Gender Difference in Internet Usage Pattern: A Study on University Students of Bangladesh

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Abstract: Internet has evolved rapidly and affects every aspect of our life. There are considerable amount of research discussing on gender difference in internet/ICT access and use. Some find that man and women are significantly different in terms of perception, skill, and purpose of internet use, while others argue that this gap is decreasing and in some cases women are more in internet use. This study tests this finding through empirical examination. We aim to investigate whether there is gender difference in internet usage pattern and what might be the reasons why both genders use them differently. A sample of 176 university students of Bangladesh are analyzed using logit models. The analysis surprisingly reveals that except for the purpose of gaming and commercial transaction, there is insignificant difference between students of both genders in overall internet usage pattern. Men report greater preference for gaming than women do, whereas women's use of internet is higher for commercial transaction than the men. We also find that unlike most past research, there is no significant difference in the level of ICT self-efficacy between men and women. Only, academic background proved to have some association with self-efficacy. Students from IS arena are more likely to have higher degree of self-efficacy than the students from non-IS field. Further, our research explores positive relationship between parental support and ICT self-efficacy for both male and female students. This result provides researchers, business practitioners and policy makers a new insight regarding gender and pattern of internet use.
Keywords: Internet, gender, ICT self-efficacy, parental support, usage pattern.

INTRODUCTION

As Internet continues to become an integral part of life, it affects the lifestyle of the digital generation [1]. There was a time when computer use seemed to be a highly gender bias [2, 3] and ICT were seen as another "toy for the boys" [4]. However, recent research indicates that as Internet and mobile telephony penetration rates started to go high, females began to draw near to the males in many developed nations and gender differences existed at a lower rate [5, 6]. Still the rest of the world is far behind in minimizing the gender gap in Internet penetration as well as in ICT usage. While the smallest gaps observed in the Americas (1.8%) and the CIS regions (5.1%), the gap is widest of all in LDCs, at 31%. We can visualize this distinction between gender equality by another statistics. America and Europe have the highest percentage of women online at 76%. This compares to just less than 13% of women being online in LDCs [7].

Bangladesh has a little above 80 million internet users [8] meaning that almost half of the population of Bangladesh has been, perhaps, out of the reach of internet till now. There are no reliable statistics on women's ICT penetration and usage in Bangladesh [9]. However, Islam [9] claims that the number is small and mostly dominated by women at workplace and by women from upper income enclaves. A 2015 survey of Facebook use in Bangladesh reveals that 79% of users are male and only 21% are female [10]. This statistic clearly indicates the gender divide with respect to internet usage pattern. Research on the digital divide differ in focus and methodological approach. For example, studies tried to answer who are divided digitally, what are their attributes (income, education, gender, age etc.), and so on [11]. Digital divide can also be seen as difference in usage pattern of users [12]. Bonfadelli [13] and Adams [14] suggested researchers to shift their attention toward difference in how women and men differ in terms of using ICT.

Past research on gender differences in internet usage pattern and web information seeking behavior argued that men and women differ in their attitude, perception and capabilities in web-based shopping

[15], online reading [16], information search [17] e-health information use [18], etc. They found that males tend to use Internet for functional and entertainment purpose, and focus more on the value gained through online activities while females are more into shopping, focusing on trustworthiness and use it as a tool for interpersonal communication and for maintaining social values. A disparity in usage frequency is also observed in the study of gender and Internet. Men use Internet more frequently and for long hours compared to women [19]. Research [20] highlight that men's ICT self-efficacy is higher than women therefore they view Internet more favorably than women.

However, most research findings are based on developed nations' scenario, and we still lack in knowledge on whether gender makes difference in Internet usage pattern in Bangladesh. University students are the focused population in this paper since they are the major user of computer and internet technology. They are more familiar with the usage of technology and have inclination toward using technological applications to achieve academic targets as well as for enjoyment [21]. According to Prensky [22] and Veen [23] this generation of students is naturally familiar with the usage of technology and able to deal with bulk amount of digital information. Taking study sample with similar age, education and institutional support would help us determine whether gender influence on creating difference in Internet usage pattern and what causes those differences.

