Information and Communication technology use, Technostress, Psychosocial effects and implications on University students

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ABSTRACT

Objective: To examine the gender and family differences in information and communication technology use, technostress, personality, and psychological well-being among university students.

Study Design: Descriptive cross-sectional study.

Place and Duration: At the Department of Applied Psychology, Bahauddin Zakariya University Multan (BZU), Pakistan, among the students of Sciences and Social Sciences Departments of the University of Sahiwal and Sargodha, Punjab, Pakistan from 1st November 2020 until 30th November 2020.

Methodology: Purposive sampling, 165 university students participated in the study. Internet Usage Scale, The Problematic and Risky Internet Use Screening Scale, Ten Item Personality Measure, Technostress, and Ryff's Psychological Well-Being Scale have been used in data collection. Descriptive statistics and Chi-square test of independence are used for analysis.

Results: Chi-square results show gender and family system differences in internet use, problematic internet use, technostress, personality, and psychological well-being among university students. Significant gender differences are found in Technostress (X^2=4.757[a]; p=.05) and psychological well-being (X^2=4.176[a]; P=.02). Significant family differences are only found in openness to experiences (X^2=3.892[a]; P=.03) and psychological well-being (X^2=3.438[a]; p=.03).

Conclusion: High levels of internet use, problematic internet use, technostress, and low psychological well-being are prevalent among university students in Pakistan across gender and family types.

Keywords: Internet use, Problematic internet use, Internet addiction, Technostress, Big-Five, Ten Item Personality Measure (TIPI), Psychological well-being, Pakistan.

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INTRODUCTION

The purpose of "information and communication technologies" (ICT) is to make human life easier by bringing people closer, despite being miles away and making humans more empowered, accessible, and satisfied[1]. In recent years, the use of internet has grown exponentially as an integral part of everyone's life. Increased internet access and long-term usage raise the risk of developing problematic internet use[2]. The negative consequences of problematic internet use range from the possibility of stress, anxiety, depression, and communication problems, especially among youth and adolescents[3].

ICTs and modern technologies have complicated lives, and people frequently experience technostress. "Technostress" is a particular type of "stress" resulting from the use of ICTs[4]. Due to the accessibility, habitual checking of the internet and excessive usage could result in significant stress (technostress) for technology users[5].

Personality is an individual's distinctive characteristic patterns of beliefs, emotions, and behaviors, organized with the psychological mechanisms hidden or not underneath those patterns[6,7]. The role of personality in developing these behavioral and technological addictions is significant[8].

Ryff and Keyes define psychological well-being (PWB) as a 'pursuit of perfection reflecting realization of true potential. Briefly, Psychological well-being typically concentrates on personal growth, purpose in life, and having positive relations with others[9]. The literature enormously highlights the inverse relationship between the problematic use of the internet and PWB[10].

Gender is a pertinent social determinant for health, well-being, and sustainable development[11]. Family systems are essential in determining many of our behaviors and tendencies, including personality. "Family systems theory" emphasizes the importance of families in shaping human behavior[12]. Members of the family frequently interconnect to become a webbed system that is larger than the individual element. Any change in an individual of this system possibly affects and changes the whole system.

Although literature in Pakistan has addressed these variables in different contexts, few researcesh have been conducted in Pakistan to check the ICTs and their psychosocial consequences among university students. In order to fill this gap, the current study is conducted to examine the levels of ICT use, technostress, personality, and psychological well-being over the demographic characteristics of university students. It has been hypothesized that gender and family systems would show differences in ICTs usage, technostress, personality, and psychological well-being. The objective of this study is to examine the gender and family differences in information and communication technology use, technostress, personality, and psychological well-being among university students.

METHODOLOGY

This Descriptive Cross-sectional study has been conducted online at the Department of Applied Psychology, Bahauddin Zakariya University Multan (BZU), Pakistan. Data is collected from two public sector universities in Punjab, the University of Sahiwal and the University of Sargodha, from 1st November 2020 until 30th November 2020. Data is collected from 165 students in the Sciences and Social Sciences departments through google forms. The inclusion criterion of the participants is: 1) university students who are 18 years and above, 2) university students who are internet users. Those who are below 18 years and do not use the internet have been excluded from the study. Purposive sampling technique is used, and the participants are informed about the purpose as well as the right to withdraw from research.

