



---

**The impact of information and communication technology usage on  
psychological well-being among undergraduates**

D.M.J. Wickramasinghe<sup>1,\*</sup> and A.U. Jayatilleke<sup>2</sup>

<sup>1</sup>Faculty of Management Studies, Rajarata University of Sri Lanka, Mihintale, Sri Lanka

<sup>2</sup>Faculty of Graduate Studies, University of Colombo

\*Corresponding author: [mihirijanitha@gmail.com](mailto:mihirijanitha@gmail.com)

**Abstract**

*Globalization has undoubtedly changed human lives during the era of Information and Communication Technology (ICT). ICT has become a substantial source of innovation across the globe. Though there are positive social and educational benefits of ICT use, scholars are currently attempting to identify whether ICT usage is destructive since it is related to the psychological aspects. When reviewing each research paper and other data source individually, there is a dearth of the extensive literature in pertinence with this research area in the Sri Lankan context. Therefore, this study primarily focuses on examining how the factors: smartphone usage, social media usage, Internet usage, device usage, video gaming, and television viewing influence undergraduates' psychological well-being. To achieve the proposed research objective, the quantitative research method was adopted. Primary data were gathered through self-administered structured questionnaires from the undergraduates in a state university of Sri Lanka. The SPSS package was used to analyze the collected data. Basic descriptive statistics, and stepwise regression tests were performed to determine the answer to the research questions. Consequently, the key findings revealed that social media usage, internet usage, and television viewing have a positive significant impact and video gaming has a negative significant impact on psychological well-being. However, smartphone usage and device usage have no significant impact on psychological well-being. Moreover, internet usage is the most influential factor of ICT usage which has the strongest predicting power on psychological well-being. The findings of the study would be beneficial to the university students, parents, academic and non-academic staff, social media developers, mobile applications developers, and television providers to properly respond to this emergent phenomenon.*

**Keywords:** ICT usage, psychological well-being, undergraduates.

## 1. Introduction

Globalization has transformed human lives from the era of ICT and become an important source of innovation across the globe with involves the use of computers, the internet, emails, software, and mobile communication devices of the computer for the store, process, convert, protect, send and receive data and information (Meenakshi, 2013). ICT is developing faster and it is become a most important part of humans especially children and adolescents day to day life and technology has always been associated with them (Perbawaningsih, 2013). Young people use computers for studying, playing games, find information on the Internet and they communicate via mobile phone. ICT is a broad concept with referring communication devices, broadcast media, intelligent building management systems, and applications such as radio, television, cell phones, computers, internet, hardware, software, and more applications (Cotten, 2008).

The nature of education has changed over the last few decades and in European countries, the use of ICT has become a major part of education in the last decades (Khan et al., Khan, Din, Ismail, Khattak, & Rahimullah, 2015). Rose and Kadvekar (2015) state that the ICT adoption model is really specific to higher education academics who seek to learn, they try to make relationships with their peers to exchange new ideas and news, ask for some information, share their documents and ask for help for classroom activities. Well-being is a broad term and well-being is the experience of health, happiness, and prosperity. That content good mental health, the satisfaction of life and sense of meaning. Simply author defines well-being as humans' feeling well with better health, good connection with social life (Davis, 2019). Well-being can be defined as how a human feels and how they functioning in both personal and social life and especially how humans evaluate their lives as a whole. Well-being is not the same as happiness, it is broader than happiness. Well-being includes happiness but not only happiness (Michaelson, Mahony, & Schifferes, 2012).

Davis (2019) stated that there are main five types of well-being as emotional well-being, social well-being, workplace well-being, societal well-being, and physical well-being. Emotional well-being mean manages people stress and try to lead to good feeling. To develop these emotional skills people should have to improve their positive thinking, emotional regulations, and mindfulness. Defining social well-being is developing their communication with other people and try to alleviate human loneliness through the development of social skills such as gratitude, kindness, and communication. Third well-being is workplace well-being that is the ability to follow humans' interests and values to gain happiness in their profession. Societal well-being means that participating in community, culture, and environment actively with building skills that make people feel interconnected with all things. The fifth well-being defines by Davis (2019) is physical well-being. Physical well-being is the ability to improve the functioning of the body with healthy. To develop this well-being everyone should eat healthy food.

Turashvili and Japaridze (2012) stated that well-being is a dynamic concept with including subjective, social, and psychological dimensions and the tested relationship between psychological well-being and academic performance of students in Georgia. The result of

## The impact of information and communication technology usage on psychological well-being among undergraduates

this survey showed that lots of students who are in the middle level of well-being, not have depression and average self-evaluated academic performance. The same result showed that the students who have a medium and high level of academic performance, have a high level of well-being, the purpose of life, and personal growth. Psychological well-being depends on people controlling their feels and their day today activities. Psychological well-being problems have been increasing commonly in human life, especially among older people and Youngers. Nowadays university students have more issues related to this matter with their academic environment.

ICT helps the students to improve their performance with knowledge skills and learning skills (Wasif, Munir, & Shad, 2011). However, this occurs with a small number of undergraduates, and others use the Internet in their daily lives but not for academic purposes (Oulmaati, Ezzahri, & Samadi, 2017). Undergraduates do not use the Internet for academic purposes alone (Basri, Alandejani, & Almadani, 2018). They use the Internet for general purposes, like communication and entertainment (Mahmood, 2009). Undergraduates are not always able to take advantage of ICT and the Internet. While there are positive social and education benefits of ICT use, there is some concern about whether usage is also harmful (Berkowsky, 2012; Borzekowski 2006; Plowman, McPake, & Stephen, 2010), particularly as it related to psychology. Weerasendera (2014) mentioned that usage of ICT especially Internet made a negative impact on the mental health of the young generation in Sri Lanka and several suicides were reported due to usage of social media.

There is recently investigated research to find out the social impacts of mobile phones (Goswami & Singh, 2016) and social networks (Daffalla & Dimetry, 2014) separately. As an example, Goswami and Singh (2016) researched to examine the impact of mobile phones on younger's life and as a result, they founded that there is a negative impact of mobile phones on younger's mental and physical health. Sarwar and Soomro (2013) conducted research to investigate the impact of smartphone's on society and the researchers founded that there is a negative impact on smartphone's business, education, health, human psychology, and social life.

A key limitation of research on ICT usage on psychological well-being is the lack of published studies in this area. Although the variety of studies examine the use of different types of technologies among individuals across the life course and most of the research on the impact of ICTs on well-being has focused on the relationship between Internet usage and depressive symptomatology in young and older adults (Berkowsky, 2012). Shaw and Gant (2002), conducted research to investigate the beneficial impact of Internet usage on users. In this study, they measure depression, loneliness. Self-esteem and social support with changing their scores were tracked over time. DeRushia (2010) conducted a study to investigate the impact of internet usage on depression, social anxiety, and social engagement among college students. And found out time spent on the internet was not predictive of depression, social anxiety, or social engagement.

