

## Web 2.0 Usage: Implications of Digital Divide

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*Received: January 7, 2016*

*Accepted: March 22, 2016*

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### ABSTRACT

Pakistan is a developing country. Trend of using ICT's (Information and Communication Technologies) is not yet embedded in Pakistani community. Despite the growing awareness among Pakistani people about the benefit of ICT's, there are possibilities of gender, age and area based digital divide. The goals of this research are twofold. First, we conducted a survey on presence of "digital divide" in urban and rural areas of Azad Jammu and Kashmir. Second, through case studies we see the effect on digital divide contributed by the usability problems of social networking sites. From this, we discuss the dynamic relationship between the web 2.0 based sites and their contribution in bringing people towards using ICT. Our results indicate presence of age based and area based digital divide, but gender based digital divide is disappearing in our targeted area. The survey results also supported our hypothesis about web 2.0 based sites that they are playing a major role in attracting people towards using ICT. Our case study survey indicated some major usability problems for two most famous social networking sites. Solving these usability issues can help in attracting more non-technical people towards using internet and communication technologies.

**KEYWORDS:** Developing countries, Web 2.0, Pakistani community, digital divide, ICT (Information and Communication Technology).

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### 1. INTRODUCTION

The term digital divide is normally defined as a gap between people who use technology and the people who do not use the technology. In the era of internet this term is not restricted only to hardware use of technology but also to use of technological software's and internet. [2] has defined digital divide as the space separating those who have access to latest technology and those who do not. Economy, usability and empowerment are the basic reasons behind presence of digital divide in any society [1].

Developed countries are getting more benefits from the upcoming technologies whereas developing countries are far away from using those technologies. Internet is becoming the most prominent way of communication all over the world. Pakistan is also in the race of developing countries. More and more people are trying to use internet. Internet is provided in almost all cities of Pakistan, but internet in rural areas is still hard to access. The speed is not good enough even if it is available. Only 36% of total population lives in urban areas, so for improving the economy and digital opportunities we need to improve the internet facilities in rural areas [3].

**2. Related Studies on Digital divide.** Technology plays an important role in the lives of human being. Underdeveloped countries have yet to take full advantage of the huge opportunities ICT offers in everyday life. Most academicians, politicians and public policy makers are aware of the issues of global digital divide. Negligible work has been done to study the growth rate of information and communication technologies usage in developing countries. Research by [4] got an important place in this area. In their work, they have shown consequence of technology in developed and developing countries. Digital divide is present among the prosperous and the meager countries owing to the unavailability of resources and trained ICT (information & communication technologies) professionals. They have also highlighted different aspects of digital divide in Turkey and have given suggestions to bridge the digital gap.

Another study carried out by [3] explored the main obstruction in addressing digital divide initiatives from technological, reasonable, social, cultural, habitual and institutional perspectives in a developing country. Economy plays an important role in producing technical persons, infrastructure, social issues and mind-set of people towards using ICTs is a hindrance in reducing the digital gap.

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An Indian researcher [5] depicts in his study the present condition of India in using internet and computer technology. The center of attention for his paper is to recognize the rigorousness of digital divide in India. Reasons identified for the digital divide in India are over-population, geographical factors, transport divide, and english language.

Tanveer Zia a Pakistani researcher found out the factors which contribute to the digital divide in Asia. Targeted audiences were from four different countries Yemen, Bangladesh, Pakistan and China. According to his work unequal geographic distribution of internet, Infrastructure for connecting to the internet and sector absorption [6] are the main reasons for digital divide in Pakistan.

A usage analyzes of web 2.0 technologies, such as wikis, blogs, RSS feed, social networks, podcasting, SNS in a learning environment in different universities at Western Uttar Pradesh was done in [7]. Almost all respondents have awareness about web 2.0 and they also have the opinion that web 2.0 plays an important role in education. The author recommended that university libraries should provide training to staff on web 2.0 technologies.

Digital divide in Jammu and Kashmir also exist. People are facing problems in using internet because they are unaware of these facilities. People living in rural areas are lacking behind due to english language proficiency as technology usage is heavily dependent upon literacy and awareness among people [8]. Wireless technology can be a better way to reduce the digital divide [9].

