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A Longitudinal Study to Identify the Psychological Needs Profile of Users of Social Media in the pre-COVID and post-COVID Eras

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A Longitudinal Study to Identify the Psychological Needs Profile of Users of Social Media in the pre-COVID and post-COVID Eras

Cover Page Footnote

I am thankful to the subjects of the study and the distinguished audiences at the conference for their valuable guidance and encouraging comments which led to this research.

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ABSTRACT

Social media has had a huge impact on how we live and interact as a society. Yet, research literature is sparse on the psychology of users who participate enthusiastically in the social media. In this exploratory study with 222 student users, we apply the theory of fundamental human needs to predict and assess the psychological profile of users who actively engage in social media. Overall, the finding of the study support our hypothesis but with a few unexpected findings. Need of relationship, self-esteem and popularity-influence were found to positively impact the behavioral intention, frequency and time users spent on social media. The findings have useful practical implications for product/ project managers in understanding what motivates users to engage in social media and how social media can be designed to further enhance user participation.

KEYWORDS

Behavioral Intention, Need for Relatedness, Need For Popularity-Influence, Need For Self-Esteem

Introduction

Software development organizations are facing more competition than ever before and are constantly searching for new ways to enhance adoption and usage of their software. The underlying assumption in technology adoption research is that users are a homogeneous category as we did not find studies in information systems literature examining system use from the perspective of their psychological needs. However, in our recent study with users of computer games (Kakar, 2021) we found that users high in the psychological need for autonomy, self-esteem and pleasure-stimulation were the most avid users in terms of their behavioral intention, time and frequency of playing games.

These findings showed that not only users' need profile vary but they were salient in impacting software use. When we presented the findings to the subjects during exit interview they agreed with the findings. Yet, they suggested that the psychological needs of users in other product categories might be different and were enthusiastic about participating in a new study to find out.

In this replication study with the same participants we focus on users of social media with the goal of providing answers the following questions. Is psychological needs profile of users of social media different from other software users and if so, what is the difference? How does the psychological needs impact the behavioral intention and actual usage of social media? Did the usage of social media by the participants change over time? Does user's psychological needs profile vary with time? Answers to these questions will help product/ project manager of social media/ online websites to better understand their users and develop strategies to meet their specific needs, thereby increasing user participation.

Literature Review

The Merriam-Webster dictionary defines social media as “forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)”. User participation in social

media has grown exponentially over time. In 2005 there were only 5% of adults who used social media and in 2015 the number increased to 65% (Perrin, Duggan, Rainie, Smith, Greenwood, Porteus, and Page, 2015) and today according to the latest Pew Research Centre report the percentage of people using social media has increased to 72% (<https://www.pewresearch.org/internet/fact-sheet/social-media/>). Participation in social media is so engaging that according to a recent Nielson report users spend almost a quarter of their time in cyber space on social media (<https://www.nielson.com/wp-content/uploads/sites/3/2019/04/q3-2018-total-audience-report.pdf?cid=482>) causing “passive audience of the pre-social media era to become an active and engaging community.” (Rauniar, Rawski, Yang and Johnson, 2014). Non-profit organizations, governments, business world and political parties scrounge online social media sites to identify volunteers, customers, suppliers and prospective employees.

Human Psychological Needs

We suggest that despite the huge impact of social media on the way we live as a society, the behavior of individual users on social media is primarily voluntary and therefore must be rioted in their personal needs. There is a vast body of past literature on fundamental human needs starting with McDougall (1908), Freud (1920), Murray (1938), Maslow (1954), Baumeister and Leary, (1995) and Reis, Sheldon, Gable, Roscoe and Ryan (2000). In a more recent development, Sheldon, Elliot, Kim and Kasser (2001) examined 10 distinct feelings and came up with a list of 10 basic human psychological needs (see Appendix A), are in line with past theories within the human motivation literature stream as elaborated below (Sheldon, Elliot, Kim and Kasser, 2001).

