THE ROLE OF LONELINESS AS A PREDICTOR OF INTERNET ADDICTION WITH A MEDIATING EFFECT OF SELF ESTEEM AND MODERATING EFFECT OF RESILIENCE AMONG INTERNATIONAL STUDENTS IN CHINA

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ABSTRACT--Internet addiction has emerged as a major concern of the current decade and inner psychological factors has found to be the protective or enhancing factor in internet addiction. The aim of the present study was to inquire into the mediating role of self-esteem in the association among loneliness and IA. Secondly, to investigate the moderating role of the resilience in the indirect relationship between loneliness and internet addiction. Participants was 436 (mean age = 23.81 years, SD = 1.91) and they completed the survey questionnaire comprised of loneliness, self-esteem, internet addiction and resilience. The correlation analyses revealed that loneliness was significantly positively, and resilience was negatively associated with IA of the international students. Self-esteem mediated the link between loneliness and internet addiction. However moderated mediation advised resilience only moderated the path between self-esteem and IA, Though resilience did not moderate the relation between loneliness and self esteem's first-stage moderation. Results suggest high level of self-esteem and resilience can be a preventive component against IA in international students. Overall, these findings highlighted suggestions for internet addiction among international students.

Keywords-- Loneliness, Self esteem, Internet Addiction (IA), Resilience, International Students

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I.   INTRODUCTION

In the advanced world of technology internet has become a necessity of our daily lives (yao,zhong, 2014). According to the 40th China internet network information center,(2018) the number of internet users as of Dec 2017 thrust out more then 7 million and the substantial around (25.4%) section consist on students population. And this advanced problem is the root cause of number of other issues relating to physical, emotional, psychological issues and problems in academic domains.(Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015; Mei, Yau, Chai, Guo, & Potenza, 2016; Samaha & Hawi, 2016; Zhou, Li, Jia, Li, Zhao, Sun, & Wang, 2017).In order to grasp the risk related mechanisms of internet addiction, it is required to illuminate efforts for prevention measures however some distinctive attributes as hazardous factors for internet addiction has been identified (Saini, Baniya, Verma, Soni, & Kesharwani, 2016; Xu, et.al, 2012; Müller, et.al., 2013).

Internet addiction is a complex phenomenon and it can be divided into following categories: External environmental factors included Family, friends (Li et al., 2014; Zhou et al.,2017) and internal psychological factors such as depression, (Fayazi and Hasani,2017),self esteem (Bozoglan et al., 2013; Farah et al., 2016) , loneliness s (Özdemir et al., 2014; Sharifpoor et al., 2017) and resilience as a protective factor for internet addiction (Nam, et al, 2018).In the ongoing study we will only cater internal psychological factors and andful of studies has explored the internal factor such as role of loneliness in the development of internet addiction (LaRose, & Peng, 2009; Özdemira, Kuzucua, & Şerife,2014; Kim, ; Zhang et.al., 2018) yet role of loneliness in internet addiction among international students is still naive.

Because students have ample spare time and they are also away from families or spend most of their daily time outside from home usually it makes them lonely and it often makes students vulnerable to overuse social media, (Marengo et al., 2018; Settanni et al., 2018).As studies suggested internet navigate students in abroad and makes them internet addict (Manasijevic, Zivkovic, Arsic & Milosevic, 2015; Upadhayay & Guragain,2017). Therefor, we choose international students as our subjects.

II.   LONELINESS AND INTERNET ADDICTION

Loneliness a cognitive realization of insufficiency in association of connection with others and experiencing emotions of prolong hollowness (Ageing, 2014; Ascher & Paquetteue, 2003). And internet addiction is defines as incapability to control internet use (Bener, 2017). However, it is generally thought loneliness is one of the main antecedent and plays an important role in development of internet addiction (Bozoglan, Demirer & Sahin, 2013; Douglas et al., 2008).

The psycho-social distress model of the internet use proposed by Davis, (2001), suggests people lacking with social communication might choose digital communication over real face to face conversation. And as they pledge their time and concentration more towards digital world, most likely it would be unmanageable by some of them to limit the use of the internet. Which further also leads them to issues relating to negative life outcomes (Kim, LaRose, & Peng, 2009). Converging with this historical view ample number of researches have

demonstrate that one of the prime motives of Internet use is to reduce inner psychological state of loneliness and depression. However loneliness is looped directly with general social skills deficiency which eventually twirl into network interaction and compulsive internet use (Esen, Aktas & Tuncer 2013; Kim, LaRose, Peng, 2009; Odacı & Kalkan, 2010).

