TO EXAMINE THE ANTECEDENTS OF SECOND LEVEL OF GENDER DIGITAL DIVIDE AMONG INDIAN YOUTH

Minu Gupta[1], Dr. Ravi Kiran[2]

[1,2] School of Humanities and Social Sciences, Thapar Institute of Engineering & Technology, India

minugupta786@yahoo.com

ABSTRACT: *Digital Divide (DD) is classified into three levels as: first level DD depicting difference in physical access of hardware and software and internet connection; second level DD referring to difference in digital usage and third level DD as difference in outcomes received from digital usage. One of the forms of DD is Gender Digital Divide (GDD), remotely explained as unequal access of digital tools among men and women. Extensive studies in different economies were conducted to understand the factors contributing to GDD, specifically in relation to the first level of Digital Divide, but the present authors found few records on the factors affecting or barriers contributing to Information and Communication Technology (ICT) usage, causing the second level of GDD. Therefore, the study aims to understand the second level of GDD of Indian youth affected by the barriers classified as: Technical Barriers, Economical Barriers, and Social Networking Barriers; where the digital usage in categorized as: Entertainment Usage, Professional Usage and Financial Usage. Out of the distributed 400 structured questionnaires among the randomly selected University students, 368 were completed. ANOVA test resulted in significant difference in Entertainment Usage and Financial Usage of ICT and internet among both genders where females are found to be more inclined to both the uses, as depicted through comparative means. No significant difference was found in Professional Usage among genders. Significant difference was reported with regards to Social Networking Barriers and Economical Barriers. This study contributes in understanding the factors affecting second level of digital divide, specifically. Females highly face all the three barriers as compared to men, in spite of which Entertainment Usage and Financial Usage is more among women.*

Keywords: *Gender Digital Divide, Digital Exclusion, ICT, Socio-economic factors, Barriers*

1. INTRODUCTION

Gender Equality is the third goal on UN Millennium Development Goals and fifth of UN Sustainable Development Goals. Technological era has witnessed the technological discrimination between men and women, termed as “Gender Digital Divide” (GDD), which is the imbalance in access to and use of internet and ICT tools between men and women creating hindrance in human development.

Disparities in ICT access is the first level of digital divide. Disparities in ICT usage is the second level of digital divide (Hargittai, 2002) and disparities in outcomes or results from ICT use is the third level of digital divide (Deursen and Helsper, 2015).

Though, as compared to the extensive research conducted on the first level of DD; certain research on GDD has been done in context of second level of digital divide i.e., use of digital tools like computers or laptops (Broos, 2014; Kumar, Basavaraja and Gagendra 2014), mobiles or smartphones (Sung, 2015; Riquelme and Rios, 2010; Vimalkumar, Singh and Sharma, 2020; Joshi et al., 2020), internet or email or web (Teo, 2001; Joiner et al., 2005; Goldfarb and Prince, 2007; Dixon et al., 2014; Mumporeze and Prieler, 2017) and social networking sites among men and women, Haight, Quan-Haase, and Corbett (2014); Krasnova et al., 2017; Noguti, Singh and Waller (2019); but minimal records were found to understand the factors affecting or barriers contributing to gender gap in digital usage, because according to Singh et al. (2013), identification of barriers to internet computer use may help in forwarding appropriate policy suggestions to intensify the digital usage.

As Pinto and Poornananda (2017) stated that internet is the revolutionary form of technology, without which existence and working of any digital device is useless, thus the present researchers consider the usage of internet to study the GDD among University students. Qazi et al. (2021) has stated that gender imbalance is visible in high educational institutions despite huge use of ICT. Therefore, researchers were motivated to examine the second level of divide of an esteemed university.

The present study is motivated from the "National mission on Education through Information, Communication and Technology" launched in 2009 in India, as a centrally sponsored scheme in order to ensure the full use of ICT in imparting education to eradicate the digital divide among teachers, scholars, students, Ministry of education (2009). This led to the research questions in front of the authors for which the research was conducted.

RQ1: what is the position of GDD in terms of internet usage?

RQ2: what are the barriers or factors contributing to the second level of GDD?

RQ3: how the barriers correlated to different of uses of internet, indicating the link of barriers to specific usage among both genders.

The above research questions were ultimately framed as the objective of the study:

O1: to assess the gender difference in internet usage and related activities.