Maslow's theory of personality (1954) had earlier identified five fundamental human needs: physical health, security, love-belongingness, self- esteem, and self-actualization. The conceptualization of need for love or belongingness is similar to the need for relatedness identified by Deci and Ryan's (1985). Later in a similar vein Baumeister and Leary (1995) and Reis & Patrick (1996) discussed the need for people to feel a sense of relationship with others who are important in their life.

Further, Maslow's (1954) need for security is similar to Epstein's (1990) self-consistency need, Self-consistency need, brings a sense of stability to an individual according to Epstein, Epstein's cognitive-experiential self- theory (1990) had identified four needs that all individuals seek to satisfy namely the need for self-esteem, relatedness, pleasure (vs. pain), and self-concept consistency. The need for self-esteem was also noted by Maslow (1954). Thus, Epstein's model added one more need to Malow's (1954) five needs i.e. the need for pleasurable stimulation.

Additionally, the "American dream" assumes that happiness in individuals results from popularity-influence and money- luxuries (Derber, 1979). Carnegie (1936) had popularly identified the ability to "win friends and influence people" as a route to a prosperous and thus happy life. Further, based on Whitney's (1959) concept of mastery, Aitken's (1964) concept of self-achievement motivation and more recently Bandura's (1997) concept of self-efficacy, Sheldon, Elliot, Kim and Kasser (2001) identified competence as another fundamental human need. Finally, Autonomy was identified as their tenth human need based on CET (Cognitive Evaluation Theory) by Deci and Ryan (1985) and seminal personality theories of Murray's (1938), Erickson's (1963), and Rogers (1963).

Of these 10 needs, the needs for self-esteem, relatedness, autonomy and competence were found to be most salient followed by pleasure-stimulation, physical thriving, self-actualization, security, popularity influence and money-luxury (Sheldon, Elliot, Kim and Kasser, 2001). Further, there are individual differences in psychological needs (Deci and Ryan, 2000). For example, the individuals' need for competence and relatedness may vary. Studies by Richer, Blanchard, and Vallerand (2000) and Richer and Vallerand (2000) have found that individuals high in need of competence are low in need of relatedness. We use the 10 fundame4ntal psychological needs of users to identify the salient psychological needs of extensive social media users and their role in predicting the usage of social media.

Theory Development

Based on the fundamental psychological needs theory we suggest that the needs for competence, security and money-luxury on the other hand can be fulfilled by utilitarian software (2015a, b). Competence is related to accomplishing complex and difficult task and projects which in turn provides a means for extrinsic benefits such as job promotion, career progression, monetary benefits and security. Further, the user need for autonomy, self-actualization and pleasure-stimulation can be fulfilled by gaming software, the user needs for self-esteem, relatedness and popularity-influence can be fulfilled by social media websites. They provide a way to engage with community and establish social standing and relationships as elaborated in the following paragraphs:

Social value is relevant to users (Kakar and Kakar, 2017; Kakar and Kakar, 2018a, b). Individuals often look for social interactions to overcome their loneliness (Tauber, 1972; Forman and Sriram 1991). However, these interactions are possible only to a limited extent in utilitarian and hedonic software such as computer games but are made possible through social media. People have a desire to be socially accepted and loved (Baumeister and Leary 1995; Leary, Kelly, and Schreindorfer, 2001). This desire has its roots in the Malow's (1954) need to belong" a fundamental human motivation that is something all human beings possess ... to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships" (Baumeister and Leary 1995, p. 497). Social media provides a platform for users to fulfill this need. People with a higher need for relationship will therefore have a higher BI, FRQ and TIME. Thus,

Hypothesis 1: Users who over-indulge in social media usage have a higher need for relatedness

Hypothesis 2: Users' need for relatedness will positively impact their behavioral intention to use social media and the time and frequency of their engagement on social media

