Information and Communication Technologies as a New Learning Tool for the Deaf

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ABSTRACT

Literacy level of the deaf has recently been seriously questioned in Pakistan. Students with deafness are not able to express themselves through written or oral language. The lack of communication restricts their social interactions with hearing individuals and gradually disintegrates them from the rest of society. This deficiency creates tremendous stress on these individuals. When they are referred to psychiatrists for medical care of their emotional problems they are frequently misdiagnosed as psychotic patient because of limited expression of their symptoms. The prolonged medication results in secondary deficits and diseases. This goes on for ever. An ever increasing obsession for using ICT has, however, opened new opportunities for learning for the deaf. They are using video games, internet browsing, mobile messages etc. This ongoing study explores the choices of the deaf for using various ICT tools in accessing the world around them. The mode of their learning particularly the meta cognition is also investigated by using sign language and conducting interview schedules. The association between various independent variables such as mother language, level of education, socio-economic and age is also delineated. The implications of the study on the deaf curriculum are also discussed.

Keywords: Deafness, ICT, communication, literacy, learning tool, Pakistan

1. INTRODUCTION

The literacy rate of persons with deafness is alarming as participation of school age children in Pakistan is about 4% of their total number. There are special schools and colleges up to degree level for the deaf but their reading and writing ability is of fourth grade level irrespective of the years of schooling [1]. A lack of participation in social interactions due to limited communication is increasing their handicapping conditions many folds.

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The relationship between deafness and literate thought has emerged as a new line of research in recent literature [2]. The persons with deafness possess comparable cognitive abilities with reference to their normal peers. Yet a clear lag in reading and writing abilities exists across the globe. Hearing loss, particularly of profound level, restricts their interaction with social as well as physical environment as they are not able to capture auditory input. Limitations in communication result in underdevelopment of speech and language.

Sign language is the only mode of communication for the deaf. Since sign language is not a public language they fail to participate in social activities and discourse through sign language. The children with deafness whose parents are hearing are doubly discriminated as they are deprived of using even their mother tongue. Restrictions in socialization substantially prohibit the language acquisition at the early age.

A growing body of literature is available to indicate that information and communication technologies promise new hopes for the deaf [3]. All visual forms of ICT that are less dependent on written language create excellent learning opportunities for the students with deafness. Various search engines have already become popular among persons with deafness in finding new facts specially those that are available in visual form [5]. The deaf are able to discover their own world through internet. In this process they lean new words and concepts. The text messaging through mobile phone and email not only integrates them with hearing world but also with their own community for sharing new information and ideas. The multimedia used in ICT make the learning experience very attractive, flexible, non-threatening, personalized and effective.

There are several ICT devices and protocols that are being used by the deaf in the information society we live in. The gap between the developed and underdeveloped countries is shrinking because of the power, attraction affordability and usefulness of ICT. It is well recognized fact that information leads to power. The revolution brought about by ICT is re-shaping our future. It is transforming our consciousness about what we believe, what we do and what needs to be done. The knowledge explosion has become unmanageable by the

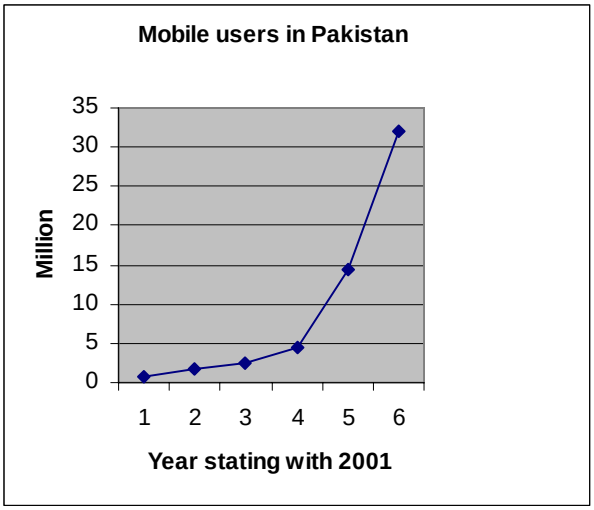
individuals. The deaf must not be forgotten in this information seeking human race.