O2: to assess the gender gap in barriers faced to use internet and allied activities.

O3: to extract the correlation of the barriers hampering activities performed over internet.

2. REVIEW OF LITERATURE

Viadero (1994) stated that the origination of the digital divide among girls and boys occurs right from the school level where girls use the internet for social connection and educational purposes, Weiser (2000) and solve real-life problems while boys use the internet to train themselves for future competition.

In a study conducted by Basavaraja and Kumar (2017) in urban schools of India, they found that female students were restricted to use computers at public cafes and computer coaching centers and at homes, depicting the gender divide in place of internet accessibility. Male students were even allowed by their parents to use computers at friend's house or neighbor's house, which was not case of female students.

In a study of Indian Universities by Verma and Dahiya (2016), they found no significant difference in opinion of male and female students for ICT. They formed universities as the sample because higher educational institutions offer quality education in different fields of engineering, humanities, and social sciences. Contrarily, in a study conducted by Aswathi and Haneefa (2019) on students of an Indian university, found, significant gender difference in attitudes towards IT, where, males had a higher level of positive and attitude towards IT as compared to female students.

Mahendru, Dutta, and Mishra (2022) in their "India Inequality Report 2022: Digital Divide" mentioned the contrasting realities of Digital India, that, despite 13 per cent digital growth rate in a year, Indian women own mobiles 15 per cent lesser than men and use internet 33 per cent lesser. Overall, the report stated that India witnessed the huge gender gap of 40.4 per cent among Asia-Pacific region.

Mobile Gender Gap report by GSMA (2020) highlighted barriers faced

by women in mobile internet adoption and usage, stating that 34% of Indian women face a barrier of SIM or handset cost in mobile ownership. 9% have little or no knowledge to use internet via mobile, 16% face literacy problems, 11% of women consider mobile and internet non-useful to them and 3% gave security reasons as strangers may contact and harass them.

This was later elaborated by Bala and Singhal (2018), stating that in most of the urban areas of Noida (Uttar Pradesh, Indian state) women are found to be dominant in ownership of computers, but their access and usage is less as compared to men because of their less technical skills, interrupting social norms and financial problems due to unemployment. It is also observed that women are using internet more for educational purposes while men are inclined to internet more for entertainment purposes.

Aswathi and Haneefa (2019) elaborated "Digital Divide" not only as difference in access to digital tools and skills or competencies to use the tools, but also as the divide created due to attitudinal differences towards the ICT, visible within genders too, supporting the claim of Moghaddam (2009), that, women have risk averse attitude, thus they restrict usage of ICT devices in fear of its probable risks. According to Joiner et al. (2005), significant difference in web page ownership by both genders was reported, but not in owning computers or personal email addresses. Men are found to be high users of internet as compared to women and that too for games or downloading tasks. There is a positive relation of internet identification and its usage while internet use is negatively related to internet anxiety.

Earlier authors studied the barriers to ICT access, leaving a research gap of lack of understanding on barriers to digital usage, which was optimally targeted by the

present authors. The study contributes by specifically focusing on the gender difference in internet usage and their respective barriers.