Yet, overcoming loneliness and the need to belong and be loved are not the only objectives of social interactions. Its experiential meaning is more complex and can be understood from a symbolic interactionist perspective (Blumer, 2012). The symbolic value of social interactions is very different from the functional and hedonic value. Sheth et al. (1991) Social media provides a means for individuals to express and share their values online. Even people with social competence deficits and low self-esteem offline and can boost their self-image online without having to meet them (Wu, Huang, Chen, Davison and Hua, 2018). They can receive recognition, positive feedback and friendship based on their online participation, self-expression and disclosures (Shaw and Grant, 2002; King and Lee, 2011) and achieve the same level of social intimacy in virtual environment as they would have experienced in a real-life environment (Mathwick et al., 2008). Therefore, we suggest

Hypothesis 3: Users who over-indulge in social media usage have a higher need for self-esteem

Hypothesis 4: Users' need for self-esteem will positively impact their behavioral intention to use social media and the time and frequency of their engagement on social media

The need for popularity-influence is the need to be "liked, respected, and have influence over others rather than feeling like a person whose advice or options nobody is interested in." ((Zhu and Chen, 2015). The need for popularity-influence differs from the need to belong which is characterized by the desire to form "lasting, positive, and significant interpersonal relationships."(Baumeister and Leary 1995, p. 497). While

a few intimate relationships can satisfy this need the need for popularity-influence can be satisfied only through a large number of (often superficial) relationships such as for example the relationship between a celebrity and her fans. People high in need for popularity-influence have impression management goals (Utz, Tanis and Vermeulen, 2012). Social media allows such individuals unique opportunities for self-presentation and provides reach. They can address a very large audience with just a few mouse clicks and gain popularity through communicating their unique insights and interesting experiences to a large number of people quickly. Thus,

Hypothesis 5: Users who over-indulge in social media usage have a higher need for popularity-influence

Hypothesis 6: Users' need for popularity-influence will positively impact their behavioral intention to use social media and the time and frequency of their engagement on social media

Method

Study Setting and Design

The longitudinal study was conducted in a public university in the south with student subjects. Each subject in the study answered a questionnaire-based survey that captured data on demographics and questions to determine the users' needs profile (see Appendix A). The actual usage of social media websites was captured using a tool developed for the purpose.

Participants

The participants were from a medium sized university located in a southern state. The college of business of this university encourages research exposure by awarding students extra credit for research participation. Only those students who agreed to provide data in both rounds of the study, at the end of the Fall semester, 2019 and at the end of Spring semester 2020 were recruited for the study. All 222 participants agreed to provide browsing data of the computing devices used by them and participate in both rounds of the study. The participants were 19-23 years old. 51.5% respondents were female, and 49.5 % respondents were male.

Measures Used

The 10 human psychological needs (see Appendix A for items) were each represented by the 3-item scale (Sheldon, Elliot, Kim and Kasser, 2001). For Behavioral intention (BI) we adapted the Venkatesh, Thong and Xu (2012) scale using following 3 items:

1. I often think about visiting social media websites
2. I would like to engage in social media activities in my spare time
3. I will continue to engage in social media activities frequently

All measures used a 9-point Likert scale with anchors of 9 (strongly agree) and 1 (strongly disagree). Some items were reverse coded. The construct value was computed by taking the average of user response to the items. For actual system usage we collected historical data in the first and second rounds on the average frequency of social media access (FRQ) and the average time spent per day (TIME) over the previous 4 months.

Procedure

A software tool was provided to the participants that automatically generated their actual usage information of social media. The software used the list of top 100 social media websites (<https://www.practicalecommerce.com/105-leading-social-networks-worldwide>) and was run by the participants themselves to provide the data. In case some social media websites accessed by the participants were not included in the statistics the participant had the choice to add them in the list (deletion from the list was not allowed) and run the software again to provide a more comprehensive historical data.

Participants also answered the survey questionnaire regarding demographics their psychological needs (Appendix A) and BI to engage in social media activities at the beginning of fall 2019 semester. They also answered the questionnaire on their psychological needs and BI to engage in social media activities at the end of the semester fall 2020 semester. Two groups of participants were created for analysis. The first group of participants (constituting Group A of 73 students) were those that participated in social media activities for one standard deviations above the mean time for the group of all participants. The second group consisted of remaining subjects (constituting Group B of 149 students).