Multiple ICT choices are available for the deaf. These services include TTY, SMS, email, chat, fax and video telephony. A relay can be used if deaf wants to communicate with hearing person. The relay telephony converts text and video into speech through PSTN and internet. The examples of telephony relay include Typetalk (www.typetalk.org), Talking Text (www.talkingtext.net), AT&T TTY relay service (www.consumer.att.com/relay), Australian Communication Exchange's NRS (National Relay Service) and Sprint Relay System (www.sprintrelayonline.com). Video relay services are also available over the internet. Microsoft's Net Meeting is popular on internet [3]. The number of similar services is rapidly growing in other parts of the world as well.

Persons with deafness are not only finding new facts by using internet resources but also learning how to learn. This engagement is crucial for the development of their meta cognition. Meta cognition, i.e. "learning how to learn" largely remains underdeveloped because of limited oral communication skills of the deaf. The two-way interactive nature of man to machine communication creates ample opportunities to adapt the best route to learning. Once the learning is triggered with the help of ICT the learning process is accelerated many folds. This intervention must be ensured as early as possible so that the child does not lag behind others in language acquisition.

Pakistan offers a growing market for information and communication technologies. As a result of governmental incentives and policies, the ICT total investment and spending has crossed US$ 10 billion during 2005-06. There are 5.5 million internet users and over 32 million mobile users operating through 150 IPS/ DNOPs in Pakistan. In other words 20 out of one hundred

Figure 1: Line graph of mobile phone users in Pakistan



Source [4]

households have a mobile. The number of cities connected to internet is 2339 with 5500 internet cafes. There are 4.5 million PC users and over 100,000 graduates at Master's and Bachelor degrees are in IT sector [4]. There is a fear that if participation of the deaf is not ensured through sustainable interventions they will not be able to benefit from this IT boom. Other services to the benefit of the deaf have already taken a start. They include e-payments of utilities bills, e-money, smart cards and digital cash.

Affordability is a crucial issue while dealing with accessibility issue with reference to developing countries like Pakistan. If facility is available but not affordable it is not accessible for everyone. There are four factors that are considered important in determining the relevance of technology to the consumers. They include accessibility, affordability, availability and appropriateness. Both hardware and software of ICT are too expensive to afford for the deaf already struggling with economic burden of disability if market driven technology is made available in developing countries. Most of the mobile plans, for example, include free or reduced price voice calls. Most of the deaf people do not use voice call but they have to pay for it [5]. This situation may widen the digital divide between hearing and the hearing impaired.

Of over 150 million population about 0.3 million are deaf in Pakistan [6]. Literacy rate of children with deafness is 4% [7]. The deaf education is still segregated from the mainstream education. The special school further marginalizes the deaf by socially isolating from the rest and by teaching a reduced substandard curriculum. As a result of schooling the deaf child is gradually isolated from the family and eventually becomes a part of deaf community. The family support is weakened and the child is vulnerable to social and physical harm. The dis-integration from the family results in homelessness and depression. The special education fails to transform the life of the deaf to the extent that full participation of the deaf in the society as a productive member is possible. As a result the deaf ends up doing beggary or becoming dependent of siblings. The inclusion of the deaf into ordinary school system seams an uphill task because of deficiency in communication skills. An ICT based school curriculum can not only improve the communication skills of the deaf but also facilitate the process of inclusion into mainstream schooling in Pakistan.

2. OBJECTIVES OF THE STUDY

This study was conducted to:

1. Identify the various forms of ICT being used by students with deafness
2. Document the students' preferences in using ICT
3. Study the perceptions of the deaf about benefits of ICT
4. Formulate recommendations for policy initiatives

3. METHOD AND MATERIAL

A convenient sample of 31 students with hearing impairment enrolled in Colleges for the Deaf located in Lahore city was selected to collect data by using an interview schedule. The interviewers were trained in using the protocol in sign language. Of these 23 were male and 8 were female. They come of families with an average income of PKR 8000 per month with median educational level of twelve years schooling mostly employed in public and private sectors. The interview schedule comprised questions such as age, qualification, father's education and occupation, income and email address. The information sought include frequency of computer use, preferred place, type of information sought, area of interest, most favorite websites, type of difficulties faced, type of other ICT hardware in use, use of mobile, the type of mobile services in use, attitudes of parents, places from where these skills were learnt, effectiveness of ICT in contacting hearing people, language used, etc. In the end they were asked to give their views about ICT on an open ended question.