When going through each research paper related to this study area, founded that most of the researchers focused on different fields such as workers, drivers (O' Driscoll, Brough,

Timms, & Sawang, 2010; Ndubisi & Kahraman, 2005), children (Cotton, 2008; Plowman et al., 2010) and old people (Berkowsky, 2012). There is, however, little evidence focusing on university students. When studying each research paper and other data sources separately related to this research area, the researchers found that most of the studies were done by the researchers at the international level (Cotton, 2008; O' Driscoll, et al., 2010). Therefore, it is clear now in the Sri Lankan context, there is a research gap in relevance with this research area. Therefore, to fill these gaps, this study is to examine how ICT usage influences the undergraduate's psychological well-being.

## **2. Literature review**

New technologies have been the most important part of human life with changing and modifying people communications, works, and how to spend human's free time. ICT refers to these technologies providing access to information through telecommunications. ICT is related to Information Technology (IT), but focusing on communication technologies with including the internet, wireless networks, cell phones, and more communication devices (Christensson, 2019). The list of ICT components is exhaustive and it is growing every day with existing components, like computers, television, telephones, and new entries, such as smartphones, digital TVs, robots, and more. Software, hardware, transactions, communications technology, data, internet access, and cloud computing are components of ICT.

Kumara (2014) was surveyed to investigate the level of ICT usage by 338 new coming undergraduates to the University of Moratuwa. Selected basic computer usage, computer application, Internet/E-mail use, and use of technologies for research or academic were the ICT related activities that were used in this research. Results from this study showed that most of the new enters use computer applications such as more than 90% of the respondents have used word processing, 85.7% used spreadsheets, and 87.6% presentation package. Under Internet and email usage, more than 90% used Internet browsers such as Explorer and Mozilla, 92.9% used blogs and video websites and more than 90% used ICTs for social networking, emails, and searching information from the web. When considering skill levels of ICTs the largest percentage has rated that they are skillful in using social networking.

In 2019, gathering 102 arts undergraduates' questionnaires using the convenience sampling method, this study investigated the purpose of using ICT. From results of this study showed that 93.1% of the participants can start, use, and shut down the computer, 59.4% indicated that they can use Microsoft Word, 70.3% of respondents can create a presentation using PowerPoint and 71.3% can use either laptop, tablets, or smartphones. And 70% of the survey participants indicated they can use smartphones, laptops, or desktop computers with 76% mentioned that they use the Internet to collect information and 63% used the Internet for social networking purposes, and around half of the respondents use the internet for developing their English knowledge through internet. In this survey, they mentioned that students' use of ICT based on this evidence with 90% of students have their email accounts and 77.5% of students have their own Facebook accounts. Most of the students spend with their computers an average of 4 to 6 hours per week and close to 50% used computers in an



## The impact of information and communication technology usage on psychological well-being among undergraduates

average of 1 to 3 hours and 30% of students use their computers for 3 to 9 hours per week (Ambogama, 2019). According to the media and technology usage and attitude scale (MTUAS), independent variable ICT usage measuring includes smartphone, social media, internet, devices, video gaming, and television activities (Rosen, Whaling, Carrier, Cheever, & Rokkum, 2013).

When considering the relationship between psychological well-being and the use of smartphones among students, according to Kumcağiz and Yü (2016), there is a significant relationship between smartphone usage and psychological well-being. According to Costa, Goncalves, Pereira, and Hitipeuw (2019), there are two types of impacts because of smartphones such as positive and negative psychological well-being. As the positive impacts undergraduates can make contacts and chat with their relatives and friends through smartphones. Further, they can develop their human resources and their skills by studying using smartphones. The negative impact was the frequencies of using the smartphone for their day to day activities such as play games. This will be impacted on medical healthy of student's eyes and ears. Other negative impacts are smartphone addiction, reduce social interaction, and wasting time and money. Thus, this study proposes the following hypothesis:

H<sub>1</sub>: Smartphone usage has a significant impact on undergraduate's psychological well-being

Social media is a platform that helps humans to discuss their problems and their opinions and it can be defined as computer tools for share and exchange human information, ideas, photographs, videos, and so on (Lee, Ng, & Bogomolova, 2020). At present, Social media became the most important part of people day to day life activities and it changed people's lifestyles also. They use social media as a shopping tool, as an education tool, and as a business tool to promote their business by conducting marketing and advertising activities (Alalwan, 2018). People engaged with the most popular social media platforms such as Facebook, Google +, Snapchat, YouTube, and Twitter (Alalwan, 2018) for making contact with their relatives, families, and organizations easily (Siddiqui & Singh, 2016). According to Choi and Noh (2020), there are relationships between psychological well-being, social isolation, and social media usage. Social media usage is positively linked with psychological well-being and it was related to a negative attitude toward suicide. Further according to Gerson, Plagnol, and Corr (2016), there is a positive association between most famous social media, Facebook intensity, and life satisfaction and eudemonic well-being. Upadhayay (2018) researched to examine the relationships between social media usage and various aspects of psychological well-being such as anxiety, depression, self-control, positive well-being, and general health. According to the findings of this study, there are negative relationships between self-control and social media usage, as well as positive well-being. Other aspects of psychological well-being, such as anxiety, depression, and general health, have no statistically significant relationships with social media use. Thus, this study proposes another hypothesis:

H<sub>2</sub>: Social media usage has a significant impact on undergraduate's psychological well-being

Over the last decades, internet usage has been increased globally and it is known that more than half of the global population uses the internet for daily activities. At the end of 2019, around 4,574,150,134 internet users are available in the world and the highest presentation from that showed in Asian countries with 55.1% of the global population. 10.7% of internet users in European countries. In the Sri Lankan context, there are only nearly 120,000 internet users in 2000 and now it increased up to nearly more than a million internet users (Internet World Stats, 2020). According to DeRushia (2010) internet helps people to interact with their friends and family members but decreasing the social interaction with others in the world. Further, the researcher mentioned that time spending on the internet was not predictive of depression, social anxiety, or social engagement and indicated that there is no correlation between the type of activities related to the internet and well-being. Further, Omar, Fadzil, and Bolong (2019) conducted a research study to examine the relationship between internet usage and well-being among young people in Malaysia. It was founded that internet usage is positively impacted psychological well-being and frequency of internet usage can lead to undergraduate subjective well-being. On the other hand, Kitazawa et al. (2019) showed that there is a significant negative correlation between young people's happiness and Internet usage. They founded the low happiness group of youngers' internet usage frequency is high than the high happiness group of youngers. Based on the aforementioned statement, the following hypothesis is proposed:

H<sub>3</sub>: Internet usage has a significant impact on undergraduate's psychological well-being

In general, a device can be defined as a machine or a unit of hardware or equipment that is designed for a specific purpose and a computer can be considered as a device (Bauer et al., 2005). According to Rosen et al. (2013), media usage or media sharing means activities performed on devices or media especially computers. These devices have become an important part of human life in recent years, making our day-to-day tasks easier. However, computer-related activities can have negative consequences, such as human behavioral issues. Based on six published articles in this field, Reinecke and Eden (2017) address the special issue of device usage and well-being. These papers indicated that usage of devices in both positive and negative effects on well-being. As positive effects, they showed that media can role as a tool for coping with stress and help to make communication using social sharing. Risk of media exposure for well-being, social pressure, and digital stress are negative effects of media usage. Finally, Reinecke and Eden (2017) concluded that there was a significant relationship between media use and well-being and the effect of media use on well-being receive attention from disciplines such as social-psychological. Based on the aforementioned statement, the following hypothesis is proposed:

H<sub>4</sub>: Media usage has a significant impact on undergraduate's psychological well-being

Video gaming was correlated with psychological well-being specially absorption, depression, anxiety, and stress in men. Considering women, there is a weak correlation between anxiety and depression. The finding of the study indicated that quality of life was unrelated to video game playing in both men and women (Tolchinsky, 2013). According to Bonab (2021), video game addiction was related to psychological well-being specially

## The impact of information and communication technology usage on psychological well-being among undergraduates

depression. Heiden, Braun, Müller, and Egloff (2019) discovered recently that there is a negative correlation between video gaming and psychological functions such as psychological symptoms, affectivity, coping, and self-esteem. The results showed that there is a medium size relationship between video gameplay and poor psychological functioning, and McLean and Griffiths (2013) suggested that to examine the impact of video game usage and psychological well-being. Thus, the following hypothesis is proposed:

H<sub>5</sub>: Internet usage has a significant impact on undergraduate's psychological well-being

Further, television viewing has been associated with young children's behavioral problems, poor attention, social isolation, sleep problems, reduced cognitive performance, and same as psychological distress. Conducting a study with 1,486 young children's parents showed that, they were spent at least three hours per day for watch television and this television viewing time is independently associated with psychological distress in this sample. A high level of television viewing interacts to increase psychological distress (Hamer, Stamatakis, & Mishra, 2009). On the other hand, Wheeler (2015) investigated to show the relationship between television viewing behavior, television affinity and relationship attachment, loneliness, depression, and psychological well-being. The investigated result indicated three opinions such as depression was significantly positively related to television viewing, loneliness had a significant positive relationship with television viewing and finally, in this study, they were not founded that any significant relationship between television viewing and psychological well-being. Thus, the following hypothesis is proposed:

H<sub>6</sub>: Television viewing has a significant impact on undergraduate's psychological well-being

Psychological well-being is important for every university student. Surveyed to examine this matter with founded the factors that impact for it. In this survey, 131 students participated and the result of this study indicated, gender, age, support students received from their family and friends and financial well-being were the most important factors are impacted for psychological well-being (Ludban, 2015) and conducting a survey with 280 students between the age of 19 and 22 of eight private and government schools showed that gender, educational levels of parents, family income, occupation of parents and family relationships are the factors that can be impacts to the psychological well-being of students (Daraei, 2013). In other, Ismail and Shujaat (2018) conducted a study survey to examine the factors affecting the Mental Well-Being of undergraduates in Karachi using online questionnaires from 208 undergraduate students as a sample and these participants were aged between 16 and 26 years. The result of this survey showed that social support and demands of families influencing students' mental well-being and students who participated from higher socioeconomic groups and non-mainstream educational backgrounds have higher scores on stress and depression.

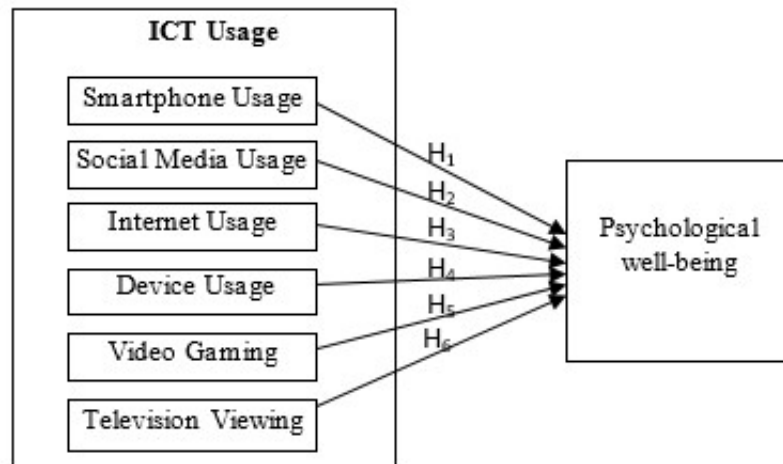
To measure the psychological well-being of undergraduates there are several well-being scales. Ryff (1995) is one of the previously mentioned scales for measure psychological

well-being with six dimensions such as self-acceptance, positive relations with other people, autonomy, environmental mastery, purpose in life, and personal growth (Berkowsky, 2012). There are other indicators for psychological well-being that used by previous studies such as stress (Safara, Seifi, Salmabadi, & Gooshki 2020; Cotten, 2008), loneliness (Cotten 2008; Sims, Reed, & Carr, 2017), social support (Cotten 2008; DeRushia, 2010), self-esteem (Cotten 2008; Neal, Timothy, & Shelia 2015), psychological distress (Cotten, 2008), depression (Safara et al., 2020; DeRushia 2010; Neal et al., 2015), life satisfaction (Sims et al., 2017) and hopelessness (Neal et al., 2015). In this research, the researchers provide a clear and more realistic picture of the impact of ICT usage on psychological well-being among undergraduates. Well-being can be described as a state of physical, psychological, and social health as well. Psychological well-being can define by domains such as emotional experiences, cognitive evaluation, personality characteristics, identity, life experience, and human healthy (Udhayakumar & Illango, 2018). Basically, can define psychological well-being same as positive mental states such as happiness or human satisfaction (Johson, Robertson, & Cooper, 2018) and this refers to the extent people feel to control their life and their day to day activities. Psychological well-being can be measured through four dimensions such as relationship, self-esteem, purpose, and meaning of life, and optimism (Diener et al., 2010).

### 3. Methodology

#### 3.1 Conceptual framework

A conceptual framework has been developed based on the literature survey for the study on the impact of ICT on psychological well-being, which is illustrated in Figure 1.