Method of Analyses

Factor analysis was performed on the data set obtained from the participants to establish validity and reliability of the measures used in the study. Further, the correlation matrix and internal reliabilities of the measures were also examined. A paired t-test was performed for within group analysis of data and multiple two sample t-tests were performed for across user group comparison of social media usage.

We adapted the widely accepted (Brandt, 1987; Anderson and Mittal, 2000; Brandt, 1988; Mittal, Ross and Baldasare, 1998) PRCA (Penalty Reward Contrast Analysis) technique for analyzing the data collected in Round 1 and Round 2 to test the hypotheses. By having two sets of dummy variables representing each group indicating high value (1 SD above mean) of social media usage representing group A and a low value of (1, 0) representing Group B, multiple regression analysis is conducted with social media usage and BI as independent variable. Using this statistical approach, we get two regression coefficients for each user need, one (high) representing the impact of high level of psychological need on computer usage and the other representing the impact of low level of psychological need on computer usage.

Results and Analyses

The results of the factor analysis using IBM® SPSS® Statistics Version 19 (see Appendix B) show that the factors extracted using Varimax rotation represented the scales used in the study: the autonomy scale represented by items A1 to A3, the competence scale represented by items C1 to C3, the relatedness scale represented by items R1 to R 3, the physical thriving scale represented by PT1 to PT3, the security scale represented by items SE1 to SE3, the self-esteem scale represented by items ST1 to ST3, the self-actualization scale represented by items SA1 to SA3, the pleasure-stimulation scale represented by items PL1 to PL3, the money-luxury scale represented by items ML1 to ML3, and the popularity-influence scale represented by items P1 to P3).

The loadings within factors was found to be (>.50) demonstrating convergent validity of items within scales, and there was no cross loadings (>.40) between factors demonstrating discriminant validity between scales. The internal reliabilities of all the scales used in the study were greater than .70 (see Table 1). Further none of the inter-correlations between the scales were greater than .65 (Table 2).

Name of the scale	Cronbach's Alpha	Number of Items
Behavioral Intention (BI)	0.90	3
Autonomy (A)	0.81	3
Competence (C)	0.80	3
Relatedness (R)	0.79	3
Physical Thriving (PT)	0.78	3
Security (ST)	0.83	3
Self-Esteem (SE)	0.77	3
Self-Actualization (SA)	0.81	3
Pleasure Stimulation (PS)	0.84	3
Money luxury (ML)	0.81	3
Popularity Influence (PI)	0.84	3

Table 1. Internal Reliability of Scales

	A	C	R	PT	SE	ST	SA	PS	ML	PI	BI
A	1.00										
C	-.32*	1.00									
R	-.22	-.21	1.00								
PT	.40*	.31*	.21	1.00							
SE	.38*	.32*	.39*	.21	1.00						
ST	.33*	.37*	.20	.32*	.20	1.00					
SA	.39*	.41*	.16	.31*	.12	.32*	1.00				
PS	.31*	.10	.31*	.20	-.09	.21	.30*	1.00			
ML	.22	.31*	.21	.11	.21	.20	.21	.33*	1.00		
PI	-.18	.34*	.38*	.20	.41*	.21	.20	.32*	.35*	1.00	
BI	.41*	.17	.23	.21	-.18	.19	.32*	.48*	.16	.12	1.00

* p < .05

Table 2. Correlations

Psychological Need	R	C	A	PT	SA	ST	SE	PI	ML	PS
Round 1	7.6	6.4	6.8	6.1	6.0	6.5	5.8	7.4	6.5	7.6
Round 2	7.6	6.4	6.8	6.6	6.0	6.5	5.8	7.6	6.5	7.6
Difference (Round 2-Round 1)	0	0	0	0.5*	0	0	0	0.2*	0	0

*p < .05

Table 3. Users' Psychological Needs in Round 1 and Round 2

From Table 3 we can see that except for user need for Physical Thriving and the user need for Pleasure Stimulation the user needs in Round 1 and Round 2 were relatively stable.