A wide range of surveys show that technology access and usage demonstrate a significant discrepancy among students [24-26]. Gender difference in internet usage were evident from some studies (e,g. [27-29] where age also emerged as an important predictor of internet usage variation [13, 30, 31]. Parental Support has been appeared as a strong determinant of positive self-efficacy beliefs of the students [32] and so is true in case of ICT self-efficacy which has been apparent from the study of [33]. Students from low socio-economic status (SES) parents stated low confidence in ICT skills and perceived parental support was highly correlated with ICT value beliefs of the students [34]. Taking all these factors into consideration, this paper examines difference in Internet usage pattern across male and female users. With an understanding of the behavioral pattern of the users of Internet and the underlying case of differences in gender gap in technology use, policy makers and practitioners could minimize gender inequality in ICT use. From the perspective of Internet commerce, knowledge on market (the size, characteristics, and demands of the user market) would help them setting up strategy to establish an effective Internet presence.

LITERATURE REVIEW

The gratifications derived from different web applications differ from person to person, from male to female, from older to younger. Role of gender in discrepancy in web usage has been widely researched [35]. argued that both gender and technology transform along with the societies they belong to, both culturally and historically. It implies there is a cross-cultural difference in internet usage among females and males from distinct society. Gender differences in numerous cases may be thin and magnitude may fluctuate from country to country or by age, still a consistent pattern stands [36, 37, 3]. In USA, experience gained from internet is the reason why men like internet and women like it for the human connection it props up [38]. Taiwanese women spend much time on searching academic information, making new social connection and chatting, shopping, checking e-mail while men remain busy more in playing online games, browsing stock information [27]. Female internet users are supposed to have tendency to acclimatize better academic and trend oriented lifestyle where male internet users fancy better career oriented lifestyle - found in India [1]. Canadian boys choose to play multiplayer online games more and girls make intense use of social media [39]. In case of official tasks, the altitude of online office of males is higher than for the females [40].The discovery of [11] was interesting and he found men are more enthusiastic in using Internet as an entertainment tool whereas women were revealed to use digital channels more properly than men to achieve education and training.

Past research (such as [41, 42] identified a number of demographic and economic factors (location, age, gender, education levels, employment status, martial status, children at home, and combined family income) causing differences in internet use pattern. Age is found to have immense impact on usage difference of internet [31]. Downloading music, browsing for fun, chatting or instant messaging is popular among the young adults [30, 31]. In reverse, communicating via e-mails, searching health-oriented information, online shopping are the major online activities for older people [41]. The level of education, age, location found to have significant influence on adoption and use of internet [42].

Self-efficacy is an important tool that is used to realize one's beliefs and poise with respect to their capabilities to perform specific tasks or activities [43]. The Internet self-efficacy points to the self-perceived confidence and expectations of using the internet by the web users. Learners or users with high efficacy expectations may perhaps have a higher chance of success in Internet-based tasks [44-46]. Male university students are supposed to have elevated confidence in their computer abilities than their female

peers [47, 48]. Autonomous learning and having ICT experiences are the most significant variables those can elucidate variations in student's ICT self-efficacy [49]. Durndell [20] found that male students were apt to show greater computer self-efficacy and further positive attitude toward the Internet than female students. Men in China and Great Britain are at a place of higher self-confidence than that of women in terms of computer skills [50]. Girls tend to underestimate their ability of learning and are more likely to feature successful computer performance to good fortune [51-53]. Internet is an indispensable part of contemporary ICT usage and this pattern of gender divide in the Internet self-efficacy also prevails in various literatures. Again, male students scored higher in Internet Self-efficacy Scale (ISS) than female students in the areas of "general self-efficacy" and "communicative self-efficacy" [44]. Perceived parental support is one important factor in shaping ICT self-efficacy of an individual. Family problematic support hinders optimal outcome of any activity by weakening individual's self efficacy [33]. Difference in computer attitude between male and female is assumed to be related to gender difference in perceived parental support [54]. Parental support seemed to be the strongest predictor of computer self-efficacy [3]. Students from families in the income bracket indicating low socio-economic status apparently have less computer beliefs in comparison to their peers from middle and high socio-economic status [54, 55]. Parents with a low socio-economic status might not have that much educational experience and resource to cultivate their children's learning [49] and those children are technologically disadvantaged because they are less likely to have digitally literate parents [56]. Numerous researchers also found this clear-cut relationship evident from their corresponding studies [57-59].

