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Impact of Web 2.0 on Digital Divide in AJ&K Pakistan

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Abstract—Digital divide is normally measured in terms of gap between those who can efficiently use new technological tools, such as internet, and those who cannot. It was also hypothesized that web 2.0 tools motivate people to use technology i.e. social networking sites can play an important role in bridging digital gap. The study was conducted to determine the presence of digital divide in urban and rural areas of district Muzaffarabad, Azad Jammu & Kashmir. A cross-sectional community based survey was conducted involving 384 respondents from city Muzaffarabad and village Garhi Doppta. The existence of digital divide was assessed on the basis of the questionnaires given. Chi-square test was applied to find the association of different demographic and ICT related factors with internet usage. Despite the growing awareness there are possibilities of gender, age and area based digital divide. Outcomes of the survey affirmed that web 2.0 based web-sites are becoming popular and attracting people to use internet.

Keywords—AJ&K; digital divide; ICT; web2.0; social networking; social inclusion and cohesion enabling approaches; net-living life styling personalization and optimization; subjective human and social factors; well-being through net living

I. INTRODUCTION

Digital divide is defined as two interdependent gaps; gap between skills of people who use technology and gap caused by access to the technological tools [1]. It is very difficult to use the technology without its proper understanding. In [2] digital divide is defined as the disproportion among; the internet users, poor and the rich people, internet access in the developing countries and gender discrimination. Access, awareness, attitude and application is the 4A viewpoint given by [3], which emphasis on digital gaps at local as well as global level. Other factors that influence access to internet and communication technologies are income and gender. Thus, digital divide is not only limited to the hardware use of technology, but also to the use of technological software's and internet [4].

Pakistan is among the developing nations of the world. Cities like Karachi, Lahore and Islamabad are competing the world in technological advancement. Mubashir Akram, a Pakistani political communication specialist, indicated that Pakistan is having a total population of 180 million, among them only 36% population is living in cities and from the urban residents only 16% are using internet [5].

Azad Jammu and Kashmir (AJ&K) is a self-governing state under the constitution of Pakistan. Head of the state is President. It is located in the north of Pakistan and has a mountainous terrain. Pothwari is the most commonly spoken language. Azad Kashmir is famous for its beauty all over the world and it is full of natural resources. Kashmir is also called heaven on earth and tourism is one of its main industries. Azad Kashmir suffered from earthquake of 7.6 magnitudes in 2005 which totally destroyed its infrastructure.

Internet has become fundamental for performing everyday tasks from all aspects of human life. But unfortunately, it is found that senior citizens of Asia are using internet rarely, which can contribute to their social segregation. Pew's finding in Asia reported that only 25% older people in china, 17% in Malaysia, 14% in Thailand, 7% in India, 5% in Pakistan and 2% in Bangladesh own smart phones [6].

People in AJ&K have limited internet facilities and resources. In spite of the literacy rate of 60% in AJ&K [7], little is known about prevalence of ICT (Information and Communication Technology) usage in its community. No study has been made so far to identify the presence of digital divide in AJ&K. The objective of the present study is to estimate the prevalence of digital divide in rural and urban population of AJ&K by taking "Weekly Internet Usage" as the key factor. Because "gap in internet usage" is a main contributor in digital divide and has been the subject of many scholarly debates.

Paper is divided into following sections. Section II introduces the different types of digital divides. Research questions and hypothesis are highlighted in Section III. Methodology used to evaluate the presence of digital divide is presented in Section IV where research finding and Internet usage along with Web 2.0 are discussed in detail in Section V and Section VI, respectively. We analyze association between hypotheses and findings in Section VII. Recommendations to reduce the digital divide in targeted community are proposed in Section VIII. Finally, the paper is concluded and future work is highlighted in Section IX.

II. RELATED STUDIES ON DIGITAL DIVIDE

A. Age based Digital Divide

Internet has become an integral part of our lives. Internet prevalence have reached more than 80% in Germany, South Korea, USA and Switzerland and it has crossed 90% in Scandinavian countries. This ubiquity of internet access is due to socio-demographic dimensions such as income, education, gender and age [8].

Age based digital divide is categorized in first level of digital divide. According to [8]-[9] more than 95% youth in United States and Switzerland are taking technology benefits. From a survey conducted in Switzerland during the time period 1997-2016 it is quite clear that people of age 70+ are less frequent internet users and they need extra consideration.