Psychological Need	R	C	A	PT	SA	ST	SE	PI	ML	PS
Group B	7.2	6.9	7.1	6.4	6.6	6.6	5.7	6.9	6.6	7.2
Group A	7.8	6.1	6.7	6	5.7	6.4	6	7.7	6.4	7.8
Difference	0.6*	-.8*	-.4*	-.4*	-.9*	-0.2	.3*	0.8*	-0.2	0.6*

*p < .05

Table 4. Users' Psychological Needs of Group A and Group B in Round 1

Psychological Need	R	C	A	PT	SA	ST	SE	PI	ML	PS
Group B	7.2	6.9	7.1	6.9	6.6	6.9	5.7	7.1	6.6	7.2
Group A	7.8	6	6.7	6.4	5.7	6.4	6	7.7	6.4	7.8
Difference	0.6*	-.9*	-.4*	-.5*	-0.9	-0.2	.3*	0.6*	-0.2	0.6*

*p < .05

Table 5. Users' Psychological Needs of Group A and Group B in Round 2

From Table 4 and 5 we can see that except for user needs of security and money luxury, the psychological needs profile of users in Group A (heavy users of social media) and Group B (not so heavy users of social media) in Round 1 as well and Round 2 were significantly different.

Behavioral Intention (BI)				Frequency (FRQ)				Time of Usage (TIME)			
Round 1 overall	Round 2 overall	Round 1 group A	Round 2 group A	Round 1 overall	Round 2 overall	Round 1 group A	Round 2 group A	Round 1 overall	Round 2 overall	Round 1 group A	Round 2 group A
5.71	7.13	7.42	8.31	1.22	1.63	1.54	1.84	0.22	0.64	0.44	0.79

Table 6. Users' Psychological Needs of Group A and Group B in Round 2

From Table 6 we can see that the behavioral Intention to engage in social media activities and actual usage (FRQ and TIME) were higher for the Group A than for the overall group of subjects in both rounds 1 and round 2. BI, FRQ and TIME were higher in round 2 than in round 1 for both group A and the overall group.

Psychological Needs ->		R	C	A	PT	SA	ST	SE	PI	ML	PS
PRCA	Low	.02	.08	0.03	.18	.07	.04	.20	.06	.023	.05
	High	.63*	-0.5	-0.05	-.14	-.06	.04	.38*	.54*	0.18	.17

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Penalty Reward Contrast Analysis

Table 7. Results of regressing high and low levels of user needs on BI Round 1

Psychological Needs ->		R	C	A	PT	SE	ST	SA	PI	ML	PS
PRCA	Low	0.17	0.15	0.13	0.22	0.20	0.13	0.29	0.18	0.31	0.11
	High	.72*	0.08	0.02	0.00	0.01	0.10	0.44*	0.63*	0.25	0.25

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Penalty Reward Contrast Analysis

Table 8. Results of regressing high and low levels of user needs on BI Round 2

The results of Table 7 and 8 show that as hypothesized users with high need for Relationship, Popularity and Self-Esteem positively impacted BI. The impacts of other psychological needs on BI were not significant.

