analysis (EFA) to test whether the measure shows factor loading above 0.4 (Hair Jr, Black, Babin, Anderson, & Tatham, 2010). The resulting value (see Table 2) is within the required load cut-

Table 3
Descriptive statistics, square root of AVE and correlation matrix.

Constructs	Mean	SD	BOC	SPW	BRC	WHU	SI
BOC	3.47	0.89	(0.86)				
SPW	3.62	0.85	0.42	(0.72)			
BRC	3.56	0.95	0.48	0.16	(0.74)		
WHU	3.49	0.81	0.32	0.53	0.04	(0.73)	
SI	3.42	1.12	0.54	0.56	0.18	0.42	(0.86)

Note: (1) BOC = Social Bonding, SPW = Psychological Well-being, BRC = Social Bridging, WHU = WhatsApp Time Usage and Social Integration = SI. (2) Correlation is significant at the 0.01 level (3) Square roots of AVE for every constructs is shown in parentheses.

off range (between 0.594 and 0.909), so there is no validity issue. Since all values are above the recommended level, this indicates no cross-loading issues. By testing the factor loading values, composite reliability (CR), and average variance extracted (AVE), the convergent validity was evaluated (Khan & Ali, 2018; Karaiskos, Tzavellas, Balta, & Paparrigopoulos, 2010). Moreover, CR and AVE were used to assess the reliability and validity of the data (Karaiskos et al., 2010). The values of CR and AVE should be 0.70 and 0.5, respectively, or higher. Table 2 shows that the CR value is between 0.89 and 0.93 and the AVE value is between 0.51 and 0.74. Results are higher than the recommended values, thus indicating effective measures.

The discriminant validity of the measurement model is evaluated by comparing the AVE square root of each construct to the correlation among the constructs (Fornell & Larcker, 1981). Table 3 shows the AVE square root of each construct is greater than the correlation among all inter-constructs. Thus, the discriminant validity of each scale was established.

4.2. Structural model

The data collected by the validated measures were used to test the structural model. The overall fit index of the proposed model was calculated using AMOS. The resulting value is within the range normally accepted. Table 4 shows that the root mean square error of approximation (RMSEA) is 0.041, and the standardized root mean residual (SRMR) is 0.046, lower than the recommended value of 0.10 (Anderson & Gerbing, 1988). The degree of freedom (df) is 1.444 and is also within acceptable limits. In addition, IFI is 0.952, TLI is 0.950, and CFI is 0.953; these values are higher than the recommended 0.90 estimates.

Table 2
Items loadings, Composite reliability and Average variance extracted.

Construct	Items	Loadings	CR	AVE	Construct	Items	Loadings	CR	AVE
Psychological Well-being (SPW)	SPW1	0.782	0.928	0.517	Whatsapp Time Usage (WHU)	WHU1	0.79	0.920	0.537
	SPW2	0.697				WHU2	0.834		
	SPW3	0.676				WHU3	0.676		
	SPW4	0.791				WHU4	0.722		
	SPW5	0.769				WHU5	0.692		
	SPW6	0.731				WHU6	0.746		
	SPW7	0.673				WHU7	0.701		
	SPW8	0.669				WHU8	0.695		
	SPW9	0.670				WHU9	0.762		
	SPW10	0.702				WHU10	0.695		
	SPW11	0.702			Social Bridging (BRC)	BRC1	0.846	0.915	0.550
	SPW12	0.754				BRC2	0.681		
Social Bonding (BOC)	BOC1	0.833	0.937	0.748		BRC3	0.623		
	BOC2	0.871				BRC4	0.594		
	BOC3	0.909				BRC5	0.732		
	BOC4	0.872				BRC6	0.69		
	BOC5	0.838				BRC7	0.732		
Social Integration (SI)	SI1	0.88	0.899	0.747		BRC8	0.868		
	SI2	0.852				BRC9	0.852		
	SI3	0.861							

Note: CR = Composite reliability, AVE = Average variance extracted. All factor loadings are significant at the p < .001 level.

Table 4
Overall Model fit.

Fit indices	Acceptable value	Model value	Model fit
ML (χ^2)	The smaller the better	999.141	–
Degrees of freedom (df)	The bigger the better	692	–
χ^2/df (normed chi squire)	$1 < \chi^2/df < 3$	1.444	Yes
RMSEA	< 0.08	0.041	Yes
SRMR	< 0.08	0.046	Yes
TLI (NNFI)	> 0.9	0.950	Yes
CFI	> 0.9	0.953	Yes
IFI	> 0.9	0.952	Yes

Moreover, it is considered that all questions in the survey were answered at different time intervals. There is no serious issue of common method bias. The model shows good fit and thus, the path analysis was calculated to test the hypotheses.