4. FINDINGS

The frequency distributions of the nominal data indicate that 74% respondents owned a computer (Table 1).

Table 1: Frequency distribution on the use of computer

No	Statement	Yes	No
1	Do you own a computer?	23 (74.2%)	8 (25.8%)
2	Do you use computer daily?	14 (45.2%)	17 (54.8%)
3	Thrice a week?	9 (29.0%)	22 (71.0%)
4	Once a week?	6 (19.4%)	25 (80.6%)
5	Do you never use a computer?	1 (3.2%)	30 (96.8%)
6	Do you feel comfortable in using computer at home?	19 (61.3%)	12 (38.7%)
7	At cyber cafe?	3 (9.7%)	28 (90.3%)
8	At your friend's home?	5 (13.1%)	26 (83.9%)
9	At any other place?	1 (3.2%)	30 (96.8%)

The cross-tabulation between the ownership of computer and income level showed that there was no significant association between these two variables. In other words majority of the deaf purchased a computer irrespective of income level. The frequency of its use was also encouraging (Table 1) as 45% respondents were using computer on daily basis and only 3% were not using computer although they had it. Home turned out to be the most comfortable place for using computer (61%).The assumption that cyber café may be the popular place for logging on to computer because of free access to obscenity does not hold true. As far as the area of interest is concerned chatting was the most favored (84%) followed by Yahoo search (36%) among

Table 2: Frequency distribution on the area of interest

No	Statement	Yes	No
1	Is entertainment your area of interest in using internet?	5 (16.1%)	26 (83.9%)
2	Sports?	7 (22.6%)	24 (77.4%)
3	Google?	2 (6.5%)	29 (93.5%)
4	Yahoo?	11 (35.5%)	20 (64.5%)
5	Chatting?	26 (83.9%)	5 (16.1%)
6	Emailing?	8 (25.8%)	23 (74.2%)
7	Anything?	0 (0%)	31 (100.0%)

the respondents (Table 2). Again entertainment was not a popular place for deaf computer users as one may think of. The cross tabulation indicated that there was no significant association between gender and the area of interest. The choices of male were similar to that of female deaf respondents.

Table 3: Distribution on the use of cell phone

No.	Statement	Yes	No
1	Do you own a mobile phone?	22 (71%)	9 (29%)
2	Do you use mobile phone for playing games?	3 (9.7%)	28 (90.3%)
3	For information about sports?	0 (0.0%)	31 (100.0%)
4	For voice calling?	2 (6.5%)	29 (93.5%)
5	For SMS?	26 (83.9%)	5 16.1(%)
6	For photography?	7 (22.6%)	24 (77.4%)
7	For video recording?	0 (0%)	31 (100.0%)
8	For watching date and time?	4 (12.9%)	27 (87.1%)
9	As a notebook?	0 (0%)	31 (100.0%)
10	For listening FM Radio?	3 (9.7%)	28 (90.3%)
11	For listening news?	0 (0%)	31 (100.0%)
12	For listening music?	1 (3.2%)	30 (96.8%)
13	For any other purpose?	0 (0%)	31 (100.0%)

The number of the deaf who owned a cell phone (Table 3) was slightly less (71%) than the number of computer owner. Majority of mobile phone owners were using SMS (84%) followed by photography (23%). No deaf was using computer for information of sports. The heavy use of computer for chatting and mobile for SMS clearly indicate that communication with hearing and other deaf persons was the prime concern.

The deaf respondents were also using other ICT gadgets such as TV, videos, newspapers etc.(Table 4). Among those watching TV (61%) reading news papers and magazines (55%) are at the top followed by videos (39%).