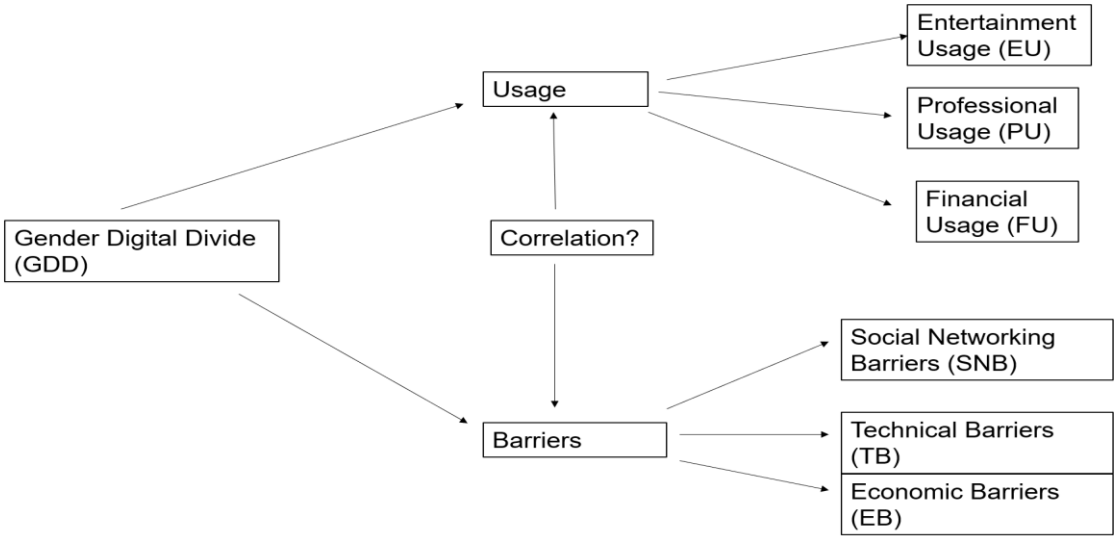

Figure 1: Conceptual model; Source: created by the authors.

The above Figure 1 represents the conceptual model of the study aligned with the research objectives.

3. METHODOLOGY

To understand the GDD in Indian youth, students of a reputed Indian university ranked in 1001-1200 QS World University Rankings, 2023 were randomly selected, as Aswathi and Haneefa (2019) stated that since University students are imparted with free and unlimited internet access within the campus, also they have adequate skills and knowledge to use computers, Ab-Shanab and Al-jamal (2015); they make a sufficient sample to understand the Digital Divide among educated youth. A pre-validated structured questionnaire was framed by the researchers that demanded answers on the activities performed on internet (either through mobiles or laptops or computers or tablets) and the barriers faced by the students in performing different internet activities. The questionnaire consisted of 14 questions on usage of internet and 10 questions on barriers faced by students to use internet devices. Scored on a 5-point likert scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). Does the highly educated students also face the digital divide was the cause of concern. Thus, 400 questionnaires were randomly distributed. 368 were completed, which comprised of 190 females and 178 males. Respondents were asked 14 questions on internet usage and 10 questions on barriers faced by men and women over internet usage, as presented in the Table 1.

Table 6. Questions on usages of internet and barriers to internet usage

Usages	Barriers
U1: social networking	B1: access to technical or vocational courses through online media
U2: watching movies or videos	B2: social norms of work-life balance
U3: watching news	B3: high cost of ICT infrastructure
U4: educational purpose	B4: dependency on others' income
U5: sending or receiving e-mails	B5: marital status
U6: professional purpose	B6: household chores
U7: job search	B7: language problem
U8: vocational learning	B8: safety over internet
U9: watching blogs	B9: mobile network issues
U10: sharing files,	B10: electricity connection.
U11: shopping	
U12: bills payments	
U13: online calling	
U14: games	

Source: authors' compilation

4. DATA ANALYSIS AND RESULTS

The data was checked for reliability and validity using SPSS version 21. Both Cronbach's alpha and CR in Table 2 have values above 0.70 which is a satisfactory reliability measure. Average Variance Extracted (AVE) measures Convergent Validity assessing the degree to which constructs are different from each other in the instrument. AVE values of both constructs in Table 2 for males and females are higher than 0.50 reflecting more than 50% of variations in the respective constructs were because of their indicators. Square root of AVE as displayed in Table 2 is a measure of Discriminant validity that assesses distinctiveness of constructs from each other. According to Forner-Larcker criteria, the square root of AVE should be greater than the squared correlation.

Table 2: reliability and validity measurements

	Cronbach's Alpha	*Composite Reliability*	*Average Variance Extracted (AVE)*
Barriers	*0.840*	*0.903*	*0.757*
Usage	*0.776*	*0.863*	*0.763*
Fornell-Larcker Discriminant Validity			
		Barriers	Usage
Barriers		0.870	
Usage		0.105	0.874

Source: authors' compilation

The usages and barriers as presented in Table 1 were clubbed to categorize, as shown in the Table 3. The statistical test of ANOVA was run on SPSS to examine the gender difference in internet usages and the barriers. ANOVA results of Usages and that of Barriers are presented in Table 4 and Table 5, respectively.