Social networking sites are becoming a trendy way of bringing up online social relationships. People can upload videos and photos. They can also send messages to each other. Usability issues of three social networking websites like Facebook, Myspace and Orkut are discussed in [10]. To maintain the users and to improve the usability issues of these websites several guidelines were given like use of consistent and familiar terminology, giving explanation for unique terms in the website, providing proper feedback to the user, improve link placement, uploading a profile picture and finding the chat link, placing the setting options within user easy view and giving sufficient feedback to the user for incomplete tasks. In [11] the researcher is of the view that usability evaluation depends on evaluating techniques, the better the evaluation technique more refined the usability evaluation will be.

In short, social networking sites are gaining popularity and influencing the life's of the people in many different ways. Customer support, trustworthiness, ease of use and innovativeness are the key factors that influence user's satisfaction.

### 3. Research Hypothesis

- i. Young generation is more inclined towards technology than older people.
- ii. Gender difference between computer usages is decreasing.
- iii. Web 2.0 sites have attracted peoples towards using computer technology.
- iv. Cities have better access to technology.
- v. Language is a factor that influences digital divide. Availability of computers and internet is a factor that influences digital divide.
- vi. Usability problems in social networking sites do not allow lay man to use technology.

**4. Methodology.** This study is divided into two sections. Quantitative research method is used for the first section, as in this method research can be conducted on small number of subjects. General information about the participants like their age, gender, computer expertise, internet availability, internet usage, internet cost, interest towards using web 2.0 applications and problems they face using internet are collected in the first section. In the second section qualitative method is used to collect information about usability issues. In which Facebook and LinkedIn are used as case studies. The purpose of the second survey is to analyze the impact of web 2.0 based website's design on digital divide.

Data is gathered using questionnaires and interviews where required. This survey took one month time. People from different age groups and gender were chosen to fill up the survey form. A brief description was given to all the participants to make them familiarize about the purpose of the study. Issues raised by the participants, like people who were unaware about web 2.0 technology, were also resolved. Total 162 questionnaires were sent to rural as well as urban areas of Azad Jammu & Kashmir. 112 people participated in the survey. Interviews were conducted from different people to discuss their issues regarding digital divide.

**5. Research Findings.** The participants are divided into three age groups, 16-25, 26-40 and 40 onwards. This categorization is done so that the impact of digital divide can easily be analyzed on the basis of age difference. The survey results supported the **first hypothesis** that “Young generation is more inclined towards technology than older people”.

**Table 1. Age Based Computer Expertise**

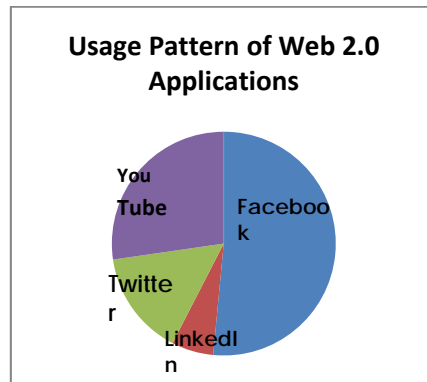
	16-25	26-40	40 onwards
Novice	4%	10%	8%
Mediocre	39%	9%	4%
Expert	6%	11%	0%

An important observation is seen that more females of age group 16-25 and 26-40 are involved in using computers than males. But in 40 onwards age group number of male computer users are twice the females. This shows that previously less females were involved in using the computer but now-a-days this gap is reducing. Thus the gender difference among computer users are decreasing, negating our **second hypothesis** is not supported by our survey results.

**Table 2. Age & Gender Based Computer Expertise**

	Age Group		
	16-25	26-40	40 onwards
Novice (F)	4%	4%	6%
Novice (M)	4%	16%	11%
Mediocre(F)	46%	12%	2%
Mediocre(M)	35%	7%	5%

**Third hypothesis;** that web 2.0 sites have attracted peoples towards using computer technology is proven by our research as most of the young participants are using Facebook.