Table 4: Distribution on use of other ICT

No	Statement	Yes	No
1	Do you watch TV?	19 (61.3%)	12 (38.7%)
2	Do you watch video movies?	12 (38.7%)	19 (61.3%)
3	Do you play video games?	3 (9.7%)	28 (90.3%)
4	Do you read newspapers and magazines?	17 (54.8%)	14 (45.2%)
5	Do you use any other ICT equipment?	0 (0%)	31 (100.0%)

The attitudes of the parents of the deaf were very positive (Table 5). Majority of them (74%), as reported by the deaf, encouraged the use of ICT. Interestingly enough those who were disinterested were distributed across all levels of income.

The role of school in learning ICT is doubtful. Only 48% respondents saw any such role (Table 5). About all 90% deaf respondents believed that they learnt ICT by themselves. In other words they were independently trying to access ICT learning tools.

Table 5: ICT and the Deaf

No	Statement	Yes	No
1	Is attitude of your parents encouraging about using ICT?	23 (74.2%)	8 (25.8%)
2	Are they disinterested?	4 (12.9%)	27 (87.1%)
3	Is attitude of your parents discouraging about using ICT?	1 3.2(%)	30 90.6(%)
3	Did you learn using ICT in school?	15 (48.4%)	16 (51.6%)
4	By attending a course?	3 (9.7%)	28 (90.3%)
5	Through a friend?	6 (19.4%)	25 (80.6%)
6	By yourself?	28 (90.3%)	3 (9.7%)
7	Did you learn using ICT through a family member?	4 (12.9%)	27 (87.1%)
8	Did you learn using ICT by any other mean?	2 (%)	29 (93.5%)

The impact of computer courses offered by both public and private sectors is negligible (10%). There is no reason for accepting their claim that they offer effectivecomputer courses for the deaf for their empowerment. They receive heavy grants on this false claim. The role of family in teaching ICT to their deaf member is also slim (13%). Similarly the deaf friends are not helpful in this regard.

Majority of the respondents used English as a medium of communication (58%). None of them was using the national language Urdu as mode of communication (Table 6). About one third (29%) used a mix of Urdu and English languages.

Table 6: Use of Language in ICT

1	Do you use Urdu language in emailing/messaging/chatting?	0 (0%)	31 (100.0%)
2	Do you use English language in emailing/ messaging/ chatting?	18 (58.1%)	13 (41.9%)
3	Do you use Mix language in emailing/messaging/chatting?	9 (29.0%)	22 (71.0%)

A possible explanation of the contradiction between statement 1 (use of Urdu) and statement 3 (use of mix of Urdu and English) is that the use of Urdu language in English script is on the rise in Pakistan among those who are not proficient in using English language.

5. DISCUSSION

The study is based on a small sample size. The number of students studying in the colleges of the deaf in Pakistan is no more than 200. The sample is about 15.5 % of the total population which is acceptable sample size if randomly drawn. The generalizability of the findings of the study is not very promising. Yet some alarming indicators have surfaced. Firstly, ICT is equally popular among the deaf in Pakistan although curriculum is not very supportive. Secondly, ICT provides an effective mode of communication with hearing population and English language is not seen as a barrier. Thirdly, the deaf students are very wise users of ICT and it is less likely that ICT will invade their value system. Fourthly, ICT giant and service providers are not paying attention to the ICT needs of deaf community in Pakistan although there is great potential in the market for expansion of their business.

6. RECOMMENDATIONS

The following recommendations are made on the basis of the findings of the study:

1. The government of Pakistan should take necessary measures to meet the emerging ICT needs of persons with disabilities in general and with hearing impairment in particular.

2. The multinational ICT companies should fulfill their commitment in making ICT equally accessible to all persons irrespective of their any limitation.
3. The curricula of the colleges for the deaf and their feeder schools must be revised in line with new developments in ICT sector. Emphasis should be on "hands on" experience rather than on rote learning.
4. The affordability issue in the use of ICT requires serious considerations at the manufacturing end particularly in developing countries like Pakistan. The ICT must in the reach of persons with disabilities with respect to their purchasing power.
5. There is a dire need to initiate research and development activities to develop indigenous solutions to meet the specific ICT needs of this community.
6. Persons with disabilities should be the focus of corporate incentives so that the digital divide may be overcome.
7. Experiences of other nations particularly of developing countries may serve as a role model in this regard.

7. REFERENCES

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