Table 3. Categorization of Usages and Barriers

Usages	Barriers
Entertainment Usage (EU)= U1+U2+U3+U9+U13+U14	Social Networking Barriers (SNB) = B2+B5+B6+B7
Professional Usage (PU)= U4+U5+U6+U7+U8+U10	Technical Barriers (TB)= B1+B8+B9+B10
Financial Usage (FU) = U11+U12	Financial Barriers (FB)= B3+B4

Source: created by the authors

Also, comparative means are presented in both tables, indicating the level of Usages and barriers faced by both the genders. Significant gender difference with respect to Entertainment Usage and Financial Usage of internet, whereas no significant difference in Professional usage of internet was found in men and women, from Table 4. Also considering the barriers to internet usage from Table 5, Social Networking Barriers and Financial Barriers had a significant gender difference. To be simply stated, that, men and women have significant difference in internet usages for entertainment purposes and making financial transactions; but not significant difference was found between male and female students of TIET in terms of Professional usage. This could be due to the same syllabus or study requirements they face in the campus. But entertainment and financial usages are subjective.

Table 4. ANOVA Results for Usage

		Sum of Squares	df	Mean Square	F	Sig.
EU	Between Groups	82.766	1	82.766	121.643	.000***
	Within Groups	249.027	366	.680		
	Total	331.793	367			
PU	Between Groups	1.163	1	1.163	1.328	.250
	Within Groups	320.671	366	.876		
	Total	321.834	367			
FU	Between Groups	26.628	1	26.628	31.756	.000***
	Within Groups	306.905	366	.839		
	Total	333.534	367			

Source: created by the authors

Table 5. ANOVA results for Barriers

		Sum of Squares	df	Mean Square	F	P values
SNB	Between Groups	32.485	1	32.485	28.085	0.000***

	Within Groups	423.340	366	1.157		
	Total	455.826	367			
TB	Between Groups	2.896	1	2.896	2.616	0.107
	Within Groups	405.191	366	1.107		
	Total	408.087	367			
EB	Between Groups	7.123	1	7.123	6.928	0.009**
	Within Groups	376.309	366	1.028		
	Total	383.432	367			

Source: created by the authors

To deeply understand the difference in internet usage by men and women, authors compare the means of Usages and Barriers, presented through Table 6, which presents that female students use internet for Entertainment purpose (2.83) and Financial purpose (3.11), more than men. We can state that women use internet more for Social networking, watching videos, watching news, watching blogs, online calling and games. High use of internet for entertainment, online shopping, and social networking are in line with the results of Saha and Zaman (2017). Also, they stated that male students are more inclined to Professional usage of internet in terms of sending e-mails, searching information for their work, using MS Office, installing software, solving virus problems, than female students.

Table 6. Comparative means

	Males	Females		Males	Females
Entertainment Usage	2.37	2.83	Social Networking Barriers	2.79	3.39
Professional Usage	2.87	2.82	Technical Barriers	2.9	3.2
Financial Usage	2.85	3.11	Economic Barriers	2.9	3.2

Source: authors' compilation

Considering the barriers, a small negligible difference exists among men and women in Technical Barriers and Financial Barriers. As all students in the university campus have adequate opportunities to access vocational education through online mode due to unlimited and uninterrupted data connection; they do not face privacy risks over internet; regular electricity is supplied, no issues in mobile network, which means that the slight difference in mean value of Technical Barriers could be due to sampling error. Also, according to Panda (2022), India has the cheapest internet package, merely about 0.043 Indian rupees, thus Economic barriers could not be issue for university students. Social Networking Barriers are observed to be high in female students, which comprised of work-life balance, marital status, household duties and language issues, as depicted in Table 1. Banerjee (2019), Liu (2022) explained that

how women face patriarchal restrictions to use digital devices in the view of being immoral, which leads to hesitation among them towards technology.

In order to understand the relation of barriers to internet Usages and actual internet Usage, a correlation matrix is created in Table 7. The matrix helps to understand as to how each usage is affected by the respective barriers.

Table 7. Correlation values of usages and barriers

	Social Networking Barriers	Technical Barriers	Economic Barriers
Entertainment Usage	0.214*	0.116*	0.128*
Professional Usage	0.113*	0.106*	0.110*
Financial Usage	0.108*	0.089	0.078

Source: authors' compilation

Table 7 represents that Entertainment Usage and Professional usage of internet by both men and women have a significant relation with all the three barriers. While the Financial Usage of internet has a significant and positive relation with Social Networking Barriers. This explains that Social Networking barriers have significant effect of all three types of internet usages, but Technical barriers and Economical barriers do not have a significant effect on Financial usage of internet.