B. Gender based Digital Divide

One of the major problems faced by women living in developing countries is gender discrimination [9]. This affects their access to internet and communication technologies. Most of females are also unemployed [3]. 25% women in Middle East countries [10] and 45% women's in Sub-Saharan Africa are lacking internet access [11] due to the reason that they are more indulged in accomplishing their household tasks [12]. UN data statistics showed that 60% women's are unemployed [13]. In [14] segregation from technology awareness, supporting men in comparison to women and economic issues are shown as the main obstacles in the way to technology usage.

C. Socio Economics Digital Divide

Open ended questions were asked to collect qualitative data in a study carried out in Oyo state and Yewa about exploring the impact of digital divide on computer usage and internet access.. Their results showed that affordability and lack of internet access are the main reasons behind digital divide [26]. Another research carried out in Australia focused on the existence of digital divide in young generation. Outcomes of the research indicated that young people are using more technological tools like mobiles, handheld devices, etc. it may affect the economy, academia and health [27]. In a report presented by OECD for exploring the existence of digital divide, government officials identified that electronic commerce can be improved by increasing the technological use [28]. OECD countries are motivating investors to increase the demand for communication technologies for economic growth. They intend to decrease the digital divide by individual capacity building and by improving the technological setups.

D. Area based Digital Divide

Age and gender are not the only glitches that are producing digital cavity but one of the most imperative elements is locality of an individual. A number of reasons were underlined in a study carried out in US and all over the world, problems identified are; less frequent use of technological tools in class rooms, unavailability of technology, inadequate bandwidth to attend online programs [15], [16]. If appropriate technological tools are provided to the teachers they can make a big revolution in bridging the gap [17].

E. Other Digital Divides

Trend of using social networking sites are growing rapidly. Social networking is not only a mean of communication between different people it also plays a significant role in establishing a geographically close romantic relationship [18], [19]. Another study was carried out to elaborate the problems that teachers face in order to cope with the technological changes in the society. They identified that teachers were unable to choose suitable technological tools for education [20]. Furthermore over population, use of English language, ecological factors and transportation are the main reasons of digital illiteracy in addition to problems like budget, resources, social norms and mentality of societies [21].

III. RESEARCH QUESTIONS AND HYPOTHESIS

On the basis of the background studies following research questions are formulated.

- 1) Are their multiple user groups based on age, area, computer literacy, gender, etc.?
- 2) What proportion of people are more frequent internet users?
- 3) How web 2.0 applications influence people towards internet use?
- 4) What is the internet access level of the people living in rural and urban areas?
- 5) Which social factors restrict people from using internet?
- 6) Which economical and other factors limit internet use?

Based on research questions we have tested the following hypothesis in urban and rural areas of district Muzaffrabad.

H1: Young generation is more inclined towards technology than older people.

H2: Gender difference between computer usages is increasing.

H3: Web 2.0 sites have attracted peoples towards using computer technology.

H4: Cities have better access to technology.

H5: Language is a factor that influences digital divide.

H6: There is association between demographic aspects and ICT factors.

IV. METHODOLOGY

The entire study was done in order to evaluate the presence of digital divide in Muzaffrabad city and village Garhi Dopppta. Total population of district Muzaffrabad and garhi dopptta is approximately 0.8 Million. This study involved cross sectional data collection through a detailed open ended questionnaire based survey of 384 respondents in the area under consideration. Data was collected using systematic random sampling technique. However, first we used cluster sampling for residents of neighborhoods, blocks, and housing structures. Then within each selected area, we used systematic random sampling where each unit in the population was identified, and each unit had an equal chance of being in the sample. To select the sample of 600 houses, we picked every 18th house to cover large area of population. Instrument for data collection, in the form of a structured questionnaire, was designed to elicit information about the use of internet and web 2.0 sites. A printed questionnaire was distributed among the participants manually. Group of 10 volunteers helped in conducting the survey; they were well trained before. All the questions were explained in native language to participants who had problem understanding English. Interviews were also conducted where required. Initially the survey was given to 300 people from whom 174 responded back. Survey questionnaire were again distributed manually among 300 more people out of whom 210 returned the completely filled survey. Remaining 90 questionnaires were either incomplete or never received. So the total response rate was 64%. Every time, during survey distribution, questionnaire was explained completely. Problems faced by the participants like unawareness about the web 2.0 technologies were resolved by the volunteers. Survey consisted of two sections. First section collected demographic information and the second collected information regarding the usage of web 2.0 based websites. It took two months to complete the survey.