METHOD
Procedure

Our target population was the university students with engagement in online activities in their regular lives. The sampling frame of this study was a list of students of a comprehensive university in Bangladesh who registered for taking a basic course on Microsoft Excel conducted by a private organization. We adopted a non-probabilistic convenience sampling method for the survey. From the list, we sent emails attaching a questionnaire to all the enrolled participants in this course.183 responses were returned back from which 7 responses were omitted due to inconsistency in data (e.g. usage hours more than 24 hours a day). Therefore, the final sample size was 176. The survey instrument- a questionnaire, followed mixed method containing both closed-ended and open-ended questions. The participants filled out the self-report questionnaires measuring their pattern of the Internet usage, self-efficacy and parental support in the first three sections. Then they provided us with some demographic information such as age, gender, family income, academic background and Internet usage hours in the fourth section.

Table-1: Male Female composition and educational profile of the students

Gender	Freq.	Percent	Cum.
Female	90	51.14	51.14
Male	86	48.86	100.00
Total	176	100.00	
IS Discipline			
No	64	36.36	36.36
Yes	112	63.64	100.00
Total	176	100.00	

Participants

The ratio of male (N = 86) to female (N = 90) was almost around unity which indicates almost equal participation of male and female in the survey. One of our motives in this study was to differentiate between the usage pattern of students from Information Science (IS) area and that of students from non-IS arena. Our sample consisted of students from both discipline where 36% of the participants were from non-IS arena (N = 64) and 64% of the participants were from IS field (N = 112). Table 1 above shows the Male Female composition and educational profile of the students. The participants family income, on an average, was approximately 51,000 BDT (SD 83810). The mean Internet usage hours of the participants were 5 and a half hours per day (SD 3.42) and this implies they pass one-fifth of a day in online activities, on an average.

MATERIALS

The first three parts of the questionnaire contain statements that have been taken on and modified from previously published research and validated questionnaires. In the first section, to identify the level of Internet usage for any specific purpose, 7 binary outcome questions [high (more than 2 hours per day) or otherwise] were addressed indicating the students level of internet usage per day in the purpose of *Personal Development, Leisure and Entertainment, Social Interaction, Commercial Transaction, News, Gaming and Information Seeking*. The items included

in this section were modified from previous research of [12]. In the next two sections, we went for assessing the ICT self-efficacy and Perceived Parental Support of the students. Students were posed to express the extent of their agreement or disagreement with the proclamations on the questionnaire on a five-point likert scale (1 = Strongly Disagree, 5 = Strongly Agree). To measure the ICT self-efficacy of the students, 7 validated items ($\alpha = 0.79$) were adopted from the study of [60]. In order to determine the perceived parental support, 5 validated items were obtained from the study of [3] and an additional question was asked by the researchers ($\alpha = 0.75$). Data on Age, Family Income, Internet usage hours were obtained by open-ended questionnaires. The following table (Table-2) displays the items used in the questionnaire.

Table-2: Measurement Items

Items	Reference
Level of Internet Usage:	[12]
Personal Development: The level of your internet usage for the purpose of personal development	
Leisure Entertainment: The level of your internet usage for the purpose of leisure and entertainment	
Social Interaction: The level of your internet usage for the purpose of social interaction	
CommTrans: The level of your internet usage for the purpose of commercial transaction	
News: The level of your internet usage for the purpose of news	
Gaming: The level of your internet usage for the purpose of gaming	
Information: The level of your internet usage for the purpose of information	[60]
ICT Self-Efficacy:	
SE1: I can solve most problems if I invest the necessary effort	
SE2: It is easy for me to stick to my aims and accomplish my goals	
SE3: I can remain calm when facing difficulties because I can rely on my coping abilities	
SE4: When I am confronted with a problem, I can usually find several solutions	[3]
SE5: I am confident that I could deal efficiently with unexpected events	
SE6: Thanks to my resourcefulness, I know how to handle unforeseen situations	
SE7: No matter what comes my way, I'm usually able to handle it	
Perceived Parental Support:	
PS1: My parents encourage me to use computers.	
PS2: My parents think that being good at computers is useful for my future.	
PS3: My parents think that I can do well at computers.	
PS4: My parents are happy with my computer progress.	
PS5: My parents get involved when I use the computer.	
PS6: My parents got angry when they saw me surfing internet in my school/college days. [a]	