**Figure 1** Conceptual framework on ICT usage and psychological well-being  
 Source: Developed by researchers (2020).

The impact of information and communication technology usage on psychological well-being among undergraduates

### 3.2 Research design

This study was conducted to find out the impact of ICT usage on undergraduate's psychological well-being. Accordingly, the study becomes applied research with an explanatory nature. This study has applied a quantitative research approach to meet the research objectives with a larger sample, numerical measurements which lead to quantifiable results, and collected data from individual undergraduate, online using Google form without controlling any extraneous factors affecting students' psychological well-being.

The current study investigated the impact of ICT usage on psychological well-being with special reference to a selected state university in Sri Lanka. Accordingly, the population of the study was all undergraduates who have been studied at the Rajarata University of Sri Lanka.

Table 1  
Population of the study

Faculty	Students		
	Male	Female	Total
Faculty of Agriculture	148	337	485
Faculty of Applied Science	227	481	758
Faculty of Management Studies	794	1,060	1,854
Faculty of Medicine & Applied Sciences	448	815	1,263
Faculty of Social Sciences and Humanities	231	1,437	1,668
Faculty of Technology	290	224	514
Total	2,188	4,354	6,542

Source: Students' Registration Department of Rajarata University (2019).

The study used a probability sampling design, hence every student in the target population has a known probability of being selected as a respondent of the study. To represent these all groups and to reduce random sampling errors, stratified sampling techniques were used for the study in which academic year represent stratum. At a 95% confidence level based on a 5% margin of error, a population of 6,500 requires 363 samples. Therefore, a total of 400 questionnaires was distributed to the target respondents since the population is comprised of 6,542 students.

The primary surveys were conducted to obtain the needed data from the respondents and were collected physically and the first part of the questionnaire was included to collect eight demographics information of the students: gender, faculty, and year of study. The second part of the questionnaire was created to measure Smartphone usage, Social media usage, internet usage, device usage, television usage, and psychological well-being. A five-point Likert scale ranging from 1 as never to 5 as almost always is used for the measurement.

SPSS tools were used for the analysis of the primary data by using descriptive, validity, reliability analysis, and stepwise regression.

Convergent validity was tested based on the indicators since some variables in this study; video gaming and television viewing, do not comprise dimensions, but only with indicators. Therefore, the convergent validity of the indicators was tested and the component extracted value of each item was greater than 0.550 which is at an acceptable level according to Hair, Black, Babin, and Anderson (1998) and the component extracted value of buying products online (0.431) is very low showing less convergent among other indicators of the particular variable. Therefore, the study decided to remove the aforementioned indicators from future analysis. KMO values of each indicator were more than 0.5 which implies the sample was adequate to validate the test result. The study retested the convergent validity of the data set removing Buying products online.

After removing the aforesaid indicator, the component extracted value of each indicator was greater than 0.550 which is still at the accepted level according to Hair et al. (1998). KMO was greater than the value of 0.5 indicating the sample was adequate to validate the test (Hair et al., 1998). The study examined the reliability and identified that all eight variables were internally consistent. Hence, none was removed from the scale. According to the Cronbach Alpha value of each variable; smartphone usage (0.928), social media usage (0.907), Internet usage (0.912), device usage (0.770), video gaming (0.897), Television viewing (0.886), and Psychological well-being (0.934) was greater than 0.7 which indicates that the internal consistency of variables is at a good level (Sekaran & Bougie, 2019).

In the data, refining process study applied graphical methods proposed by (Osborne, 2010) to test the normality of the data set. However, graphical methods were preferred because it visualizes the distributions of random variables and is easy to interpret (Osborne, 2010). The study identifies the normality of residual and this assumption ensures that the distribution of disturbance terms will approximate normality. According to the Shapiro Wilk test for residuals can support residuals in a normal pattern. Further, the Histogram residual shows a normal pattern.

#### **4. Data analysis**

A total of 400 questionnaires were administered among undergraduates in Rajarata University of Sri Lanka out of which 387 were returned resulting in the 96.75 % of response rate which is considered highly adequate.

#### 4.1 Demographic profile of the sample

Table 2  
Demographic Profile of undergraduates

Variable	No. of Respondents	Percentage (%)
Gender		
Male	139	36
Female	247	64
Faculty		
Agriculture	31	8
Applied Science	47	12.2
Management Studies	110	28.5
Medical and Allied Science	79	20.5
Social Sciences and Humanities	92	23.8
Technology	27	7
Academic Year		
First Year	31	8
Second Year	174	45.1
Third Year	109	28.2
Fourth Year	72	18.7

*Source: Survey data (2020).*

Out of 386 participants of this study, 36% are male participants and 64% are female. Accordingly, six faculties of the university responded as 8% from Faculty of Agriculture, 12.2% from Faculty of Applied Science, 28.5% from Faculty of Management Studies, 20.5% from Medical and Allied Science, 23.8% from Faculty of Social Science and Humanities, and 7% from Faculty of Technology. The majority of the participants of this study were Second year students which are 45.1% as a percentage of the total participants and 8% represented the first year students of the university.

#### 4.2 Descriptive analysis

Descriptive statistics were used to explain the prevailing situation of the variables. According to mean values for the Psychological well-being, Smartphone usage, and Internet usage were 3.858, 3.977, and 3.907 respectively and they were in the higher agreement level of the respondents. Mean values of Social media usage (3.524), device usage (3.496), and Television viewing (3.022) indicated that the participants of the study have moderately agreement. Standard deviations for the variables were 0.7449, 0.682, 0.706, 0.797, 1.083, and 0.960 and the Standard deviation of all variables were low and it reveals that there are considerable low variations among the undergraduates on their psychological well-being. Further, skewness and Kurtosis values were in the range of between +1.94 and -1.94 after being divided by the standard error of each indicating a little skewness of the data distribution.

### 4.3 Regression analysis

Stepwise regression analysis was conducted to test the hypothesis. Consequently, four models under four steps were generated through the SPSS. At the first step, model one was developed automatically by the SPSS utilizing the most significant predictor; the independent variable.

Table 3  
Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin Watson
					R Square change	F change	df1	df2	Sig. F Change	
1	0.577 <sup>a</sup>	0.332	0.331	0.542	0.332	131.177	1	384	0.000	2.048
2	0.607 <sup>b</sup>	0.368	0.365	0.528	0.036	21.616	1	383	0.000	
3	0.621 <sup>c</sup>	0.385	0.381	0.521	0.017	10.816	1	382	0.001	
4	0.626 <sup>d</sup>	0.392	0.385	0.519	0.006	3.961	1	381	0.047	

Predictors: (Constant), Internet usage  
 Predictors: (Constant), Internet usage, Television viewing  
 Predictors: (Constant), Internet usage, Television viewing, Social media usage  
 Predictors: (Constant), Internet usage, Television viewing, Social media usage, Video gaming  
 Dependent variable: Psychological well-being

Source: Survey data (2020).