In order to check the reliability and consistency of questionnaire, Cronbach Alpha test was used [22], [23]. The reported value of Cronbach Alpha turned out to be 0.65, implying that questionnaire used for the study was reliable and consistent.

This survey facilitated in identifying major difficulties faced by the community while using ICT. Total 600 questionnaires were disseminated in Muzaffarabad city and village Garhi Duppatta while 384 people responded positively. Problems faced by the people were discussed and resolved during survey. The data was analyzed using SPSS version 14.0 [24].

Descriptive statistics was done using mean \pm SD for continuous variables and frequencies with percentage for categorical variables. The Chi-square test [25] was applied to find the association of demographical and ICT factors with digital divide using (1). Chi-Square is the sum of the squared difference between observed (o_i) and the expected (e_i) data, divided by e_i . Furthermore 95% CI was calculated using (2).

$$\chi^2 = \sum_i^n (o_i - e_i)^2 / e_i \quad (1)$$

$$\hat{P} \pm 1.96 \sqrt{\hat{P}(1 - \hat{P})/n} \quad (2)$$

V. RESEARCH FINDINGS

The distribution of socio-demographic characteristics of the study population is shown in Table I. Survey was distributed random among respondents of various age ranges and gender evenly among city and rural population. Rural to urban ratio in AJ&K is 88:12. This fact is depicted in our survey results as 54.69% respondents belong to rural areas. 80% of the respondents are either employees or students thus we have 48.1% respondents who have mediocre computer knowledge, 37.7% novice and 14% as expert users. Literacy rate in AJ&K is very high as compare to rest of the country. 56.7% of the population under study was English literal, 27% were comfortable with English to some extent.

Tables II and III shows association of weekly internet usage with demographical and ICT factors respectively. These tables indicate various aspects of the digital divide in the region. In Table II, the association between demographical and weekly internet usage, the factor "gender" showed non-significance; the p-value is greater than level of significance (0.05). While all the remaining variables that are area, age group, computer knowledge, professional status and English literacy are highly associated with weekly internet usage. Thus our results, based on responses of various age groups, indicate that gender difference among computer users are decreasing. Another observation seen is 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 doubled than the females, as evident in Table IV. This shows that previously fewer females were involved in using the computer but now-a-days this gap is reducing. To find out the most significant ICT related factors that can cause digital divide in the area, Chi-square test was performed to check the association of different ICT factors with weekly internet usage. This confirms the validity of hypothesis of the study. Internet cost, computer access and mobile access all contribute in prevalence of digital divide.

Tables V and VI show the problems faced by participants while using internet and their purpose of internet usage respectively. It was observed that internet was most commonly used for emails, social networking sites as well as academics and research. Internet speed was the major problem faced by the participants.

TABLE I. DEMOGRAPHICAL CHARACTERISTICS OF THE STUDY COHORT

Variable	Number	(%age)	95% CI
Area			
Rural	210	54.69%	(49.70-59.66)
Urban	174	45.31%	(40.33-50.33)
Gender			
Female	197	51.30%	(46.30-56.30)
Male	187	48.69%	(43.69-53.69)
Age Range			
16-25	127	33.07%	(28.36-37.36)
26-40	129	33.59%	(28.86-38.86)
40 onwards	128	33.33%	(28.61-38.04)
Computer Knowledge			
Novice	145	37.76%	(32.91-42.60)
Mediocre	185	48.18%	(43.17-53.17)
Expert	54	14.06%	(10.58-17.53)
Professional Status			
Employee	167	43.48%	(38.53-48.44)
Student	140	36.46%	(31.64-41.27)
House wife	47	12.24%	(8.96-15.51)
none of these	30	7.81%	(5.12-10.49)
English Literacy			
Yes	218	56.77%	(51.81-61.72)
NO	62	16.14%	(12.46-19.82)
To Some extent	104	27.08%	(22.63-31.52)