Literature suggests, Students are at high risk of loneliness which might be because of the social changes they go through (Stickley et al., 2014) and they are also high user of internet as well (Veen & Vrakking, 2006) because they have the opportunity to unlimited Internet access usually free from interference of authority figures, and their higher interest in internet usage in terms of educational purposes and communication with loved ones is linked to Internet addiction (Abdel-Salam et al., 2019;Leung & Lee,2012).

III.   THE MEDIATING ROLE OF SELF-ESTEEM

Plenty of research studies in current decade highlighted the psychological element, self-esteem as one of the interpretive factor in progression or elimination of internet addiction (Mei, Yau, Chai, Guo, & Potenza, 2016; Wiederhold, 2016). `Self esteem is elucidate as an evaluation of a person about himself (Du et al., 2013). However,

plethora of studies and loneliness theorists proposed that loneliness is coincident with and also has reciprocal relationship with self esteem (Cacioppo, et al., 2006; Du, Li, Chi, Zhao, & Zhao, 2018; Mahon, Yarcheski, Yarcheski, Cannella, & Hanks, 2006). This notion is supported by the sociometer theory proposed by Leary et al., (1995), as self-esteem is govern by a persons realization of outlying from others, and such awareness is hold by the element of loneliness. Thus studies suggest that greater loneliness reported by individuals also report lower self esteem, However people with experimentally induced loneliness report decrease in self esteem (Cacioppo et al., 2006;Du, Li, Chi, Zhao, & Zhao, 2018).

Cognitive behavioral model of pathological internet use devised by Davis (2001), proposed that low level of self-esteem is an attainable element to acquire addiction relating to internet. And ample number of researches suggest that individual's reporting lower self esteem could anticipate to addictive use of the internet (Błachnio, Przepi´orka, Senol-Durak,Durak, & Sherstyuk, 2016; Park, Kang, & Kim, 2014; Sariyska et al., 2014; Yen,Chou, Liu, Yang, & Hu, 2014; Zhang, 2015), However this predictive connection among self-esteem and Internet addiction is also congruous with cross cultural studies with different ethnic groups(Błachnio et al., 2016; Sariyska et al., 2014).The relative literature is acquire with the notion that self esteem could predict the internet addiction (Mei, Yau, Chai, Guo, & Potenza,2016) and loneliness has relationship with internet addiction (Bozoglan, Demirer & Sahin, 2013). To date, no previous literature directly examined direct effect of loneliness and mediating effect of self-esteem on internet addiction among international students.

IV.   THE MODERATING EFFECT OF RESILIENCE

Though loneliness and lower self esteem may leads to several behavior, psychological problems and internet addiction (Bilgin & Taş, 2018; Mei, et al, 2016). Thus it is important to explore potential moderator which can be a possible protective factor to internet addiction yet researches suggest, resilience as exceptionally extensive human sentiment which helps to overcome negative or risky behaviors(Choi, et al, 2015; Nam, et al, 2018)

Resilience is interpret as an individuals ability to conquer the negative life events and accommodate oneself to new circumstances (Doğan, 2015; Öz, Bahadır Yılmaz, 2009). The notion of resilience linked with wide range of psychological topics (Herrman, et al, 2011). But handful of studies have recently started combining resilience with

internet addiction((Bilgin & Taş, 2018; Yan & Rapoza, 2018) and suggests inner psychological factors such as loneliness (Esen, Aktas & Tuncer 2013) and lower self esteem (Mei, Yau, Chai, Guo, & Potenza,2016) acts as a risk factors, though studies suggested resilience act as a protective factor to internet addiction (Campbell, Cumming, & Hughes, 2006; Kim et al, 2014).

In the light of theoretical context protection motivation and social cognitive theorists states individuals online behavior allocates conceptual agreement on protective effects of resilience for defensing possible online jeopardizing (Tsai, Jiang, Alhabash, LaRose, Rifon, & Cotton, 2016). And scholars proposed that an individuals perception of being resilient can help them to control, and limit online activity (Staksurd & Livingstone, 2009) and it specially limit students exposure of risk in terms of internet addiction as well (Chai, Bagchi-sen, Morrell, Rao, & Upadhyaya, 2009). Convergent with this theoretical view a growing number of researches suggest, resilient individuals cope with negative psychological factors and protective element of resilience also lined up with managing internet addiction (Choi, Shin, Bae, & Kim, 2014; Li, Zhang, Li, Zhan, & Wang, 2010; Wisniewski, et al, 2015).