According to model summary Table 3, the R<sup>2</sup> value of the third model was 0.392. It highlighted that when other factors are constant, these four independent variables; Internet usage, Television viewing, Social media usage, and Video gaming explain 39.2% variation of psychological well-being. After adding video gaming to the model, R<sup>2</sup> was increased by 0.006 and reduced F value by 3.961. The change of F value was significant at 0.05 level.

Table 4  
ANOVA table

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	56.236	1	56.236	191.177	0.000 <sup>b</sup>
	Residual	112.956	384	0.294		
	Total	169.192	385			
2	Regression	62.270	2	31.135	111.529	0.000 <sup>c</sup>
	Residual	106.921	383	0.279		
	Total	169.192	385			
3	Regression	65.214	3	21.738	79.864	0.000 <sup>d</sup>
	Residual	103.977	382	0.272		
	Total	169.192	385			
4	Regression	66.284	4	16.571	61.352	0.000 <sup>e</sup>
	Residual	102.907	381	0.270		
	Total	169.192	385			

Dependent variable: Psychological well-being  
 Predictors: (Constant), Internet usage  
 Predictors: (Constant), Internet usage, Television viewing  
 Predictors: (Constant), Internet usage, Television viewing, Social media usage  
 Predictors: (Constant), Internet usage, Television viewing, Social media usage, Video gaming

Source: Survey data (2020).



The impact of information and communication technology usage on psychological well-being among undergraduates

According to Table 4, significant value of the ANOVA test was 0.000. It was less than the 0.05 standard level. It indicated that the regression coefficient of Internet usage, Television viewing, social media usage, and video gaming was not equal to zero. Hence, the model is strong enough to predict psychological well-being.

The stepwise regression excluded the variable smartphone usage and device usage from the model due to the insignificant explanatory power of the respective variables. Hence, stepwise regression was limited to only four variables; Internet usage, Television viewing, social media usage, and video gaming. Table 5, indicates the result of the fourth regression model fitted by stepwise regression test.

Table 5  
Regression coefficient table

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
4	(Constant)	1.321	0.171		7.729	0.000		
	Internet usage	0.437	0.045	0.466	9.760	0.000	0.701	1.427
	Television viewing	0.120	0.029	0.174	4.107	0.000	0.893	1.120
	Social media usage	0.166	0.048	0.171	3.477	0.001	0.658	1.520
	Video gaming	(0.050)	0.025	(0.082)	(1.990)	0.047	0.934	1.071
Excluded Variables								
4	Smartphone usage	0.028			0.516	0.606	0.527	1.897
	Device usage	0.089			1.676	0.095	0.559	1.790

Source: Survey data (2020).

The interpreted results of the hypotheses tested based on stepwise regression analysis are as follows;

H<sub>1</sub>: Smartphone usage has a significant impact on undergraduates' psychological well-being

According to the stepwise regression coefficient Table 5, the regression coefficient of Smartphone usage was 0.028. It indicated a positive impact of smartphone usage on psychological well-being but the respective significant value was 0.606 which is above the standard level (0.05). Hence, the impact of smartphone usage on psychological well-being was statistically insignificant at 0.05 level. Therefore, smartphone usage has no significant impact on undergraduates' psychological well-being. Resulting, stepwise regression excluded the variable from the model. Therefore, it can be concluded that smartphone usage among undergraduates does not affect their psychological well-being.

H<sub>2</sub>: Social media usage has a significant impact on undergraduates' psychological well-being

According to Table 5, the regression coefficient of Social media usage was 0.166. It indicates a positive impact of social media usage on undergraduate psychological well-

being. Since the sig value of the test was 0.001, the hypothesis was accepted; Social media usage has a significant impact on undergraduates' psychological well-being. That means, there is a positive effect of social media usage on students' psychological well-being statistically at 0.05 significant level. The result further indicated that the change of social media usage by one percent will lead to a change in the psychological well-being of undergraduates by 16.6% (0.166).

H<sub>3</sub>: Internet usage has a significant impact on undergraduates' psychological well-being

Table 5, shows the regression coefficient of Internet usage was 0.437. It indicates a positive impact of internet usage on psychological well-being. The significant value of the test was 0.000. Thus, the third hypothesis was accepted. Accordingly, the positive effect of internet usage on psychological well-being was statistically significant at 0.05 level. Based on the result, it can be concluded that the change of Internet usage by one percent will lead to a change of psychological well-being of undergraduates by 43.7%.

H<sub>4</sub>: Device usage has a significant impact on undergraduates' psychological well-being

According to the stepwise regression coefficient Table 5, the regression coefficient of device usage was 0.089. It indicated a positive impact of device usage on psychological well-being but the respective sig. value was 0.095 which is above the standard level (0.05). Hence, the impact of device usage on psychological well-being was statistically insignificant at 0.05 level. Therefore, device usage has no significant impact on undergraduate psychological well-being. Resulting, stepwise regression excluded the variable from the model. Therefore, it can be concluded that device usage among undergraduates does not affect their psychological well-being.

H<sub>5</sub>: Video gaming has a significant impact on undergraduates' psychological well-being

Table 5, shows the regression coefficient of video gaming was -0.050. It indicates a negative impact of Video gaming on psychological well-being. The significant value of the test was 0.047. Therefore, the hypothesis; video gaming has a significant impact on undergraduates' psychological well-being was accepted. Accordingly, the negative effect of video gaming on psychological well-being was statistically significant at 0.05 level.

H<sub>6</sub>: Television viewing has a significant impact on undergraduates' psychological well-being

Table 5, shows the regression coefficient of Television viewing was 0.120. It indicates a positive impact of Television viewing on psychological well-being. The significant value of the test was 0.000. Consequently the sixth hypothesis was accepted. Accordingly, the positive effect of Television viewing on psychological well-being was statistically significant at 0.05 level. Based on the result it can be concluded that the change of Television viewing by one percent will lead to a change of psychological well-being of undergraduates by 12%.