TABLE II. ASSOCIATION OF WEEKLY INTERNET USAGE WITH DEMOGRAPHICS PARAMETERS OF THE STUDY COHORT

Variables		Weekly Internet Usage				Chi Square	df	Sig
		0 hrs	1-4 hrs	5-10 hrs	More			
Area	Rural	80	69	40	21	23.48	3	0.000
	%	20.83	17.97	10.42	5.47			
	Urban	33	54	51	36			
	%	8.59	14.06	13.28	9.38			
Gender	Female	64	65	48	20	7.479	3	0.580
	% of total	16.67	16.93	12.50	5.21			
	Male	49	58	43	37			
	% of total	12.76	15.10	11.20	9.64			
Age Group	16-25	28	39	32	28	20.873	6	0.002
	% of total	7.29	10.16	8.33	7.29			
	26-40	31	46	35	17			
	% of total	8.07	11.98	9.11	4.43			

	40 onwards	54	38	24	12			
	% of total	14.06	9.90	6.25	3.13			
Computer Education	Novice	84	39	12	10	156.139	6	0.000
	% of total	21.88	10.16	3.13	2.60			
	Mediocre	28	77	60	20			
	% of total	7.29	20.05	15.63	5.21			
	Expert	1	7	19	27			
	% of total	0.26	1.82	4.95	7.03			
Professional Status	Employee	31	60	51	25	62.184	9	0.000
	% of total	8.07	15.63	13.28	6.51			
	Student	33	48	30	29			
	% of total	8.59	12.50	7.81	7.55			
	House wife	30	7	8	2			
	% of total	7.81	1.82	2.08	0.52			
	None of these	19	8	2	1			
	% of total	4.95	2.08	0.52	0.26			
English Literacy	Yes	16	80	69	53	138.83	6	0.000
	% of total	4.17	20.83	17.97	13.80			
	NO	44	11	7	0			
	% of total	11.46	2.86	1.82	0.00			
	To Some extent	53	32	15	4			
	% of total	13.80	8.33	3.91	1.04			

TABLE III. ASSOCIATION OF WEEKLY INTERNET USAGE WITH AVAILABILITY/ACCESS TO ICT FACILITIES

Variables		Weekly Internet Usage				Chi square	df	Sig
		0 hrs	1-4 hrs	5-10 hrs	More			
Internet Cost	1000	5	80	39	15	277.063	9	0.000
	%	1.30	20.83	10.16	3.91			
	2000	8	23	43	24			
	%	2.08	5.99	11.20	6.25			
	More	12	7	6	17			
	%	3.13	1.82	1.56	4.43			
	< than 1000	88	13	3	1			
	%	22.92	3.39	0.78	0.26			
Computer Available at home	Yes	48	100	90	56	114.939	3	0.000
	%	12.5	26.0	23.4	14.6			
	No	65	23	1	1			
	%	16.93	5.99	0.26	0.26			
Availability of Mobile Phone	Yes	89	112	87	56	22.588	3	0.000
	%	23.18	29.17	22.66	14.58			

If internet is provided at low cost number of users will increase	No	24	11	4	1	88.695	9	0.000	
	%	6.3	2.9	1.0	0.3				
	Strongly Agree	18	44	58	44				
	%	4.69	11.46	15.10	11.46				
	Agree	76	70	32	12				
	%	19.79	18.23	8.33	3.13				
Internet is available at schools or offices	Disagree	14	8	1	0		137.131	6	0.000
	%	3.65	2.08	0.26	0.00				
	Strongly Disagree	5	1	0	1				
	%	1.30	0.26	0.00	0.26				
	Yes	18	44	58	44				
	%	4.69	11.46	15.10	11.46				
	No	76	70	32	12				
	%	19.79	18.23	8.33	3.13				
	Some times	14	8	1	0				
	%	3.65	2.08	0.26	0.00				

TABLE IV. AGE AND GENDER BASED COMPUTER EXPERTISE

Computer Expertise	Age Group		
	16-25	25-40	40 onwards
Novice (F)	8.63%	9.14%	15.23%
Mediocre (F)	21.83%	20.81%	17.26%
Expert (F)	2.54%	2.54%	2.03%
Novice (M)	12.83%	13.37%	16.58%
Mediocre (M)	14.97%	11.23%	9.63%
Expert (M)	5.35%	10.16%	5.88%