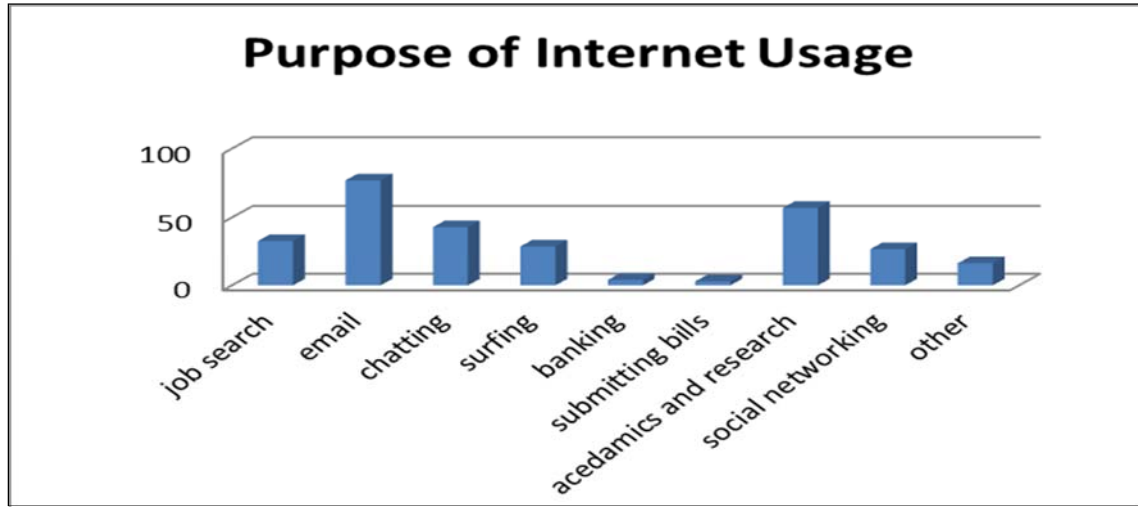
**Fig. 1. Usage Pattern of Web 2.0 Applications**

**Fourth hypothesis;** that cities have better access to technology is also supported by the survey results. Results showed that people living in cities have better access to technology as compare to the rural areas. As this is clear from the table below that in urban areas 68% participants are mediocre users of computers whereas in rural areas only 24 % participants are mediocre users.

**Table 3. Urban VS Rural Internet Usage**

	1-4 hrz	5-10 hrz	More	Did not Answer
Novice (U)	5%	4%	0%	0%
Novice (R)	8%	3%	0%	34%
Mediocre(U)	23%	21%	25%	0%
Mediocre(R)	18%	0%	5%	0%
Expert(U)	3%	8%	10%	0%
Expert(R)	0%	3%	8%	0%

**Fifth hypothesis;** language is a factor that influences digital divide is not supported in the targeted community. It is also observed that internet was most commonly used for emails and Academics & Research.



**Fig.2** Purpose of internet usage

**6. Case Studies:** Usability problems were categorised in two sections; major and minor problems.

Major problems are those that were most commonly seen by the participants and minor problems are those which are identified by fewer participants. Major problems include, difficulty in undoing any action, low access/processing speed, improper feedback for half-done tasks and insufficient help provision. Most of the participants were not comfortable with the attention-getting techniques such as size, contrast and animations, rarely needed information is placed high in the architecture and it was difficult to recognize the features just by viewing them.

Minor problems identified by the participants were difficulty in going forward and backward while using multiple screens, finding required information at the expected place is also difficult for some participants; improper arrangement of navigation items, language used is not according to local audience and lack of proper assistance if the user stuck into any task and white spaces are not used. These results revealed that usability problems in website like Facebook and LinkedIn also influences the digital divide. If the websites are built in a way that is easily understandable and usable by the people than more and more people feel ease in using these websites that can help in reducing the digital divide.

**Table 4: A comparison with global IT report 2012**

Issues	Pakistan's Position	Our Findings
Affordability	26	55% users are getting internet at affordable rates
Skills	129	53 % users are mediocre users
Internet Usage	104	More than 80 % participants use internet at least for 1-4 hours a week.
Households with personal computers	101	More than 75% participants own a computer
Use of virtual social networks	95	81% participants are using social networking sites
Internet access In schools	90	70% participants have internet in schools

**7. Recommendations.** Use of online social media is on its urge these days. According to the case studies followed in this research, most of the participants are using social websites like Facebook and LinkedIn. Following changes in the design are suggested according to the problems identified by the users. Incorporation of these changes will definitely attract more people towards these web sites.

**7.1. Implications for design:**

**Improving User Interface.** Most of the targeted participants were educated but even then they felt lack of proper assistance if the user stuck into any task. Website does not show that task is being processed or not yet initiated. Inclusion of progress bar can help reduce this problem. Participants also felt difficulty in going

forward and backward if using multiple screens. Although home option is available on each page but there is no option that takes the user back to the location from where the user left. To improve this proper navigation scheme should be maintained. Some participants also find it difficult to get the required information at the expected place. This was more noticeable in “Option settings” area. Participants were having trouble when they wanted to undo any action. They had to redo the previous settings if they were not satisfied with the new settings. This problem can be solved if the website keeps the record of the previous settings for some specific time duration. Low access/processing speed and improper feedback for half-done tasks were also the main contributors of the users dissatisfaction towards these sites.