4.3. Hypotheses testing

The results from path analysis indicate WhatsApp use has a significant positive relationship with student psychological well-being (H1:β = 0.45, p < .0.001), therefore, H1 is accepted. WhatsApp use also has a significant positive association with BOC (H2:β = 0.32, p < .0.001), and positive but insignificant association with BRC (H4:β = 0.06, p > .0.05), and thus, H2 is accepted and H3 is rejected.

Similarly, the moderating effect of social integration in the relationship among WhatsApp use and BOC and BRC was tested by making interaction term between WhatsApp use and social integration. Before making interaction term *z*, scores for social integration and WhatsApp use were calculated and then multiplying the *z* score, a variable interaction term was created. The results indicated (see Fig. 2) that moderating effects of social integration on the link between WhatsApp use and BOC (H6:β = 0.14, p < .05), and WhatsApp use and BRC (H7:β = 0.18, p < .01), was significant, thereby supporting H6 and H7.

The interaction pattern as shown in Fig. 3 states that when social integration is higher relationship between WhatsApp use and BOC is stronger (β = 0.35), as compare to lower (β = 0.12), and Fig. 4 indicated that when the social integration is higher, the link between WhatsApp use and BRC becomes stronger (β = 0.46), and when social integration is lower, the relationship between WhatsApp use and BRC becomes weaker (β = 0.16).
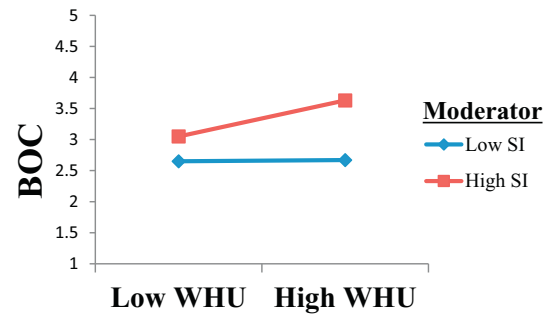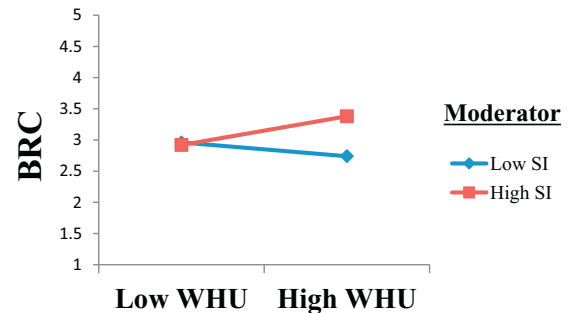

Fig. 3. Interaction graph of WHU and SI on BOC.

Fig. 4. Interaction graph of WHU and SI on BRC.

4.3.1. Mediation test through bootstrapping method

To examine the mediation, bootstrapping method was used. Based on 5000 bootstrapping samples, the study produced a bootstrap of 95% confidence intervals (CIs) to obtain indirect effects between dependent and outcome variables. Statistically, if the value between lower (LCIs) and upper confidence intervals (UCIs) does not include zero, CIs are considered significant (Hayes, 2013). The results show (see Table 5) BOC significantly mediates the relationship between WhatsApp use and student psychological well-being (UCIs = 0.1609 and LUCIs = 0.0311) because the CIs in both do not contain zero, thereby supporting H4. BRC insignificantly mediates the relationship between WhatsApp use and student psychological well-being (UCIs = 0.0302 and LUCIs = −0.0106), the relationship contains zero values, thereby rejecting H5.
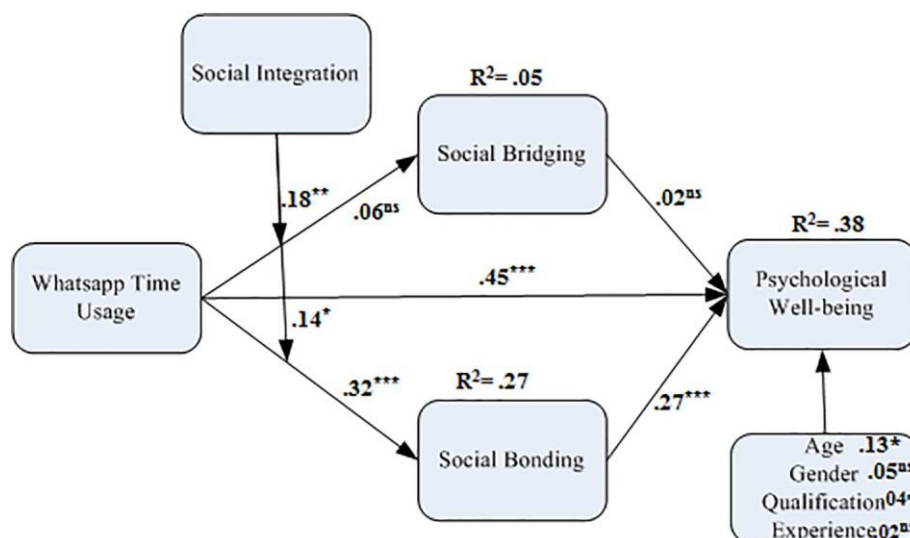
The model demonstrates that 38% of the variance exists in

Fig. 2. Results of Path Analysis. Note: ***p < .001, **p < .01, *p < .05, ns = Non-significant.