TABLE V. PROBLEMS FACED USING INTERNET

Speed	Availability	Computer Expertise	Busy Schedule
61.61%	34.82%	19.64%	22.32%

TABLE VI. PURPOSE OF USING INTERNET

Job Search	Email	Chatting	Surfing	Banking	Submitting Bills	Academics and Research	Social Networking	Other
29.46%	60.71%	39.29%	26.79%	3.57%	3%	55%	48%	14%

VI. INTERNET USAGE AND WEB 2.0

Most frequent use of internet was found for emails and social networking sites. As these help people to stay connected with their work as well as families (Table V). In our survey, we also inquired about various features of Web 2.0 that are used most by the participants. Also they were asked to mention if these features have helped them in becoming computer fluent. Their responses depicts that Facebook is the famous social networking site among both the females and males with total 32% of respondents using only this site. YouTube was second

on this ranking with 7% users. 44% of participants used more than one web 2.0 based website as shown in Fig. 1.

Fig. 2 shows that 70% females and 71% males agree on the theory that social networking sites have helped them in becoming a fluent computer and internet user. Results clearly indicate that web 2.0 based sites play a major role in bringing people towards the use of ICT that not only reduces the digital gap but also results in productivity and improves overall economic growth and development.

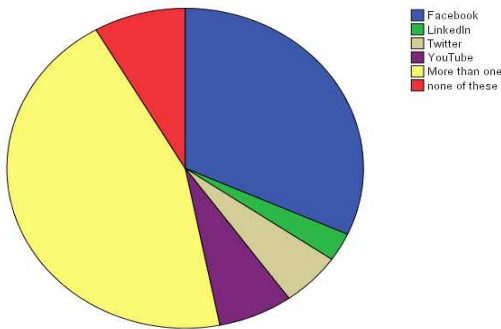


Fig. 1. Usage pattern of web 2.0 applications.

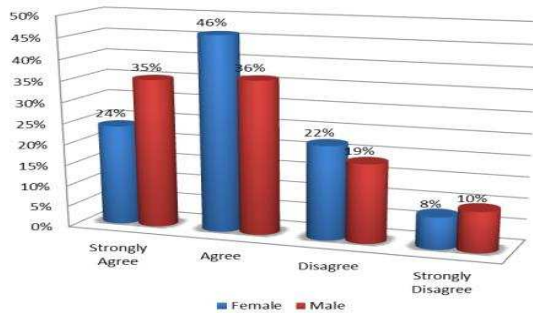


Fig. 2. Social networking sites vs. fluent internet user.

VII. ANALYSIS

The first hypothesis “young generation is more inclined towards technology than older people” has been supported by the survey results. Results also indicate that gender difference among computer users are decreasing day by day, so second hypothesis is not supported by the survey results. Third hypothesis; “web 2.0 sites have attracted peoples towards using computer technology” is proven by the research conducted as most of the young participants are using internet to use Facebook and social networking sites. Fourth hypothesis, “cities have better access to technology” is also backed by survey results as people living in cities have better access to technology as compare to the rural areas. The fifth hypothesis; “language is a factor that influences digital divide” is not supported in the targeted community. Other results revealed that usability problems in website like Facebook and LinkedIn also influences the digital divide. If the websites are user friendly than more people will feel comfortable in using these websites which in turn will help in reducing the digital divide. The overall results provide a prominent association between demographic aspects and ICT factors.

VIII. RECOMMENDATIONS

The study commenced is a preliminary work done to investigate the attitude of the people towards internet usage. Subsequent steps were taken to involve more people into the study to enhance the quality of the collected data. On the basis of the collected data, to reduce the digital divide in the targeted community following recommendations are made; proper infrastructure should be provided at low cost in all rural areas, to introduce the benefits of using technology proper awareness sessions should be given to the community, sufficient number of computers should be provided in schools

and offices, proper training of using different technologies should be provided, speed of the internet should be increased, focus the Digital Literacy from basic education level, internet cost reduction, promotion of online banking and online shopping can bring people closer to ICT. The positive aspects of social networking sites should be highlighted to avoid any kind of miss use of these services

IX. CONCLUSION AND FUTURE WORK

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

Results showed that 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, and internet is available at schools and offices. However, 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 encouraged people to use internet. Proper training to the people will increase the use of technology.

This work can be enhanced by targeting visually impaired and handicapped audience.

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