Socio-demographic information on age, gender, program, semester, and information about frequency internet usage (hours, device, and purpose) are collected. Valid and reliable instruments have been chosen from the literature and used to measure the variables of this study. The Internet usage scale (IUS) measures the internet usage among students[13]. It has 12 items, and the response format is based on Likert Scale that ranges from "Not at All" to "A Lot" to measure Internet use. "The Problematic and Risky Internet Use Screening Scale" (PRIUSS), comprising three subscales and 18 items, is used to measure problematic internet use among students[14]. The response format for the items is also based on a five-point Likert Scale ranging from "never" to "very often"; where 0 is scored for never, 1 for rarely, 2 for sometimes, 3 for often, and 4 for very often, and the total score could be achieved by simply adding the responses[15]. Technostress is measured by an adapted version of the original technostress questionnaire consisting 12 of items[16,17]. Responses to the questions are recorded on a five-point Likert Scale ranging from 0 = "strongly disagree" to 4 = "strongly agree." It measures respondents' stress in response to technology use.

Personality traits of the participants are measured by using the Ten Item Personality Measure (TIPI)[18]. The inventory measures five core dimensions of the personality: extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness. The response format for these items is based on a seven-point Likert Scale ranging from strongly disagree (1) to agree strongly. Seven (7) reverse-scored items (item no. 2, 4, 6, 8, & 10) are recorded (i.e., recode "2" with a "6," etc.). The average of these two items (the standard and the recoded reverse-scored items) makes up each scale. Participants' psychological well-being is measured by employing the Ryff's Psychological Well-being Scale (PWB)[9,19]. The scale contains 42-items to measure six dimensions of well-being which include "self-acceptance," "positive relations," "autonomy," "environmental mastery," "purpose in life," and "self-awareness." Responses on the items are recorded on a six-point scale ranging from 1 (strongly disagree) to 6 (strongly agree). There are twenty negative worded items (# 3, 5, 10, 13,14,15,16,17,18,19, 23, 26, 27, 30, 31, 32, 34, 36, 39, and 41). After reversing these items (i.e., if the score is 5, the adjusted score is two, and if the score is 6, the adjusted score is 1), the total score is computed. In each sub-domain of the scale, a high score indicates a high level of psychological well-being, while a low score on the domain is considered low psychological well-being.

All the scales exhibited excellent Cronbach's alpha value: Internet usage scale displayed α= 0.90, Problematic Internet Usage Scale's Cronbach alpha is 0.96, technostress questionnaire's α value is 0.94, Ten Item Personality Measure (TIPI) showed α= 0.95 and Psychological Well-being Scale's Cronbach alpha value was 0.93.

Data Analysis: The data is analyzed using IBM SPSS (version 25). Descriptive statistics are used to measure the demographic characteristics of the students, and the levels of continuous variables are determined using Median Splits, and two dichotomized groups (high and low) are formulated. Chi-square test of independence is used to check the associations of gender and family system with high and low levels of internet use, problematic internet use, technostress, personality, and psychological well-being.

RESULTS

The socio-demographic information of the university students is presented in Table-I. Out of a total of 165 students, 56.5% are females, and 43.5% are males. A majority (43.5%) of the respondents are 20 to 21 years old, while 28.2% are 10 to 19 years old, and 28.2% of students are 22 to 25 years old. 69.6% of the students are studying in the graduation (BS) program, and 30.4% are doing masters.

Table-I: Demographic profile of the university students (N=165)

Variable	Attribute	Frequency	Percentage%
Gender	Male	72	43.7%
	Female	93	56.3%
Age	18-19	46	28.2%
	20-21	72	43.5%
	22-23	32	19.5%
	24-25	15	8.7%
Program of Study	BS	115	69.6%
	Masters	50	30.4%
Faculty	Arts and Social Sciences	57	34.8%
	Sciences	79	47.8%
	Engineering	29	17.4%
Semester	freshmen	36	21.7%
	Sophomores	39	23.9%
	seniors	90	54.4%

Chi-square is applied to check the significant differences among respondents according to their gender and levels of study variables (Table-II). Statistically, significant gender differences are found in high and low levels of technostress (X^2=4.757[a], P=0.05**)**, emotional stability (X^2=2.231[a], P=0.06), and psychological well-being (X^2=4.176[a], P=0.02), in contrast, no gender differences are found regarding internet use, problematic internet use, and personality dimensions of extraversion, conscientiousness, openness to experience and agreeableness. On the contrary, most students are high on internet use, problematic internet use, technostress, and low psychological well-being.