Table 5
Bootstrap test results for mediating relationships.

Bootstrap results for indirect effects	Effects	Boot SE	Boot Lower limit 95% CI	Boot Upper limit 95% CI
BOC	0.091	0.032	0.0311	0.1609
BRC	0.001	0.001	−0.0106	0.0302

Table 6
Regression results of moderated mediation test for conditional effect at SI = mean and +/− 1 SD on JE

SI on BOC	Boot indirect effects	Boot SE	Boot Lower limit 95% CI	Boot Upper limit 95% CI
−1 (Low)	0.029	0.028	−0.0144	0.1048
Mean	0.060	0.024	0.0207	0.1201
+1 (High)	0.091	0.040	0.0306	0.1901

Regression results of moderated mediation test for conditional effect at SI = mean and +/− 1 SD on EE

SI on BRC	Boot indirect effects	Boot SE	Boot Lower limit 95% CI	Boot Upper limit 95% CI
−1 (Low)	−0.011	0.017	−0.0666	0.0047
Mean	0.006	0.011	−0.0077	0.0402
+1 (High)	0.023	0.024	−0.0056	0.0938

Note: CI = Confidence Interval; Bootstrap sample size = 5000.

psychological student well-being, 27% of the variance is related to BOC and 05% is related to BRC. From control variables, only age has a significant effect, student psychological well-being and other all control variables were non-significant. Therefore, we conclude that the hypothesized model is acceptable (see Fig. 2).

4.3.2. Moderated mediation

For testing moderated mediation, SPSS process macros' model 7 was used, which is recommended by Hayes (2013) for testing such kinds of moderated mediation. Table 6 represents the bootstrap CIs for indirect influence with BOC when social integration values are one SD above mean (ULC = 0.1901 to LLC = 0.0306), mean (ULC = 0.1201 to LLC = 0.0207), and one SD below the mean (ULC = 0.1048 to LLC = −0.0144), a significant mediating indirect influence of WhatsApp use on student psychological well-being via BOC was observed because the result did not contain zero and thus, H8 is supported. Similarly, social integration values are one SD below mean (ULC = −0.0056 to LLC = 0.0938), mean (ULC = 0.0402 to LLC = −0.0077), and one SD below the mean (ULC = 0.0047 to LLC = −0.0666), which shows insignificant mediating indirect influence of WhatsApp use on student psychological well-being via BRC contains zero, thereby rejecting H9.

5. Discussion

The purpose was to systematically investigate the relationship between students using WhatsApp and student psychological well-being Pakistan, including perceived social integration, BOC, and BRC. To this end, the present study argues that these different types of social capital are important factors influencing the relationship between individual psychological indicators and the use of WhatsApp. In addition, this research explores an empirical study model that strives to elucidate the complex relationship between computer-based interactions and the consequences of happiness. The results show that the time spent by these Pakistani students on WhatsApp significantly and directly affects social integration, kinship, and BOC perceptions, thereby enhancing their student psychological well-being in the academic environment. First, the results finally proved that the frequency of WhatsApp use has

a positive impact on psychological student well-being, ties, and BOC of Pakistani students. The results of the study indicated that social integration played a catalytic role to strengthen the relationship between WhatsApp use and student psychological wellbeing, the student's social integration will lower, the time spent of social media will diminish the student psychological well-being.

In particular, WhatsApp has played an important role in gaining psychological facilitation and support from other contacts, increasing a sense of association, and making close friendships (Gan, 2017; Zhan et al., 2016). Previous research has also confirmed the positive connection between the use of social media and social capital in virtual environments (Chen & Li, 2017) and the study found that social use, friendship, and self-recognition in the social media platforms will lead people in a networked environment to gain greater social capital.

Second, the results also show that for WhatsApp users, social integration and social capital may increase their psychological well-being. Students who spend more time on WhatsApp have higher ratings of social capital than students who spend less time on WhatsApp. These results are consistent with several previous research (Ko & Kuo, 2009; Nabi et al., 2013). In particular, increasing computer-based communication was associated with improved social integration and support (Ko & Kuo, 2009). Numerous SNS deliver to persons new ways to reveal internal feelings that may be hard to describe in a face-to-face interaction, which will help surge positive impacts and reduce negative impacts (Nabi et al., 2013). Apparently, when individuals think that virtual communication can really reduce the obstacles to interface and promote more virtual self-disclosure, the results are not surprising. Therefore, emerging technologies can enhance shared trust and promote the establishment of social relationships, thereby fostering well-being.