**Consistency and Standards.** Attention-getting techniques must be used for very important tasks such as security and privacy related updates. But these are not used in the mentioned websites. Proper format should be provided for various data entry fields such as Date and Time.

**Flexibility of Use.** On average, people find the website easy to use but for “settings/privacy” option participants felt difficulty. These options were not only confusing but they were also difficult to comprehend. For novice users it was even difficult to find and modify the “settings/ privacy” option.

**Help and Documentation.** Proper help is not provided. Most participants complained that they don’t get reply for the queries asked. Also instructions are not placed within the user’s context. Help and proper documentation plays a very important role in the usage of any software or website. Ignoring this important issue creates dissatisfaction as was evident from the user’s response.

## **7.2. Web development Model based guidelines**

**Planning Phase.** The planning phase includes definition of the objectives, purpose, users, computing environment for the website. Other factors like development cost and practicality should also be measured in this phase.

The websites that were considered for the case study are already deployed. For new website development less computer expertise and low internet speed should be taken into account right from the planning phase.

**Analysis and Design.** Analysis phase focuses on user tasks and their required information. It defines functions and operations of the proposed application through intensive discussion between web development services and the client. While the design phase focuses on website layout, targeted audience and accessibility issues.

The analysis and design issues brought up as a result of the survey conducted are: Language used is not according to local audience, lack of proper assistance if the user stuck into any task and white spaces are not used, difficulty in going forward and backward if using multiple screens, finding required information at the expected place is also difficult for some participants, felt difficulty if they wanted to undo any action, low access/processing speed, improper feedback for half-done tasks, help provided is insufficient, most of the participants were not comfortable with the attention-getting techniques such as size, contrast and animations, rarely needed information is placed high in the architecture and recognizing the features just by viewing them.

**Testing.** This phase checks if the contents are correct, navigation is easy to understand and correct functionality is implemented behind each link. Improper arrangement of navigation items were the most common issues related to testing.

**Implementation and maintenance.** Updates related to the website, its structure and contents are part of implementation and maintenance phase. The websites considered in the case study lacks in updating its users about changes in their website related policies.

**8. Conclusion & Future Work.** Digital divide not only has a great impact on economic development but it also emphasis on development of a community. This paper is conducted in the major districts of AJ & K. The reasons of digital disparity in the targeted community are age, lack of infrastructure in rural areas. AJ & K is considered an underdeveloped and hard area.

Results showed that more and more females are getting technology oriented, gender based digital divide has decreased, youth is more inclined towards using technology as compare to their old age counter parts. Language is not a big barrier as English is being taught from early schools, computers are now becoming the essential parts of each house hold, internet is available at schools and offices but not sufficient, internet cost for home usage is still high and if the cost of the internet is reduced internet users will increase.

The main purpose for internet usage is social networking, email and chatting. Main problems faced by internet users include speed and availability especially in rural areas. Web 2.0 sites now encourage people to use internet. Proper training to the people will increase the use of technology.

For the case studies main usability problems for Facebook and LinkedIn users are low access speed, improper feedback for half-done tasks, help provided is insufficient, felt difficulty if they want to undo any action, recognizing the features just by viewing them, difficulty in going forward and backward if using multiple screens, some of the participants are also not pleasant with the attraction getting techniques used in the website, finding required information at the expected place is also difficult for some participants, rarely needed information is placed high in the architecture, improper arrangement of navigation items, language used is not according to local audience, lack of proper assistance if the user stuck into any task and white spaces are not used.

In this study most of the targeted audience was educated and from urban areas. In future we plan to increase our target regions and also consider areas like Neelum Velly and Jehlum Valley. Impact of other social factors like marital status, number of dependents, monthly income, etc. on digital divide will also be checked.

From the usability point of view we have checked the impact of two most famous sites like Facebook and LinkedIn. For future studies we plan to investigate the impact of social networking sites for business and education purpose, effect of social networking sites on our everyday real life, social interaction, privacy and security concerns in social networking sites will also be measured, as well as the ethical and harassment issues associated with these sites.

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