Chi-square is also applied to check the significant differences among respondents according to their family systems (nuclear family system and joint family system) and levels of study variables (Table 3). Significant gender differences are found in high and low levels of openness to experience (X^2=3.892[a], P=.03) and psychological well-being (X^2=3.438a, P=0.03). In contrast, no association is found regarding family systems and internet use, problematic internet use, technostress, and personality dimensions of emotional stability, extraversion, conscientiousness, and agreeableness among students.

Table-II: Gender-based Comparison of High and Low Levels of ICT Use, Technostress, Personality and Psychological Well-Being among University Students (N=165)

	Gender	Low level f (%)	High level f (%)	Total f (%)	Pearson Chi-Square	Significance
Internet use	Male	46(50%)	46(50%)	92(55.7%)	X^2=.928[a]	p=.335
	Female	31(42.5%)	42(57.5%)	73(44.3%)		
Problematic Internet Use	Male	47(51.1%)	45(48.9)	92(55.7%)	X^2=.332[a]	p=.565
	Female	34(46.6%)	39(53.4%)	73(44.3%)		
Technostress						
	Male	51(55.4%)	41(44.6%)	92(55.7%)	X^2=4.757[a]	p=.05
	Female	28(38.4%)	45(61.6%)	73(44.3%)		
Extraversion	Male	43(46.8%)	49(53.2)	92(55.7%)	X^2=.525[a]	p=.469
	Female	30(41.1%)	43(58.9%)	73(44.3%)		
Agreeableness	Male	45(48.9%)	47(51.1%)	92(55.7%)	X^2=1.839[a]	p=.175
	Female	28(38.4%)	45(61.6%)	73(44.3%)		
Conscientiousness	Male	45(48.9%)	47(51.1%)	92(55.7%)	X^2=.681[a]	p=.409
	Female	31(42.5%)	42(57.5%)	73(44.3%)		
Openness to Experience	Male	41	51	92(55.7%)	X^2=.390[a]	p=.532
	Female	29(39.8%)	44(60.2%)	73(44.3%)		
Emotional Stability	Male	46(50%)	46(50%)	92(55.7%)	X^2=2.231[a]	p=.06
	Female	28(38.4%)	45(61.6%)	73(44.3%)		
PWB	Male	42(45.7%)	50(54.3%)	92(55.7%)	X^2=4.176[a]	p=.02
	Female	45(61.6%)	28(38.4%)	73(44.3%)		

Table-III: Family System based Comparison of High and Low Levels of ICT Use, Technostress, Personality, and Psychological Well-Being among University Students (N=165)

	Family System			Total f (%)	Pearson Chi-Square	Significance
Internet use	Nuclear family	35(46.1%)	41(53.9%)	76(46.1%)	X^2=.021[a]	p=.884
	Joint Family	42(47.2%)	47(52.8%)	89(53.9%)		
Problematic Internet Use	Nuclear family	37(48.7%)	39(51.3%)	76(46.1%)	X^2=.009[a]	p=.923
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
Technostress	Nuclear family	34(44.7%)	42(55.3%)	76(46.1%)	X^2=.557[a]	p=.455
	Joint Family	45(50.5%)	44(49.5%)	89(53.9%)		
Extraversion	Nuclear family	29(38.2%)	47(61.8%)	76(46.1%)	X^2=2.115[a]	p=.07
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
Agreeableness	Nuclear family	29(38.2%)	47(61.8%)	76(46.1%)	X^2=2.115[a]	p=.07
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
Conscientiousness	Nuclear family	32(42.2%)	44(57.8%)	76(46.1%)	X^2=.887[a]	p=.346
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
Openness to Experience	Nuclear family	26(34.2%)	50(65.8%)	76(46.1%)	X^2=3.892[a]	p=.03
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
Emotional Stability	Nuclear family	30(39.5%)	46(60.5%)	76(46.1%)	X^2=1.646[a]	p=.200
	Joint Family	44(49.5%)	45(50.5%)	89(53.9%)		
PWB	Nuclear family	46(60.5%)	30(39.5%)	76(46.1%)	X^2=3.438[a]	p=.03
	Joint Family	41(46.1%)	48(53.9%)	89(53.9%)		

DISCUSSION

This study measured internet use, problematic internet use, technostress, personality, and psychological well-being, and their association with gender and family system. Few studies that have been conducted in Pakistan report that most of the problematic internet users are young [20,21], so the current study explored the use of ICTs, their psychosocial effects, and their implications on university students.