V.   THE PRESENT STUDY

In ongoing study, we tested loneliness will leads to internet addiction. The prime motive of the current research were twofold, firstly we will test whether self-esteem mediates the relation between loneliness and internet addiction of the international students. Secondly, whether the indirect association between loneliness and internet addiction through self-esteem would be moderated by the resilience. In all, both research questions compose a moderated mediation model. Current model can response about both mediation such as how does loneliness relate to internet addiction and moderation when and for whom this connection is minimum or mostly strong. Our proposed model can be seen in Figure 1. which explains loneliness positively predict internet addiction. Furthermore, the indirect association between loneliness and internet addiction through self-esteem will vary accordingly to being resilient.
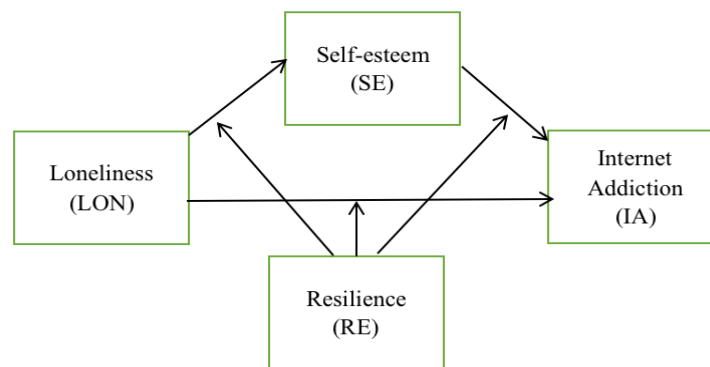
Figure 1: The proposed moderated mediation model. LON: Loneliness; SE: self-esteem; RE: Resilience; IA: Internet

addiction

VI.   METHODS

ParticipantsData for the current study was designed to examine the effect of personal psychological factors on internet addiction of international students. Participants were 436 international student. The mean age of the participants was 23.81 years (SD = 1.91), range of more then 20 years old. About 300 (0.68) participants stayed more then one year and 133(0.31) less then 6 month stayed in china.

Participants were debriefed and assured regarding their confidentiality in the beginning of the questionnaire protocol. Snowball sampling technique wad used to collect data. The survey is conducted via a questionnaire survey website (https://kwiksurveys.com/). This way to collect data online has been found to be reliable by some studies (Armstrong, Gallig & Critchley, 2011; Kong, Zhao & You, 2012).Reachable participants was also request to outspread the link of survey with their country-mates studying in Xian, China.

Measures

Loneliness. In order to measure lonliness, The social and emotional lonliness scale for adults short version (SELSA-S) (DiTommaso, Brannen, & Best 2004) was used. It consists of 15 items designed to measure "Romantic","Family" and "social" loneliness.Emotional loneliness comes out of adding (romantic & family) loneliness scores. The items are rated on a 7-point scale, ranging from 1 - strongly disagree to 7 - strongly agree. High SELSA-S scores indicate high levels of emotional and social loneliness. Alpha coefficient for (romantic, family & social loneliness) were (.91, .79, .82) respectively.

Self-esteem. Self-esteem was assessed by the Rosenberg Self-Esteem Scale (Rosenberg, 1965). it consists of 10 items (e.g., "On the whole, I am satisfied with myself"). The participants rated each item on a 5-point scale ranging from 1 = not very true of me to 4 = very true of me, with higher scores indicating higher level of self-esteem. For the current, the scale demonstrated good reliability (Cronbach's α = .79).

Resilience. In order to assess the resilience, The Brief Resilience Sales (BRS) developed by Smith et al. (2008) was used. It consists of total six items (three negative items and three positive items). According to Smith et al., items (1,3, 5) are positively worded and items (2, 4, 6) are negatively worded. Respondents were asked to answer each question by indicating their agreement with each statement from, 1 = strongly disagree to 5 = strongly agree. The scale demonstrate good reliability (Cronbach's α = .89).

Internet addiction. Internet addiction was assessed by, The internet addiction test (IAT) it is a 20-itemself-reportmeasure and includes questions such as, "How often do you try to cut down the amount of time you spend online and fail?" Participants are supposed to mark score on a 5-point scale. IAT scores range from "20 to 100" with higher scores indicating higher levels of Internet addiction symptoms. The Cronbach's alpha coefficient of the IAT in the current study was .90.