The impact of information and communication technology usage on psychological well-being among undergraduates

The psychological well-being of undergraduates was affected by social media usage, internet usage, video gaming, and television viewing significantly. The study further identified that the impact of smartphone usage and device usage was statistically insignificant at the 0.05 level. Accordingly, the study derived a regression formula to measure the impact of ICT usage on psychological well-being as follows.

$$Y = \beta + \beta_1 * IU + \beta_2 * SMU + \beta_3 * VG + \beta_4 * TV$$

$$Y = 1.321 + 0.432 * IU + 0.166 * SMU - 0.05 * VG + 0.120 * TV$$

Y	-	Psychological well-being
B	-	Constant
IU	-	Internet usage
SMU	-	Social media usage
VG	-	Video gaming
TV	-	Television viewing

According to the formula, it could be identified that the impact of Internet usage on the psychological well-being of undergraduates was higher than the impact of Social media usage, video gaming, and Television viewing. Therefore, Internet usage is identified as the greatest explanatory variable of the study.

## 5. Discussion of the result

The first research objective was to determine the main factors of ICT usage that may influence Undergraduates' psychological well-being. Six factors of ICT usage have been identified based on the literature survey: smartphone usage, social media usage, internet usage, device usage, video gaming, and television viewing. Psychological well-being can be measured through four dimensions such as relationship, self-esteem, purpose, and meaning of life, and optimism.

Consequently, the first hypothesis proposed was that smartphone use has a significant impact on undergraduates' psychological well-being, as measured by thirteen indicators. The impact of smartphone usage on psychological well-being was statistically insignificant at the 0.05 level, according to the regression. This result, however, contradicts the previous findings. The study conducted by Silva (2012) founded a negative significant impact of smartphone usage on psychological well-being which is consistent with the other studies of the same (Sumathi, Lakshmi, & Kundhava, 2018; Kumcağiz & Yü, 2016; Costa et al., 2019; Horwood & Anglim, 2019). According to Costa et al. (2019), there are two types of impacts of smartphones on psychological well-being, negative and positive. As positive impacts, they can make contacts and chat with their relatives and friends. Smartphone addiction, reduce social interaction, wasting time, and money are identified as negative impacts. But smartphones became the most important part of undergraduate and they use smartphones for their day-to-day activities. According to Silva (2012), smartphone users in Sri Lanka have been increasing rapidly in major cities as same as rural areas with the availability of networks and could not live without smartphones. However, in the University

context, the impact of smartphone usage on the psychological well-being of undergraduates was statistically insignificant.

The second hypothesis focused on determining the impact of social media usage on psychological well-being, as measured by thirteen indicators. At the 0.05 level, the regression result revealed a statistically significant positive effect of social media usage on psychological well-being. The findings of the study positively aligned with the result of Chen and Li (2017) and Gerson et al. (2016). But, Choi and Noh (2020) and Upadhyay (2018) are indicated that there can have positive and negative relationships between psychological well-being and social media usage. In this context identified there are the positive and significant impacts of social media usage on psychological well-being. The use of social media allows people to stay in touch with friends and family, share ideas and opinions, and increase social capital and social support.

The third hypothesis of this study, measured by eight indicators, was to determine the impact of Internet usage on psychological well-being. The impact of internet usage on psychological well-being was statistically significant at the 0.01 level, confirming that internet usage has a positive impact on psychological well-being. In this study, the most powerful variable determining psychological well-being is internet usage. The finding of the study positively aligned with the result of Omar et al. (2019) but not matched with DeRushia (2010) and Kitazawa et al. (2019). One of the most important factors that undergraduates should be concerned about is Internet usage. Internet usage allows people to interact with others and can be used for academic purposes. Similarly, it has a negative impact on undergraduates' psychological well-being, such as depression, anxiety, and other factors associated with internet addiction.

The fourth hypothesis was to identify the impact of device usage on psychological well-being which was measured through four indicators. The findings of the study are not associated with the findings of Reinecke and Eden (2017). Devices became the major part of human life these days and it makes people day to day works easier. Further, they indicated that usage of devices in both positive and negative effects on well-being. As a positive effect, they demonstrated that media can be used as a tool for stress management and to facilitate communication through social sharing. The risk of media exposure for well-being, social pressure, and digital stress are negative effects of media usage. Finally, Reinecke and Eden (2017) concluded that there was a significant relationship between media use and well-being. However, in the University context, the impact of device usage on the psychological well-being of undergraduates was statistically insignificant.

The fifth hypothesis was to identify the impact of video gaming on psychological well-being which was measured through three indicators. According to the regression analysis, the impact of video gaming on psychological well-being was statistically negative and significant at 0.05 in this study. These video games popular activities among young people nowadays. But several studies indicated that these activities involve human psychological problems. The finding of this study positively related to Pappa, Apergi, Ventouratou, and Janikian (2016) and Mathers et al. (2009). All these researches indicated that there is a

## The impact of information and communication technology usage on psychological well-being among undergraduates

negative correlation between video gaming and psychological well-being with decreased psychological well-being.

The sixth and final hypothesis sought to determine the impact of television viewing on undergraduate psychological well-being, as measured by five indicators. The regression test demonstrates that watching television has a positive impact on psychological well-being and is statistically significant at the 0.05 level. Television viewing aids in the sharing of experiences with others, the development of socialization and learning skills, the knowledge of current events, news, and historical programming, the development of critical thinking about society, and so on. However, this result is associated to the previous findings of Hamer et al. (2009) and Wheeler (2015). These researchers indicated that, television viewing has been associated with young children behavioral problems, poor attention, social isolation, sleep problems, reduced cognitive performance, and same as psychological distress, and psychological well-being.

Furthermore, the study identified the most influential factor of undergraduates' psychological well-being. A stepwise regression test was used to ensure this. According to the regression coefficient Table 05, internet usage was the most influential variable, accounting for 43.2% of the variation in psychological well-being.

### **6. Conclusion**

In conclusion, the primary objective of determining the impact of ICT usage factors on psychological well-being among undergraduates has been fulfilled. Six factors were identified: smartphone usage, social media usage, internet usage, device usage, video gaming, and television viewing was the first objective of the study. The findings revealed that social media usage, internet usage, video gaming, and television viewing have a significant impact on psychological well-being. Meanwhile, smartphone usage and device usage have no significant impact on psychological well-being. Furthermore, Internet usage is the most influential factor of ICT usage, with the strongest predictive power on psychological well-being. Understanding the impact of these four factors and managing them appropriately by the relevant authorities: university students, academic and non-academic staff, social media developers, and so forth, is pivotal. As a result, it is recommended to develop good social media networks for undergraduates with some specialized features. Furthermore, it is recommended that university administration develop policies that encourage innovative usage of social media for educational purposes, such as group work, group discussions, and some group projects. Besides, university administration and government can establish better technological infrastructure to improve students' Internet usage, and government can implement policies and programs to shift people's attitudes toward Internet usage in a positive direction.