Regarding the associations of gender with internet use, current findings show an insignificant gender difference in internet use of respondents, but clearly, most students indicate a high level of internet use. Because both genders have had extensive exposure to technology through their educational experiences, there is no gender gap in internet usage[22]. Next, the associations of gender with problematic internet use are also assessed. The results show an insignificant gender difference in the problematic internet use. However, most students display an increased risk for problematic internet use. A study support these findings where no gender differences are found in internet use and problematic internet use. A recent review paper has reported several studies where gender differences are significant and gender differences are insignificant and highlighted the role of culture[23] influencing the use patterns.

Next, the association of gender with technostress levels is assessed. There are significant gender differences in technostress levels, and most of the students exhibit high levels of technostress. According to the results, female students demonstrate high levels of technostress as compared to male students. These findings are supported by a recent study that also reported that females experience more technostress[24]. The study conducted by Marchiori and colleagues[25] found significant gender differences in the technostress levels. They have reported that females experience high levels of techno-uncertainty and techno-complexity, whereas men experience more techno-invasion and techno-overload.

Next, the association of gender with personality types is analyzed. There are insignificant gender differences among personality factors of extraversion, agreeableness, conscientiousness, emotional stability, and openness to experience. These results are contrary to another study from Pakistan; the results show that females scored higher on neuroticism, self-kindness, and male students score higher on openness to experience, envious behavior, and shared humanity[26]. The reason for these insignificant results could be due to the different geographical locations of the current study.

The associations of gender with psychological well-being are also assessed. Psychological well-being has significant gender differences where females exhibit low psychological well-being as compared to males. These results are in line with a recent study that tested gender differences in psychological well-being which have reported significant differences in psychological well-being scores[27]. A study conducted in Malaysia[28] provides extensive evidence about the gender differences in psychological well-being; another study has also reported gender differences in psychological well-being[29]. Current findings are also consistent with the results from a European study[30] that men tend to exhibit higher levels of PWB than women.

Differences among nuclear and joint family systems are also analyzed in study variables. There is no difference in internet use and problematic internet use levels in the context of family systems. These findings are contrary to other findings[31], where significant differences in internet use and technology addiction are found on family status and internet use, and addiction is more prevalent in nuclear families. The reason for insignificant

differences in the current study seems to be inherited in the increased use of ICTs in every household. The following hypothesis is to assess the differences in technostress levels according to the family systems. These differences are insignificant, and current findings are similar to another study where the family system has an insignificant difference in technostress scores among employees[32].

Another aim is to assess the differences in personality types in the context of the family systems. Significant differences in the family system are only found in one personality dimension: openness to experience. The nuclear family is associated with high levels of openness to experience among students. These findings are consistent with a study that linked personality with immediate family, and mothers' personality significantly impacted their children[33]. The results of Smith and colleagues show that openness to experience is linked with mothers' personality that brings healthy consequences. The last assumption is to check the differences in levels of psychological well-being according to the family systems. The results show that nuclear family is associated with low levels of psychological well-being compared to joint family systems related to high PWB. According to the "stress process theory," positive and negative relationships affect individuals' well-being[34]. As families are embedded in relationships and frequent interactions, this theory explains the impact of family systems on psychological well-being. Another study puts forward the importance of family well-being as an essential foundation that transforms into the well-being of children[35,36].

Current findings and the previous literature highlight that information and communication technology use and technostress are high among university students and low levels of psychological well-being, and students' personality is a crucial variable that determines many behaviors.

CONCLUSION

High levels of internet use, problematic internet use, technostress, and low psychological well-being are prevalent among university students in Pakistan across gender and family types.

Limitations: A cross-sectional and self-reported study should not be used for causal inference. Future researchers should use experiential data to enhance the authenticity of the data obtained. The results should not be generalized for the larger population due to the small sample size that could be increased in future research for better generalizations.

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AUTHOR'S CONTRIBUTION

Bajwa RS: Conceived idea, Designed research methodology, Data collection, Data analysis, Literature review, Manuscript writing
Abdullah HB: Designed research study, Critical review, Final approval
Jaafar WMW, Designed research study, Critical review
Samah AA: Designed research study, Critical review

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