Psychological Needs ->		R	C	A	PT	SA	ST	SE	PI	ML	PS
PRCA	Low	0.16	0.13	0.15	0.37	0.16	0.14	0.30	0.21	0.30	0.12
	High	.68*	0.08	0.05	0.03	0.00	0.11	0.40*	0.59*	0.24	0.24

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Penalty Reward Contrast Analysis

Table 9. Results of regressing high and low levels of user needs on FRQ Round 1

Psychological Needs ->		R	C	A	PT	SA	ST	SE	PI	ML	PS
PRCA	Low	0.11	0.09	0.17	0.39	0.13	0.09	0.26	0.24	0.30	0.09
	High	.73*	0.06	0.04	0.05	-0.02	0.31*	0.43*	0.64*	0.26	0.47*

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Adapted Penalty Reward Contrast Analysis

Table 10. Results of regressing high and low levels of user needs on FRQ Round 2

Psychological Needs ->		R	C	A	PT	SA	ST	SE	PI	ML	PS
PRCA	Low	0.12	0.11	0.13	0.43	0.11	0.07	0.23	0.24	0.34	0.08
	High	.75*	0.10	0.04	0.03	-0.06	0.09	0.36*	0.65*	0.26	0.08

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Adapted Penalty Reward Contrast Analysis

Table 11. Results of regressing high and low levels of user needs on TIME Round 1

Psychological Needs ->		R	C	A	PT	SA	ST	SE	PI	ML	PS
PRCA	Low	0.16	0.09	0.13	0.42	0.12	0.09	0.26	0.24	0.29	0.04
	High	.78*	0.05	-0.01	0.04	-0.11	0.35*	0.38*	0.72*	0.25	0.44*

*p < .05

Low= Regression Coefficient at low need

NI=Regression Coefficient at high need

PRCA= Adapted Penalty Reward Contrast Analysis

Table 12. Results of regressing high and low levels of user needs on TIME Round 2

The results of Table 9, 10, 11 and 12 show that as hypothesized users with high need for Relationship, Popularity and Self-Esteem positively impacted BI and actual usage as measured by frequency of use (FRQ) and time of use (TIME) in both rounds of the study. The impacts of other psychological needs on BI, FRQ and TIME were not significant in round 1. However, the impact of security and pleasure stimulation in the post-COVID era (round 2) on TIME and FRQ was found to be significant perhaps due to insecurity and lack of pleasurable avenues outside of their homes.

Discussion

Thus, all the six hypothesis were supported by the findings in the study. The user needs for Relationship, Popularity and Self-Esteem were higher for over-indulgent users of social media. The three needs not only impacted the BI of participants who engaged on social media but also their actual usage as measured by FRQ and TIME. The findings of the study also showed that overall the users' psychological needs were fairly stable and enduring over time. The significant increase in need for physical thriving and pleasure-stimulation in round 2 could possibly have been due to Covid-19 as the first round of the study was conducted in the pre-Covid-19 era while the second round was conducted in the post-Covid-19 era.

Although, there were a significant difference psychological profile of users between Groups A and B in 8 of the 10 psychological needs, the impact of only three psychological needs on BI, FRQ and TIME were significant – Relationship, Popularity and Self-Esteem. Further, as can be seen from the regression coefficients the impact of relationship on BI, FRQ and TIME was greater than the impact of popularity-influence on BI, FRQ and TIME which in turn had a greater impact than self-esteem on BI, FRQ and TIME. The greatest difference in psychological needs between participants in Groups A and B was in Self-Actualization and Competence followed by Popularity-Influence and Relationship. However, the impact of both Self Actualization and Competence on BI, FRQ and TIME was not found to be significant.

Perhaps, unlike user needs of Relationship, Popularity and Self-Esteem, the user need of competence and self-actualization can be fulfilled through the use of utilitarian software, for example. The social value derived by users through relatedness, self-esteem and popularity-influence will thus drive social media participation. Users can easily fulfill these needs through social media with a few computer clicks. The greater needs for competence and self-actualization of Group B than Group A only implies that the profile of users who over-indulge in social media is different from those who do not even though the impact of high and low levels of user need for competence and self-actualization on BI, TIME and FRQ are not found significant.