[a] This item has been built by the authors.

Data Preparation

We coded the binary outcome variables indicating the Level of Internet Usage in terms of various activities stated above as 1 = high and 0 = otherwise. Gender (*GenderType)* was coded such as female = 0 and male = 1. Academic background (*ABType*) was coded in the same manner where '1' represents students from Information Science background and '0' represents students from other discipline. The extent of agreements to each statement was added in sum in case of calculating total score on ICT Self-efficacy and Perceived Parental Support. *Self Efficacy and Parental Support* are the variables containing the total score in each section. Since ICT self-efficacy was measured in five-point likert scale and there were total 7 items, the highest possible score would be 35 and the lowest score would be 5. Perceived Parental Support was also measured in a five-point likert scale whereas there were 6 items in total. Therefore, the highest possible score in Perceived Parental Support would be 30 and the lowest possible

score would be 5. We generated a new variable named *'Self Efficacy Type'* where scores on self-efficacy above 20 was coded as '1' and scores below 20 was coded as '0' since 20 is the average of the two extreme scores. We took an interaction term *'GenderAB'* by multiplying *Gender* and *Academic Background* with a purpose to see the effect of gender and academic background altogether. Suppose, if the value of *'GenderAB'* is 1, that would indicate a male student from Information Science background.

Models

This paper has two research focuses. From past research we observe that users' demographic factors as well as their level of ICT self-efficacy influence their internet use habit. Therefore, one of our research interests is to find any significant variation in pattern of internet usage of the students depending on gender, age, usage hours, family income academic background and ICT self-efficacy. Another research interest is to discover the effects of parental support,

age, gender, academic background, usage hours and family income on ICT self-efficacy of the students. We consider parental support assuming that it helps increase individuals ICT self-efficacy.

To address first research focus, we modeled odds in favor of high internet usage for the purpose of *Personal Development, Leisure and Entertainment, Social Interaction, Commercial Transaction, News, Gaming and Information Seeking* using seven individual multiple logistic regression models. The generalized form of the model is as follows:

$ln [P_i/(1- P_i)] = B_0 + B_1(GenderType) B_2(UsageHours) + B_3(ABType) + B_4(GenderAB) + B_5(Age) + B_6(FamilyIncome) + B_7(SelfEfficacy)$

To find the relationship among the variables in the second research focus, taking *SelfEfficacyType* as the dependent variable, we modeled the odds in favor of above average score in ICT self-efficacy using a separate multiple logistic regression.The model takes this form:

$ln [P_i/(1- P_i)] = B_0 + B_1(GenderType) B_2(UsageHours) + B_3(ABType) + B_4(GenderAB) + B_5(Age) + B_6(FamilyIncome) + B_7(ParentalSupport)$

The whole analyses were done by using STATA 13.0. Table 3 shows the logistic regression analysis for the pattern of internet use along with its determinants.

Table-3: Result of logistic regression analysis for Internet Usage Pattern

Information Predictors	Personal Development OR	Leisure Entertainment OR	Social Interaction OR	Comm Trans OR	News OR	Gaming OR	Information OR
Gender							
Male	0.42	1.01	0.89	1.81	1.61	1.24	0.37
Female	(Reference)						
Academic Background							
Information Science (IS)	0.27**	0.56	0.52	1.38	1.34	1.32	0.82
Non-IS	(Reference)						
Age[a]	1.79***	0.95	1.04	1.00	0.96	1.19	1.51*
Family Income[a]	1.00	1.00	1.00	0.99	0.99**	1.00	0.99
Usage Hours[a]	1.03	1.18*	0.99	1.10**	1.01	1.08	0.92
ICT Self-Efficacy	1.07*	0.98	0.96	0.99	1.02	0.92**	1.12**
Interaction							
Male*Information Science	2.87	2.83	1.86	0.48	1.00	1.07	3.84
χ^2	37.09***	14.95**	7.09	5.52	8.22	8.49	10.86