### **7. Limitation and future research**

It is recommended that future researchers identify and consider other aspects of ICT usage that are not covered in this study but are worthy of investigation. This study's R2 value was

0.392, indicating that more factors can be investigated to better explain undergraduates' psychological well-being. As a result, future research can be conducted to investigate these other factors to gain a better understanding of psychological well-being. The research was limited to a single Sri Lankan state university. However, in the Sri Lankan context, there are seventeen state universities spread across the country. As a result, it is recommended that the study be conducted with a focus on all the state universities in Sri Lanka. Another flaw in this study is that males responded at a lower rate than females. As a result, the findings regarding ICT usage frequencies may not be nationally representative. Future research in this area should broaden the population of study to include all the state universities in Sri Lanka.

## References

- Alalwan, A. A. (2018). Investigating the impact of social media advertising features on customer purchase intention. *International Journal of Information Management*, 42(April), 65–77.
- Ambogama, R. M. M. S. (2019). Introducing information communication technologies to ESL undergraduate courses in Sri Lankan arts faculties : a survey. 2nd International Conference on Global Education & E-Learning. Malaysia.
- Basri, W. S., Alandejani, J. A., & Almadani, F. M. (2018). ICT adoption impact on students' academic performance: evidence from Saudi Universities. *Education Research International*, 2018(), 1-9.
- Bauer, L., Garriss, S., McCune, J. M., Reiter, M. K., Rouse, J., & Rutenbar, P. (2005). Device-enabled authorization in the Grey system. In International Conference on Information Security, 431-445. Springer, Berlin, Heidelberg.
- Berkowsky, R. W. (2012). Internet use, social integration, and psychological well-being in older adults. (Doctoral dissertation), The University of Alabama, Birmingham, Alabama.
- Bonab, O. M. (2021). Video game use: the relationship between video gaming and psychological factors. *Journal of Critical Reviews*, 8(2), 1071-1077.
- Borzekowski, D. L. G. (2006). Adolescents' use of the internet: a controversial, coming-of-age resource. *Adolescent Medicine Clinics*, 17(1), 205–216. <https://doi.org/10.1016/j.admecli.2005.10.006>
- Chen, H. T., & Li, X. (2017). The contribution of mobile social media to social capital and psychological well-being: examining the role of communicative use, friending, and self-disclosure. *Computers in Human Behavior*, 75(June), 958–965.
- Choi, D.H., & Noh, G.Y. (2020). The influence of social media use on attitude toward suicide through psychological well-being, social isolation, and social support. *Information, Communication & Society*, 1–17, 23(10), 1427-1443.
- Christensson, P. (2019). ICT (Information and Communication Technologies) definition. Retrieved from Sharpened Productions website: <http://techterms.com/definition/ict>

The impact of information and communication technology usage on psychological well-being among undergraduates

- Costa, A. da, Goncalves, A. D. S., Pereira, S., & Hitipeuw, I. (2018). The impact of smartphone on universitarian psychological wellbeing. In First International Conference on Technology and Educational Science. European Alliance for Innovation (EAI).
- Cotten, R. S. (2008). Students' technology use and the impacts on well-being. *New Directions for Student Services*, 133(133), 41–53.
- Daffalla, A., & Dimetry, D. A. (2014). The impact of facebook and others social networks usage on academic performance and social life among medical students at Khartoum University. *International Journal of Scientific & Technology Research*, 3(5), 41–46.
- Daraei, M. (2013). Social correlates of psychological well-being among undergraduate students in Mysore city. *Social Indicators Research*, 114(2), 567–590.
- Davis, T. (2019). What is well-being? definition, types, and well-being skills. Retrieved January 2, 2019, from Phychologytoday.com website: <https://www.psychologytoday.com/us/blog/click-here-happiness/201901/what-is-well-being-definition-types-and-well-being-skills>
- DeRushia, K. D. (2010). Internet usage among college students and its impact on depression, social anxiety, and social engagement. (Doctoral dissertation), Indiana University of Pennsylvania.
- Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D. W., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, 97(2), 143-156.
- Gerson, J., Plagnol, A. C., & Corr, P. J. (2016). Subjective well-being and social media use: do personality traits moderate the impact of social comparison on Facebook? *Computers in Human Behavior*, 63, 813–822.
- Goswami, V., & Singh, D. R. (2016). Impact of mobile phone addiction on adolescent's life : a literature review. *International Journal of Home Science*, 2(1), 69–74.
- Hair, J., Black, W., Babin, B. and Anderson, R. (1998). *Multivariate data analysis* (7th ed.). NJ: Pearson.
- Hamer, M., Stamatakis, E., & Mishra, G. (2009). Psychological distress, television viewing, and physical activity in children aged 4 to 12 years. *Pediatrics*, 123(5), 1263–1268. <https://doi.org/10.1542/peds.2008-1523>
- Horwood, S., & Anglim, J. (2019). Problematic smartphone usage and subjective and psychological well-being. *Computers in Human Behavior*, 97(December 2018), 44–50.
- Internet World Stats. (2020). Usage and Population Statistics. Internet usage statistics: The Internet Big Picture. Retrieved from <http://www.internetworldstats.com/stats.htm>
- Ismail, Z., & Shujaat, N. (2018). Factors affecting the mental well-being of undergraduate students in Karachi. *Advances in Social Sciences Research Journal*, 5(3), 508–519.
- Johnson, S., Robertson, I., Cooper, C.L. (2018). Psychological Well-Being. In: Well-Being. Palgrave Macmillan, Cham. [https://doi.org/10.1007/978-3-319-62548-5\\_4](https://doi.org/10.1007/978-3-319-62548-5_4)