Additionally, a noteworthy finding of the study is the increased BI, TIME and FRQ in round 2 which was conducted in the post-Covid-19 era over BI, TIME and FRQ in round 1 which was conducted in the pre-Covid-19 era (Table 6). It could be due to social distancing practiced by a large number of people in the post-cCovid-19 period. With people spending more time indoors, the need of social interactions could be fulfilled online without the need for personal contact through social media. Further, perhaps for the same reason the impacts of relatedness, self-esteem and popularity influence on BI, TIME and FRQ was found to be consistently higher in round 1 compared to round 2 (Tables 7-12). With experts predicting that social distancing will remain with us for some time, we can expect social media to be more prevalent in the foreseeable future too. It is also likely that these developments will lead to more participation in social commerce providing benefits of greater information to both consumers and businesses and increased online consumer spending (Lu et al., 2016).

Conclusion

The findings of the study answers all the three research questions posed in the study. Overall, the psychological needs of users remained fairly stable over time, yet the user profile of users who over-indulge in social media activities was found to be distinctly different from those who do not. The needs that significantly and positively impacted BI, TIME and FRQ were the need for relatedness, self-esteem and popularity influence. Users who over indulged in social media were found to be higher in all these three needs.

The findings of the study has practical implications. Increasing the frequency of user participation and the number of participants is important for success of social media. Knowing the user profile and addressing their needs more

effectively can not only be helpful to social media websites in retaining their existing users but in attracting new users as well. The theory of network externalities states that augmented benefits are realized by users when the participation reaches a critical mass which in turn has the effect of further accelerating the participation (Lin and Bhattacharjee, 2008). This is not only important for increasing social media participants but also for business. It is estimated that nearly one third of all consumer spending is influenced by social commerce on social media (Lu et al., 2016). Thus, increased user and usage at social media websites is not only important for social communications but for consumer markets in general. The advent of social media has changed the way people get and disseminate information about civic life, health, dating and entertainment (Perrin, 2015). It has influenced almost all aspects of social life including work, politics and e-commerce. The advent of Covid-19 has further accelerated this trend.

Product/ project managers of social media websites can use their innovative abilities to provide features on their social media websites that meet the identified psychological needs of participants to retain and increase their user base. For example, to fulfill the salient relatedness, self-esteem and popularity-influence needs, social commerce websites can enable real-time interactions between users. Further, technological and informational features can be introduced that provide a socially supportive environment on the website by recognizing user contributions and encouraging mutual help. Providing socially rich text, multimedia contents, physically embodied agents, text-to-voice features can convey a feeling of social engagement and personal touch to the interactions. Further, providing personalized information, ratings on the quality of content and statistics on followers can help social media users to track and enhance their social presence.

Limitations and Future Research

The results of the study cannot be generalized as the sample was non-randomized due to constraints in getting a large number of participants for the study. This limitation should be viewed in light of the focus of the study which was not to test generalizability across user groups but across two time frames i.e., in the pre-Covid and post-Covid eras. Additionally, this replication study is a step forward in the direction of the relevance of the impact of users' psychological needs profile on the usage across different software products/ platforms as shown by the results of previous studies (e.g., Kakar, 2021). Future studies may focus on generalizability of these results across user populations.

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APPENDIX A. Measure for Users' Psychological Needs used in the Study
(Sheldon, Elliot, Kim and Kasser, 2001)

1. Autonomy
That my choices were based on my true interests and values.
Free to do things my own way.
That my choices expressed my "true self."
2. Competence
That I was successfully completing difficult tasks and projects.
That I was taking on and mastering hard challenges.
Very capable in what I did.
3. Relatedness
A sense of contact with people who care for me, and whom I care for.
Close and connected with other people who are important to me.
A strong sense of intimacy with the people I spent time with.
4. Self-actualization-meaning
That I was "becoming who I really am."
A sense of deeper purpose in life.
A deeper understanding of myself and my place in the universe.
5. Physical thriving
That I got enough exercise and was in excellent physical condition.
That my body was getting just what it needed.
A strong sense of physical well-being.
6. Pleasure-stimulation
That I was experiencing new sensations and activities.
Intense physical pleasure and enjoyment.
That I had found new sources and types of stimulation for myself.
7. Money-luxury
Able to buy most of the things I want.
That I had nice things and possessions.
That I got plenty of money.
8. Security
That my life was structured and predictable.