VII.   RESULTS

The purposes of the current study were to explore whether self esteem would mediate the relation between loneliness and internet addiction, and whether the indirect path between loneliness and internet addiction would be moderated by the resilience. It was tested in three steps as follows.

Preliminary analyses

Means, standard deviations, and zero-order correlations for all study variables are presented in Table 1. which explains that there is a negative relationship between loneliness self esteem and resilience. Positive relationship between loneliness and internet addiction, self esteem and resilience. However negative relationship was found between resilience and internet addiction in international students.

Table 1: Descriptive Statistics and Correlations of the main study variables

Variables	M (SD)	1	2	3	4
1. Loneliness	4.01 (0.73)	1			
2. Self-esteem	2.80 (0.45)	-0.30***	1		
3. Resilience	4.51 (0.89)	-0.19**	0.17**	1	
4. Internet Addiction	4.30 (0.96)	0.22***	-0.21**	-0.15***	1

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

Testing for mediation effectIn order to assess the mediation effect we followed MacKinnon's (2008) for step procedure to examine our first hypothesis: self esteem would mediate the link between loneliness and internet addiction. Following the four effect mediation effect it requires a significant relationship between loneliness and internet addiction, and significant association between loneliness and self esteem, a significant association between self esteem and internet addiction while controlling the loneliness and a significant coefficient for the indirect path between loneliness and internet addiction. Whether the last condition will be satisfied a bias corrected bootstrap method will determine.

First step of multiple regression analysis showed loneliness significantly associated with internet addiction, b = 0.30 , p <.001 which can be seen in (Model 1 of Table 2). Loneliness was significantly associated with self esteem *b* = 0.18 , p <.001, in the second step which can be seen in (Model 2 of Table 2). In the third step when loneliness was controlled, internet addiction through self esteem was significant, *ab* = -0.06, *SE = 0.03,* 95% CI = [-0.09, -0.03] The mediation effect accounted for 19% of the total effect. Overall, all the criteria establishing mediation effect satisfactory.

Table 2: Testing the Mediation Effect of Loneliness on Students Internet Addiction.

Predictors	Model 1 (IA)		Model 2 (SE)		Model 3 (IA)	
	b	*t*	*b*	*t*	*b*	*t*
Lon	0.30	4.99***	-0.18	-6.01***	0.33	3.99***
SE					-0.32	-4.00***
R^2	.06		.09		.04	

F	25.99***	49.89***	21.95***

Note. **$p < .01$. ***$p < .001$. Each column is a regression model that predicts the criterion at the top of the column. Loneliness (Lon) , Self esteem (SE), Internet addiction (IA).

Testing for moderation mediation

To examine moderation mediation model 59 of process macro by Hyes (2013) was adopted. As we hypothesized that resilience would moderate the indirect associations between loneliness and internet addiction through self esteem three regression models was estimated as followed. Model 1, moderating effect of the resilience on the relation between loneliness and internet addiction was estimated. Model 2, we estimated that the there is moderating effect of resilience on the loneliness and self esteem. However in model 3, we estimated the moderating effect of resilience on the relation between self esteem and internet addiction, Table 3 can be seen for details the detail of all models.

Table 3: Testing the Moderated Mediation Effect of Loneliness on Internet Addiction of the International Students.

Predictors	Model 1 (IA)		Model 2 (SE)		Model 3 (IA)	
	b	*t*	*b*	*t*	*b*	*t*
LON	0.31	3.99***	0.30	9.00***	-0.20	-3.19***
RE	-0.31	-3.52***	0.02	3.01*	0.23	4.02***
RE x LON	0.04	0.93	0.05	2.42	0.05	-3.28
SE					-0.09	-2.80**
SE x RE					-0.12	-2.71**
R^2	.09		.06		.07	
F	12.81***		22.01***		17.79***	

Note. Each column is a regression model that predicts the criterion at the top of the column. IA: Internet addiction, SE: self-esteem; LON: Loneliness, RE: Resilience .

*p < .05. **p < .01. ***p < .001.