- Khan M.S., Khan I., Din S., Ismail H.M., Khattak R., Rahumullah J. (2015). The impacts of ICT on the students' performance : a review of access to information. *Research on Humanities and Social Sciences*, 5(1), 85-94.
- Kitazawa, M., Yoshimura, M., Hitokoto, H., Sato-fujimoto, Y., Murata, M., Negishi, K., Minura, M., Tsubota, K., Kishimoto, T. (2019). Survey of the effects of internet usage on the happiness of Japanese university students. Kitazawa et Al. *Health and Quality of Life Outcomes*, 5, 1–8.
- Kumara, A. D. (2014). Use of information and communication technologies (ICTs) by university freshmen: with special reference to the university of Moratuwa. *Journal of the University Librarians Association of Sri Lanka*, 18(2), 26–40.
- Kumcağiz, H., & Yü, A. P. (2016). Relationship between psychological well-being and smartphone addiction of university Students. *International Journal of Higher Education*, 5(4), 144–156.
- Lee, D., Ng, P. M., & Bogomolova, S. (2020). The impact of university brand identification and eWOM behaviour on students' psychological well-being: a multi-group analysis among active and passive social media users. *Journal of Marketing Management*, 36(3-4), 384-403.
- Ludban, M. (2015). Psychological well-being of college students. *Undergraduate Research Journal for the Human Sciences*, 14(1).
- Plowman, L., McPake, J., Stephen, C. (2010). The technologisation of childhood? young children and technology in the home. *Children & Society*, 24(1), 63-74.
- Mahmood, K. (2009). Gender, subject and degree differences in university students ' access, use, and attitudes toward information and communication technology ( ICT ) Khalid Mahmood university of the Punjab, Lahore, Pakistan. *International Journal of Education and Development Using Information and Communication Technology*, 5(3), 206–216.
- Mathers, M., Canterford, L., Olds, T., Hesketh, K., Ridley, K., & Wake, M. (2009). Electronic media use and adolescent health and well-being: cross-sectional community study. *Academic Pediatrics*, 9(5), 307–314.
- McLean, L., & Griffiths, M. (2013). The psychological effects of video games on young people. *Aloma: Revista de Psicologia, Ciències de l'educació i de l'esport*, 31(1), 119–133.
- Meenakshi. (2013). Importance of ICT in education. *IOSR Journal of Research & Method in Education (IOSR - JRME)*, 1(4), 03–08.
- Ndubisi, N. O., & Kahraman, C. (2005). Malaysian women entrepreneurs: understanding the ICT usage behaviors and drivers. *Journal of Enterprise Information Management*, 18(6), 721-739.
- Neal, L. O., Timothy, C., & Shelia, M. H. (2015). Technology and youth : growing up in a digital world article information : technology and youth: growing up in a digital world, 19(), 267–291.



The impact of information and communication technology usage on psychological well-being among undergraduates

- Michaelson, J., Mahony, S., & Schifferes, J. (2012). *Measuring wellbeing: a guide for practitioners*. New Economics Foundation, London.
- O' Driscoll, M. P., Brough, P., Timms, C., & Sawang, S. (2010). Engagement with information and communication technology well-being. In P. L. Perrewé & D. C. Ganster (Eds.), *New developments in theoretical and conceptual approaches to job stress (research in occupational stress and well-being)*, 8, 269–316. Bingley, UK: Emerald.
- Omar, S. Z., Fadzil, M. F. B., & Bolong, J. (2019). The relationship between internet usage and subjective wellbeing among youths in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 9(7), 437–445.
- Osborne, J. (2010). Improving your data transformations: Applying the Box-Cox transformation. *Practical Assessment, Research, and Evaluation*, 15(12), 1–9.
- Oulmaati, K., Ezzahri, S., & Samadi, K. (2017). The use of ICT in the learning process among the students of history and civilization at Abdelmalek Essaadi University, Morocco. *International Journal of Scientific Engineering and Research*, 8(2), 972–979.
- Pappa, E., Apergi, F., Ventouratou, R., & Janikian, M. (2016). Online gaming behavior and psychosocial well-being in greek adolescents. *The European Journal of Social and Behavioural Sciences*, 15(1), 1988–1998.
- Perbawaningsih, Y. (2013). Plus minus of ICT usage in higher education students. *Procedia - Social and Behavioral Sciences*, 103(), 717–724.
- Reinecke, L., & Eden, A. (2017). Media use and well-being: An introduction to the special issue. *Journal of Media Psychology*, 29(3), 111–114.
- Rose, A., & Kadvekar, S. (2015). ICT (information and communication technologies) adoption model for educational institutions. *Journal of Commerce and Management Thought*, 6(3), 558-570.
- Rosen, L. D., Whaling, K., Carrier, L. M., Cheever, N. A., & Rökkum, J. (2013). The media and technology usage and attitudes scale: An empirical investigation. *Computers in Human Behavior*, 29(6), 2501-2511.
- Ryff, C. D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, 4(4), 99–104.
- Safara, M., Seifi, A., Salmabadi, M., & Gooshki, H. S. (2020). The relationship between addiction to mobile and anxiety, depression and stress in students of Islamic Azad university of Birjand. *Pakistan Journal of Medical & Health Sciences*, 14(3), 1344-1348.
- Sarwar, M., & Soomro, T. (2013). Impact of Smartphones on society. *European Journal of Scientific Research*, 98(2), 216–226.
- Sekaran, U., & Bougie, R. (2019). *Research methods for business: a skill building approach*. New York: John Wiley & Sons.
- Shaw, L. H., & Gant, L. M. (2002). Users divided? Exploring the gender gap in Internet use. *CyberPsychology & Behavior*, 5(6), 517-527.

- Siddiqui, S., & Singh, T. (2016). Social media its impact with positive and negative aspects. *International Journal of Computer Applications Technology and Research*, 5(2), 71–75.
- Silva, H. P. T. N. (2012). The impact of mobile phones on peoples' lives in Sri Lanka. In Proceedings of International Conference on Humanities and Social Sciences, 1().
- Sims, T., Reed, A. E., & Carr, D. C. (2017). Information and communication technology use is related to higher well-being among the oldest-old. *The Journals of Gerontology: Series B*, 72(5), 761-770.
- Sumathi, K., Lakshmi, S.N., & Kundhava, S. (2018). Reviewing the impact of smartphone usage on academic performance among students of higher learning. *International Journal of Pure and Applied Mathematics*, 118(8), 1–7.
- Tolchinsky, A. (2013). *The development of a self-report questionnaire to measure problematic video game play and its relationship to other psychological phenomena*. Eastern Michigan University.
- Turashvili, T., & Japaridze, M. (2012). Psychological well-being and its relation to academic performance of students in Georgian context. *Problems of Education in the 21st Century*, 49(), 73–80.
- Udhayakumar, P., & Illango, P. (2018). Psychological wellbeing among college students. *Journal of Social Work Education and Practice*, 3(2), 79-89.
- Upadhyay, V. (2018). Social media usage and psychological wellbeing among Indian youth affiliations. *International Journal of Stress Prevention and Wellbeing*, 2, 1–12.
- Von Der Heiden, J. M., Braun, B., Müller, K. W., & Egloff, B. (2019). The association between video gaming and psychological functioning. *Frontiers in psychology*, 10(), 1731.
- Wasif, M. N., Munir, E. U., & Shad, S. A. (2011). Usage and impact of ICT in education sector; a study of Pakistan. *Australian Journal of Basic and Applied Sciences*, 5(12), 578-583.
- Weerasendera, R. (2014). The impact of social media in Sri Lanka : issues and challenges in mental health. *Sri Lanka Journal of Psychiatry*, 5(1), 10–11.
- Wheeler, K. S. (2015). *The relationships between television viewing behaviors, attachment, loneliness, depression, and psychological well-being*. (Honors Thesis). Georgia Southern University, Georgia, United States.