Glad that I have a comfortable set of routines and habits.
Safe from threats and uncertainties.
9. Self-esteem
That I had many positive qualities.
Quite satisfied with who I am.
A strong sense of self-respect.
10. Popularity-influence
That I was a person whose advice others seek out and follow.
That I strongly influenced others' beliefs and behavior.
That I had strong impact on what other people did.

APPENDIX B. Results of Factor Analyses for Users' Psychological Needs

Items	Factor									
	1	2	3	4	5	6	7	8	9	10
A1	0.933	-0.004	-	-	-0.039	0.019	0.022	0.010	0.065	-0.008
A2	0.913	0.036	-	0.016	0.064	-0.001	-0.010	-0.051	-0.016	-0.004
A3	0.913	0.004	0.101	-	-0.006	0.000	-0.004	0.025	0.099	-0.143
C1	0.157	0.811	0.091	0.024	0.096	-0.148	-0.140	0.004	-0.145	0.083
C2	0.224	0.849	0.046	0.011	-0.155	0.083	0.083	0.082	-0.040	-0.002
C3	0.239	0.837	0.018	0.075	-0.040	0.004	-0.007	0.010	0.061	-0.016
R1	0.112	0.158	0.863	0.014	0.062	-0.023	-0.011	0.009	0.066	0.012
R2	0.046	0.218	0.868	0.005	0.070	0.009	0.012	0.147	0.160	0.126
R3	0.021	0.239	0.827	0.142	0.170	0.127	0.126	0.219	-0.048	0.199
SA1	0.024	0.111	0.158	0.905	0.138	0.106	0.104	0.229	0.066	0.219
SA2	0.075	0.150	0.220	0.843	-0.001	0.230	0.226	0.133	0.136	0.104
SA3	0.007	0.066	0.228	0.871	0.095	0.077	0.079	0.132	0.000	0.233
PT1	-0.062	0.014	0.103	0.112	0.646	0.085	0.089	0.123	0.094	0.084
PT2	0.002	0.017	-	0.157	0.889	0.172	0.162	0.046	0.257	0.084
PT3	0.069	0.002	0.046	0.218	0.888	0.054	0.051	0.121	0.036	0.161
PL1	-0.023	0.012	0.019	0.228	0.078	0.860	0.063	0.077	-0.002	0.059
PL2	0.010	0.122	-	0.105	0.104	0.732	0.062	0.161	0.077	0.070
PL3	0.022	0.107	0.024	0.137	-0.006	0.862	0.011	0.055	0.107	0.056
ML1	-0.002	0.072	0.005	0.071	0.120	0.011	0.805	0.195	0.120	0.094
ML2	0.078	0.155	0.002	0.019	0.149	-0.080	0.860	-0.067	0.196	0.056
ML3	0.049	0.230	0.021	0.117	0.217	0.044	0.840	0.062	0.229	0.037
SE1	0.021	0.233	-	0.151	0.233	0.029	0.009	0.790	0.371	0.014
SE2	-0.008	0.109	0.011	-	0.105	-0.009	0.020	0.848	0.100	0.103
SE3	0.014	0.134	0.028	0.012	0.138	0.018	0.099	0.832	0.132	0.161
ST1	0.006	0.069	-	0.006	0.074	0.155	-0.006	-0.046	0.873	0.281
ST2	-0.006	0.031	0.020	-	0.026	0.223	0.014	0.031	0.860	0.029
ST3	0.792	0.022	0.044	0.212	-0.059	0.235	-0.079	0.045	0.825	-0.064
P1	0.908	0.076	0.007	0.229	0.076	0.105	0.010	0.019	0.236	0.851
P2	0.815	0.012	0.117	0.074	0.081	0.155	-0.006	0.127	0.070	0.843
P3	0.104	0.001	0.050	0.029	0.073	0.222	0.012	0.051	0.026	0.826

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