5. CONCLUSION & DISCUSSION

Gender Digital Divide has till been classified into three levels, where the divide based on the access to technology has been extensively studied. Liu et al., (2022) explained second level of DD as the divide due to lack or absence of technical knowledge and expertise to optimally use the digital technology. Authors of the present research found few records on GDD of University students, as students of high educational institutions have unlimited and free access to internet. As they are well educated with all the infrastructural and economic resources, does there still exists gender disparity in internet usage, and if so, what could be the factors responsible or barriers to ICT usage? For this, ANOVA was applied and comparative means were analyzed. Also, researchers were keen to examine the relation of barriers with the usages of internet, to understand whether a particular usage of internet is affected by some barrier, which was done by correlation testing. To avail answers to the research questions, authors selected a sample from an esteemed educational institution of India. To understand the difference in usage of internet, authors asked questions on various uses of internet by both male and female students. ANOVA found that there exists a significant difference in internet usage among men and women students in terms of Entertainment usage and Financial usage but not Professional usage. ANOVA also presented significant difference in Social Networking barriers and Economical barriers. Comparative means reflected that women use internet more for Entertainment purposes and to make financial transactions, whereas male students used internet more for professional purposes. More financial usage by women (online shopping and bills payment) highlights a positive role of women in Digital Financial Inclusion. Through comparative means, we found that women face all three barriers more than men.

Later the correlation matrix displayed the weak and positive correlation of all Usages of internet with all barriers, stating that suages of internet are affected by all respective barriers.

The study contributes by examining the barriers leading to second level of GDD of highly qualified students of Indian university.

6. LIMITATIONS

The study is limited to examine GDD of educated youth, which is not a complete representation of Indian society, as India is multi-diverse nation, with people belonging to different strata of society. Howsoever, the study is novel in its approach to understand as to how the barriers affect the digital usage of the youth who are highly educated.

REFERENCES

Abu-Shanab, E., & Al-Jamal, N. (2015). Exploring the gender digital divide in

Jordan. Gender, Technology and Development, 19(1), 91-113.

Aswathi, P., & Mohamed Haneefa, K. (2019). Attitude towards Information

Technology and digital divide: A study among students in Universities in Kerala, India.

Bala, S., & Singhal, P. (2018). Gender digital divide in India: A case of inter-regional

analysis of Uttar Pradesh. Journal of Information, Communication and Ethics in Society, 16(2), 173-192.

Banerjee, P. (2019). Gender digital divide–examining the reality. International Journal

of Innovative Technology and Exploring Engineering, 8(11), 214-219.

Basavaraja, M. T., & Sampath Kumar, B. T. (2017). Gender disparities in the use of

ICT: a survey of students in urban schools. Journal of Information Science Theory and Practice, 5(4), 39-48.

Broos, A. (2005). Gender and information and communication technologies (ICT)

anxiety: Male self-assurance and female hesitation. Cyber Psychology and Behavior, 8(1), 21-31. https://doi.org/10.1089/cpb.2005.8.21

Dixon, L. J., Correa, T., Straubhaar, J., Covarrubias, L., Graber, D., Spence, J., &

Rojas, V. (2014). Gendered space: The digital divide between male and female users in internet public access sites. Journal of Computer-Mediated Communication, 19(4), 991-1009. https://doi.org/10.1111/jcc4.12088

Goldfarb, A., & Prince, J. (2008). Internet adoption and usage patterns are different:

Implications for the digital divide. Information Economics and Policy, 20(1), 2-15. https://doi.org/10.1016/j.infoecopol.2007.05.001

Hargittai, E. (2002). Second-level digital divide: Differences in people's online skills.