[a] Continuous Variable. Odds ratios were calculated for a unit change in those variables
* p < 0.10; ** p < 0.05; *** P < 0.01

Table-4: Predictors for determining ICT Self-efficacy

	ICT Self-efficacy
Predictors	**OR**
Gender	
Male	1.31
Female	(Reference)
Academic Background	
Information Science (IS)	3.32*
Non-IS	(Reference)
Age[a]	1.16
Family Income[a]	1.00
Usage Hours[a]	0.99
Parental Support	1.20***
Interaction	
Male*Information Science	0.56
χ^2	21.39***

[a] Continuous Variable. Odds ratios were calculated for a unit change in those variables
* p < 0.10; ** p < 0.05; *** P < 0.01

RESULTS AND DISCUSSIONS

The analysis shows that pupils from Information Science discipline are less likely to use the Internet more for their personal development like finding/following online courses or independent learning than their counterparts from non-IS disciplines (OR 0.27, [95% CI 0.10 - 0.73]) holding all other variables constant (p<0.01). As age and ICT self-efficacy increase, students are more likely to surf internet for personal development at a higher rate (OR 1.79, [95% CI 1.33 - 2.40]), p<0.05; (OR 1.07, [95% CI 0.99 - 1.15]), p<0.10. All other predictors including gender fail to make any significant impact on the usage of Internet for personal development.

For high internet browsing in terms of leisure and entertainment, usage hour is the only variable that is found significant statistically (p<0.01). The more the usage hours, the more likely is the internet browsing for leisure and entertainment (OR 1.18, [95% CI 1.05 – 1.35]). One possible interpretation might be thought in a way that is as the students enjoy leisure, they get the opportunity to browse internet for more hours and usually they utilize those pastimes by entertaining themselves. Gender, once again, fails to make any impact.

In case of explaining high Internet uses for social interaction we found that none of the predictors are important determinants since the likelihood ratio statistic (chi-square) is statistically insignificant at even 10% level of significance, χ^2 (7, N = 179) = 7.09, p = 0.42. This finding implies when it comes to social interaction, the pattern of the Internet usage is same for all regardless of their gender, academic backgrounds and other demographic factors.

Gender comes into the action when the differences in usage pattern in terms of commercial transaction and gaming are drawn closer to the analysis. Females are more likely than males (OR 0.30, [95% CI 0.07 – 1.19]) to browse internet for shopping/ordering products, acquiring product information, surfing product pages on Facebook which is significant at 8% level (P = 0.087). Gaming is a popular online activity among males (OR 3.50, [95% CI 0.99 – 12.31]) rather than among females and is statistically significant at 5% level (P = 0.05).

The predictor variables, altogether, don't have any association with the likelihood of high Internet browsing hours for news and seeking information. Though the chi-square values are different for respective models, still they are statistically insignificant at even 10% level. Individually, family income is a significant forecaster of the model describing browsing the Internet for news at a higher extent. The higher the family income, slightly lower is the odds ratio than unity in favor of high internet usage in terms of news searching. It implies that students from comparatively lower-income families search for the news more than the students from higher-income families (OR 0.99, [95% CI 0.99 – 1.00]), P = 0.03; χ^2 (7, N = 179) = 8.22, P = 0.31. High internet usage for information seeking is likely to be found more in students with high ICT self-efficacy (OR 1.12, [95% CI 1.01 – 1.25]), P = 0.026, and among comparatively aged students (OR 1.51, [95% CI 0.93 – 2.44]), P = 0.097; χ^2 (7, N = 179) = 10.86, P = 0.14.