Moderated mediation was established if either or both patterns existed (Hayes, 2013; Muller et al., 2005): (a) the path between loneliness and self-esteem was moderated by the resilience (first-stage moderation), or (b) the path

between self-esteem and internet addiction was moderated by the resilience (second-stage moderation). As Table 3 demonstrates, in Model 1, there was a main effect of loneliness and internet addiction, b = 0.31, p <.001, and this effect was not moderated by the resilience, b = 0.04, p > .01. Model 2 revealed that the effect of loneliness on self-esteem was significant, b = 0.30, p < .001, and this effect was not moderated by the resilience, b = 0.05, p > .05. And, Model 3 suggest that there was a significant main effect of self-esteem on internet addiction, b = −0.09, p < .01, and more importantly, this effect was moderated by the resilience, b = −0.12, p < .01. For

descriptive purposes, this study plotted predicted internet addiction against loneliness, separately for low and high levels of resilience (one SD below the mean and one SD above the mean, respectively) (Figure 2). However simple slopes tests indicates that higher level of resilience and higher level of self-esteem was not associated with internet addiction, ^{b}simple = −0.01, p > .05.. However, for adolescents with low levels of resilience, self-esteem was significantly associated with lower level of internet addiction, ^{b}simple= −0.18, p < .001.

The bias-corrected percentile bootstrap method further indicated that the indirect effect of loneliness on internet addiction through self-esteem was moderated by the resilience. For those high in the resilience, the indirect effect had a protective impact on internet addiction, b = −0.03, SE = 0.01, 95% CI = [−0.06, −0.02]. For those low in the resilience , loneliness had no effect on internet addiction through self-esteem, b = −0.01, SE = 0.04, 95% CI = [−0.04, 0.01]. Resilience only moderate the second stage of the mediation process, thus hypothesis 2, was partially supported and we can call it as second stage moderation model.
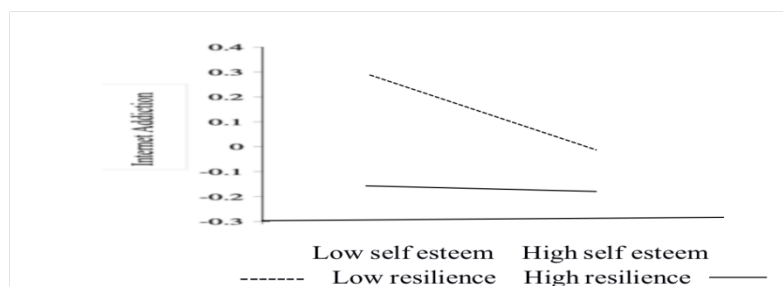
Figure 2 :. Internet addiction in international students as a function of self esteem and resilience.

Functions are graphed for two levels of the resilience; one standard deviation above the mean and one standard deviation below the mean. Not: all inferential analysis maintained the continuous values of self esteem and the resilience

VIII. DISCUSSION

In recent times, the negative impact of loneliness on internet addiction has start to attain attention (Stickley et al., 2014). But, the fundamental mediating and moderating mediums remain mainly uncertain .The current study established a moderated mediation model to acquire whether loneliness would be indirectly associated with internet addiction of international students through mediating mechanism self-esteem, however the indirect association would be moderated by the resilience.

And the results denotes that the impact of loneliness on internet addiction can be explain by international students self-esteem. Such a loneliness negatively predict self-esteem, and self-esteem also negatively forecast internet addiction of international students. Moreover it was moderated by resilience in the second stage of the mediation process as link from self-esteem was stronger in the context of being highly resilient . It demonstrate that high selfesteem played protective role apposed to internet addiction for international students with high resilience, However the protective factor was not seen in international students with low resiliency.

As current study found that loneliness decrease self esteem and further negatively connected to internet addiction of the international students it is inline with previous studies which suggest loneliness have some major negative ramifications..... and one of the basic cause of loneliness is lies in environmental and cultural circumstances (Pepula & Perlman, 1982, pg1-20) and students are being in a transitional period of living away from home (Gulam,Vicar, & Omar, 2017) and in terms of our study we have also seen that international students suffer from loneliness because they are away from their family and friends or the cultural factor might be more powerful cause.

Our study as also suggest that self esteem is negatively associated with loneliness which is supported by previous researches (Du, et al., 2018; Lasgaard & Elklit, 2009). And also supported by theoretical background of sociometer theory (1995), individuals realization of self esteem is hold by the element of loneliness. And further our results suggest that loneliness and self-esteem aggravates internet addiction which is also acquire with previous literature

which explain psychological personality elements as cause of online behavior and internet addiction (Bozoglan, Demirer & Sahin, 2013;Lee, Chang, Lin, & Cheng, 2014; Mei et al., 2016).