First Monday, 7(4). Retrieved May 17, 2016. http://firstmonday.org/article/view/942/864

Joiner, R., Gavin, J., Duffield, J., Brosnan, M., Crook, C., Durndell, A., ...&

Lovatt, P. (2005). Gender, Internet identification, and Internet anxiety: Correlates of Internet use. CyberPsychology and Behavior, 8(4), 371-378. https://doi.org/10.1089/cpb.2005.8.371

Joshi, A., Malhotra, B., Amadi, C., Loomba, M., Misra, A., Sharma, S., ...& Amatya,

J. (2020). Gender and the digital divide across urban slums of New Delhi, India: cross-sectional study. Journal of medical Internet research, 22(6), e14714. https://doi.org/10.2196/14714

Karjaluoto, H., Riquelme, H. E. & Rios, R. E. (2010). The moderating effect of

gender in the adoption of mobile banking. International Journal of bank marketing, 28(5), 328-341. https://doi.org/10.1108/02652321011064872

Krasnova, H., Veltri, N. F., Eling, N., & Buxmann, P. (2017). Why men and women

continue to use social networking sites: The role of gender differences. The Journal of Strategic Information Systems, 26(4), 261-284. https://doi.org/10.1016/j.jsis.2017.01.004

Kumar, B. S., Basavaraja, M. T. & Gagendra, R. (2014). Computer literacy

competencies among Indian students: the digital divide. Asian Education and Development Studies, 3(3), 267-281. https://doi.org/10.1108/AEDS-03-2014-0007

Liu, C., Wang, K., Goay, M., & Yoon, S. (2022, June). Note: Examining the Gender

Digital Divide in ICT: A Closer Look at Ghana, South Africa, and India. In ACM SIGCAS/SIGCHI Conference on Computing and Sustainable Societies (COMPASS), 623-627.

Mahendru, A., Dutta, M. & Mishra, P.R. (2022). India Inequality Report 2022: Digital

Divide. Retrieved December 30, 2022.

Moghaddam, G. G. (2010). Information technology and gender gap: toward a global

view. The electronic library, 28(5), 722-733. https://doi.org/10.1108/02640471011081997

Mumporeze, N., & Prieler, M. (2017). Gender digital divide in Rwanda: A qualitative

analysis of socioeconomic factors. Telematics and Informatics, 34(7), 1285-1293. https://doi.org/10.1016/j.tele.2017.05.014

Noguti, V., Singh, S., & Waller, D. S. (2019). Gender differences in motivations to

use social networking sites. In Gender economics: Breakthroughs in research and practice, 676-691. IGI Global.

Panda, S. (2022). Poised for higher growth: Digital India revolution is on a sound

Footing.

Pinto, M. S., & Poornananda, D. S. (2017). The internet usage among students: A

uses and gratifications perspective. Media Watch, 8(3), 423-437.

Press Information Bureau (2019).

https://www.education.gov.in/en/sites/upload_files/mhrd/files/upload_document/MissionDocument.pdf

Qazi, A., Hasan, N., Abayomi-Alli, O., Hardaker, G., Scherer, R., Sarker, Y., ... &

Maitama, J. Z. (2021). Gender differences in information and communication technology use & skills: a systematic review and meta-analysis. Education and Information Technologies, 1-34.

Saha, S. R., & Zaman, M. O. (2017). Gender digital divide in higher education: a study

on University of Barisal, Bangladesh. IOSR Journal of Humanities and Social Science, 22(01), 11-17.

Singh, N., Zhou, Y., Williams, K., Kendall, J., & Kaushik, P. D. (2013). Bridging the

digital divide in rural India: Lessons from a survey in four states. Review of market Integration, 5(1), 1-42. https://doi.org/10.1177/0974929213496499

Sung, W. (2015, May). A Study on the Effect of Smartphones on the Digital Divide.

In Proceedings of the 16th Annual International Conference on Digital Government Research.

Teo, T. S. (2001). Demographic and motivation variables associated with Internet

usage activities. Internet Research. https://doi.org/10.1108/10662240110695089

Van Deursen, A. J., & Helsper, E. J. (2015). The third-level digital divide: Who

benefits most from being online? Communication and information technologies annual, 10, 29-52. https://doi.org/10.1108/S2050-206020150000010002

Verma, C., & Dahiya, S. (2016). Gender difference towards information and communication technology awareness in Indian universities. SpringerPlus, 5(1), 370.

Viadero, D. (1994), “The electronic gender gap”, Education Week, available at:

https://www.edweek.org/education/the-electronic-gender-gap/1994/12

Vimalkumar, M., Singh, J. B. & Sharma, S. K. (2020). Exploring the multi-level digital divide in mobile phone adoption: A comparison of developing nations. Information Systems Frontiers, 1-20.

Weiser, E.B. (2000). Gender differences in Internet use patterns and Internet

application preferences: A two-sample comparison. Cyber psychology and behavior, 3(2),167-178.