From the logistic regression, it seems that perceived parental support plays a very important role in shaping the ICT self-efficacy of a student. Higher degree of parental support is more likely to ensure higher level of ICT self-efficacy of students (OR = 1.20, [95% CI 1.08 – 1.36]), p < 0.01. Academic background afresh proved to have some association with self-efficacy. Students from IS arena are more likely to have propelled degree of self-efficacy than the students from non-IS field (OR = 3.33, [95% CI 0.85 – 12.96]), p < 0.10. The surprising fact lies on the gender invariability of self-efficacy in this sample of students amid strong evident gender-bias of ICT self-efficacy in numerous literatures.

CONCLUSION AND RESEARCH IMPLICATIONS

Internet offers a wide range of uses. This study tests whether or not male and female behaves differently in using internet for different purposes-in what specific applications/ services preference do they differ, what might be the reason for this discrepancy (if any). An online survey among the university students were conducted. The test result reveals that overall the pattern of the Internet use is almost same for all regardless of their gender. However, this general findings can be incomprehensible. Our analysis of usage patter for specific application and use of internet indicates that male and female students show difference in internet use only for the purpose of gaming and for commercial transaction. Females are more inclined than males toward browsing internet for commercial transaction such as shopping/ordering products, acquiring product information, surfing product pages on Facebook, etc. Gaming is a popular online activity among males than females. This study also find a significant positive relation between leisure and entertainment and usage hours for students. The more they get opportunity to spend time in internet, the more likely is the internet browsing for leisure and entertainment.

When comparing ICT self-efficacy among students, our statistical analysis explores that students having academic background of IT reported higher level of ICT-self efficacy than those who are not from the same background. However, when comparing overall ICT self-efficacy between male and female students we did not find any difference. This result is inconsistent with the previous studies. Existing literature argue that men's rating of ICT self-efficacy is

higher than women. We also find that parental support influence students level of ICT self-efficacy. Wu [44] suggests that better support and guidance during learning increases the likely hood of learners' to adopt confidence and a positive attitude toward the Internet. Our findings are important because they add some insight to the relationship between ICT users profile and ICT self-efficacy.

In recent years, academic and research institutions rely more on digital media and provide students with Internet access and services. Students are now using internet for their academic purposes as well as for other use regardless of their gender. Although statistics reveals huge gap in internet use between male and female in developing nations, the picture may somewhat different when policymakers give top priority to the information and communication industry. In recent years, Bangladesh undertakes lots of policy and initiative for digitalization and minimizing digital divide. Women empowerment through digital inclusion is one among the key goals of the government. Based on the results of this study, we suggest when both gender get equal access to Internet, both have exposure to the technology through their educational experience, gender difference is not a predictor of usage pattern. When people reach to a certain extent of education, it enables both men and women to realize their capabilities. We find that students from comparatively lower-income families search for the news more than the students from higher-income families. This finding provide an insight that by making internet services accessible and affordable, government can increase digital inclusion i.e. can reduce digital divide based on income.

We also find that students belong to families where parents support are highly valued; parents care for IT know how and use, have more ICT-self efficacy-an important ingredients for ICT adoption and use. Policy makers can initiate different awareness program in favor of ICT parental support.

The results of this study have some businesses implications as well. Business could direct product offerings and design promotional campaign on internet targeting women by emphasizing on their preference, choice and habits. Men's interest for gaming can be capitalized by creating affiliation with gaming sites. High internet usage for information seeking is likely to be found more in students with high ICT self-efficacy and among comparatively aged students. This findings are logical because the more students are about to enter into the job market the more they need to equip themselves with information to build their career and to prepare for competitive examinations. Information sites, news and content providers could take this findings under consideration and design their content accordingly.

Although this research presents some meaningful insight regarding ICT usage pattern across gender and other demographic factors, it has some limitations that should be taken into consideration in future research. Since the analysis are based on data collected from self-report questionnaires, there is a possibility of a common method bias. Another limitation is that we conducted our study taking sample from one university, as a result, the generalizability of the findings might be limited. We suggest future studies to include more samples from different universities from different corners of the country. It would also be interesting to explore whether individuals from other groups (other than students) also exhibit similar result particularly gender differences in internet usage pattern.

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