Overall mediation effect in our findings of the first mediation connection of loneliness and self esteem supports self-determination theory (Deci & Ryan, 2000), (Baumeister & Leary, 1995), and the attachment theory (Ainsworth, 1989; Bowlby, 1969/1982), which demonstrate that good relation with others and feel attached to others plays as a significant factor in overall well-being and which in turn could fend off them in indulging problematic behaviors. However second part of mediation connection, self esteem and internet addiction is also congruent with the theoretical view of cognitive-behavioral model of pathological Internet use (Davis, 2001), which indicates that people with maladaptive thinking style such as low self-esteem are more prone to acquire addictive behaviors such as internet addiction, which is also supported by recent researches as well (Błachnio, et al.,2016; Park, Kang, & Kim, 2014).

As the second aim of the study was to testify weather resilience could predict internet addiction and importantly it would mediate the indirect relationship between loneliness and internet addiction. And the results suggest that the resilience could predict internet addiction and students with lower level of resilience are more prone to internet addiction which is consistent with prior researches (Campbell, Cumming, & Hughes, 2006; Kim et al, 2014)

Moreover, our results suggest that resilience only moderated the path between self-esteem and internet addiction, the second stage of moderation The relationship

between self-esteem and internet addiction was not significant for adolescents with high level of resilience; however, it was significant for adolescents with low level of resilience. Our findings are consistent with the the theoretical support of social cognitive and protection motivation theory which postulates that perception of being able to control situation could positively predict prevention to online activities. (Tsai, et al., 2016) And this notion is also support by recent studies, that students level of resilience run as a protective factor against different addictive behaviors including online addiction whereas, less resilient are more prone to addictive behaviors (Bilgin & Taş, 2018; Choi, et al, 2015; Nam, et al, 2018; Yan & Rapoza, 2018). Hence, through supporting literature and our results we can say resilience can be a propitious reference to recognize either students with distorted perception about themselves such as low self-esteem can be more prone to internet addiction (Kim et al, 2014).

Opposing to as we presume, resilience did not moderate the relation between loneliness and self esteem (first-stage moderation). This result could be explained by the robust role that relationships specially familial and social plays an important role in students lives (Esen & Siyez, 2011), similarly in our study as students was away from their countries and most importantly from their family so they develop feeling of loneliness. In line with attachment theories and self determination theory (Deci & Ryan, 2000) social support is evident for mental health and being deprived of support leads to loneliness and which further effects overall health and individuals resilience and coping skills (Bilgin & Taş, 2018; Mei, et al, 2016; Nam, et al, 2018). Hence, together by combining the resilience as a moderator current study demonstrates greater understanding of the power of psychological and personality factors in development of internet addiction.

IX. IMPLICATIONS

Current study postulates important implications as firstly, findings highlighted the important issue of loneliness in spreading internet addiction among international students. As international students are away from their home country, family and social circle. Improving the loneliness by providing different social support and activities can help the students to eradicate the feeling of loneliness and further eliminating their internet addiction (Esen & Siyez, 2011). Schools are advised to provide cultural support and guidance by advising international communities and holding different social programs.

Secondly it provide helpful information regarding mediation effect of lower self-esteem and internet addiction which is in line with problematic internet use (PIU) theory ,which postulates individual's engage themselves on Internet in order to get rid of their deprived circumstances (Hawi & Samaha, 2016). Thus our mediation findings can provide. Awareness for possible interventions like providing platform to socialize and by appreciation which can enhance self esteem and in return can reduce internet addiction of international students.

Thirdly, being resilient is a prime and strong emotion (Doğan, 2015) however level of resilience in people are different (Kim, et al, 2014).Current study postulates important awareness regarding resilience as a protective factor against internet addiction so it is advised that there must be some counseling authorities within the sphere of university in order to account such psychological and social issues of international students.

Limitation and Future directions

Firstly, despite plenty of contributions still there are several limitation as current research is a survey based which doesn't allow much understanding of causality among research constructs. Future studies are advised to hold experimental or longitudinal designs in order to confirm the presumptions of the current study. Secondly measures used in current study was self report, future studies are advised to collect data from multiple sources like peers, parents or teachers. Thirdly, in present study there was no gender wise assessment, future researchers are advised to check role of gender as well in order to get more basic differences among both genders. Fourthly, the data was collected as a whole from different ethnic international students coming studies are suggested to quantify ethnicity as well in order to get the holistic view of impact of different factors across cultures. Fifthly, in the ongoing research taken variables was on personal levels, future researchers are advised to consider interpersonal variables as well such as peer relationships, parenting styles, or student teacher relationship. Lastly, sample in the ongoing study was non clinical. Consequently, current results should not be generalized in other samples, studies in future can test the current model on clinical sample as well to quantify the authenticity and the differences of the proposed model in different sample.

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