Third, the current study claims that integration social effectively influences the relationship between time spent on WhatsApp and BOC, and also promotes student psychological wellbeing. Moreover, the use of WhatsApp does not directly affect psychological factors, given the diverse social capital as key mediators. Conversely, the various social capital established through the use of WhatsApp may ultimately increase satisfaction with contemporary life, interaction, and overall mental health. These findings facilitate the stimulus hypothesis, which argues that the interface of technology mediation is tied to tighter and higher quality connections, thereby increasing user well-being (Valkenburg & Peter, 2007). At the same time, the findings are in accord with that of earlier studies, suggesting that SNS can indirectly improve the well-being of subjects by keeping interaction with loose and closely connected persons (Guo et al., 2014; Raza et al., 2017; Wen et al., 2016). Therefore, social media technologies, particularly WhatsApp, have become an integral part of individuals' daily lives (Yang & Lee, 2018; Yoo & Jeong, 2017), which will build and expand links with other members, as well as psychological social support.

5.1. Theoretical and practical implications

The study has some meaningful implications for the investigation of the use of SNS and the mental well-being of students.

First, the current research attempts to reveal the causal relationship among important variables, such as WhatsApp use, BRC, and BOC. While many research and discussion papers explore the association between the use of social media and personal well-being, and the use of social media and its social capital (Burke & Kraut, 2016; Kim & Lee, 2011), the behavior of WhatsApp users and the potential impact of WhatsApp has not received enough attention. The study points out the significant positive association between WhatsApp's utilization and student psychological well-being indicators, and how time spent on social media may enhance student psychological well-being directly.

Second, the study used a moderated mediation model to determine the positive psychological consequences of using WhatsApp. Therefore, the results obtained may provide new explanations for the role of social integration and the mechanisms of new media adoption in academic contexts

to improve individual life quality via social capital (Tian et al., 2018).

This study also has some practical implications. The results show that online chat can cultivate university students' psychological well-being. The potential reason is that social media technology can deliver to members a convenient and effective communication channel, give and receive social and psychological support, integrate into the host society, and enhance great awareness (Pang, 2018; Wen et al., 2016). Therefore, if social media designers are able to develop a variety of interventions designed to enhance the useful aspects of this research, WhatsApp has the potential to improve the quality of life of the younger generation. As mentioned earlier, transactions among individuals in cyberspace contribute to the psychological and social adaptation of young people (Zhan et al., 2016). Therefore, consolidating more interesting virtual events through WhatsApp will help members expand their social networks and obtain a variety of information from this service. Moreover, the role of social integration is very important in this study, the students who have strong social integration, they can gain more psychological benefits and improve their academic performance.

5.2. Limitations and future research directions

This research has some limitations that need to be considered in future studies.

First, the result cannot be extended to all students in Pakistan, as the present study is only concentrated on this particular university students. Therefore, future research should add the findings to other groups, including younger and older WhatsApp users who belong to other societies. Second, because of the cross-sectional nature of the survey (Hu, Kim, Siwek, & Wilder, 2017), this study explored the relationship among the key variables comprising WhatsApp use, social integration, social capital, and well-being. There may be alternative paths e.g., students who have higher student psychological well-being and are inclined to spend more time on social media than on conceptual models. Subsequent future research can carry out by adopting a different research approach to validate current study results.

Third, this study focuses on WhatsApp use and attempted to find out its impact on the student psychological well-being via social capital. Moreover, it investigated the moderating effect of social integration, which enhances the positive impact of WhatsApp use on social capital and also on student psychological wellbeing. In fact, previous researchers have identified that engaging informational and recreational use of social media may influence university students' social capital and well-being from a different perspective (Guo et al., 2014). Therefore, future research should focus on how different types of media usage affect a user's well-being.

Finally, this study did not present findings in term of gender base data and did not measure the male and female not separately. However, future research can make the group of respondents on the basis of gender and check whether there is any difference between boys and girls and can report results accordingly.

6. Conclusion

This study attempted to find the answer to this question whether the time students spend on WhatsApp can increase the social capital of students, which in turn leads to an increase in students' mental health? The findings of this study indicated that WhatsApp use is helpful to enhance the student psychological wellbeing via bonding capital and high presence of social integration. These findings are very consistent with previous studies (Wei & Gao, 2017; Wen et al., 2016). Therefore, focusing on WhatsApp use can facilitate understanding of the core frameworks behind this connection and contribute to the academic debate on the potential impact of modern social media on the quality of personal life in a different context (Chan, 2015).

Declarations of interest

All authors declare that there is no conflict of interest for this study.

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