Digital Gap in Iranian Rural Areas

(Case Study at Sistan and Baluchestan-Iran)

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Abstract

In this paper we have tried to evaluate four levels of accessibility (motivational level, physical level, professional level, and applied level) related to digital gap in rural areas at Sistan and Baluchestan in Iran. First of all we expressed the concept of digital gap and its measurement yardsticks, and then we have introduced a model for continuous accessibility in digital gap and we explained all four levels in details. After that we came up with research model hypothesizes and the results of the statistical hypothesizes. Our findings show that rural areas in Sistan and Baluchestan in term of motivational level are in good and suitable situation but in term of other levels they don't have a suitable situation.

Keywords: Digital gap, Motivational accessibility, Physical accessibility, Professional accessibility, Applied accessibility, Information and communication technology

1. Introduction

Development and applying information technology in different parts of society is the result of information technology improvement that nowadays has encountered with high level on acceptance. Third millennium man is in trying to increase the speed of development in information technology field so that enable him to go away from traditional approach to a modern approach in consistent with a man needs in this time (Zahedi & Yaghoobi, 2005). Two of the most in used of the new technologies are computer and internet.

Because of significant effects of these technologies on societies' development, in recent decades accessibility to internet and computer has been in the heart of attention in scientific environments and universities. In dealing with these subjects the new concept such as "digital gap" has emerged. Digital gap has defined as a gap between the people who has access to these technologies (internet, computers…) and the others who have not access to them (Van Dijk, 2006). According to digital gap's definitions, the main attention and focus in digital gap, is about the amount of access to information technologies such as: access to computer and connection to internet.

In some studies and researches related to digital gap, accessibility classified in four levels. In this paper we have tried, in cooperation with some of the experts and scientists who are familiar with the information technology in some rural development organizations, to evaluate the level of access to information technologies in rural areas in Sistan and Baluchestan.

2. Digital gap

Space inequality that is consisted of two words: inequality and space, is a kind of social inequality that is different in many aspects from other kinds of inequality. In general, we can define space inequality as an unequal distribution of the opportunities and social approaches in the space. Space inequality that its dominant form is the regional inequality, in every society can emerged in different forms. Its visible forms in developing countries

are: inequality between urban and rural areas, inequality between small cities and metropolitans, inequality inside the metropolitans, inequality between deprived areas and rich areas and …..

Among the different forms of space inequality, inequality between rural and urban areas in developing countries is more dramatic than the other forms. Space inequality in digital form in information technology field is defined with digital gap (Dehghan, 1386).

From the mid of 1990th, attention to the unequal access to the new media has started, and the concept of digital gap has formed. Before this concept, some other concepts such as: informational inequality, informational gap, knowledge gap, media knowledge and computer knowledge have been reviewed in several papers (Van Dijk, 2006).

Digital gap is the gap or distance between people who are enabling to get the best use of informational technologies and people who cannot do so (Brooks et. al., 2005). In addition we provide some other definitions of digital gap. Digital gap, demonstrates the gap between countries, people, families, organizations, regions, and geographical areas with different socio-economic levels in regarding to their opportunities in access to the informational technologies and their capabilities in using the internet at a very wide extent of activities. Some of this concept' specifications are the insufficient infrastructure, high costs to access, weak or insufficient approach, incapability in providing communication services and networks from distance, lack or shortage in local content, and low capability in getting the social and economic advantages resulted from activities based on information (Guasch & Ugas, 2007).

In general, aforementioned gap between a set of countries or social groups which have the technology and those who don't have access to the technology and between classes and groups which are in good informational situation and those who are deprived of the information, is dramatic. It is important that even in developed countries, there are special classes and social groups who, anyway, have a little chance in using the technologies and innovations. This is recognized as a inter border gap (the gap between urban and rural areas, deprived and rich, between small and big cities, and between different parts of metropolitans) (Selwyn, 2006). A lot of developed countries are aimed to decrease or vanish the inter border digital gap. The reality is that the digital gap between developing and developed countries is increasing rapidly. Although some people use very high class laptops, high quality telephone, high speed internet, better educational facilities and…… the others in developing countries, don't have access to such facilities. (Guasch & Ugas, 2007). Getting a bit away from conceptual definitions, and with emphasis on space inequality's criterion in the field of communication and informational technology, we can provide an operational definition of digital gap which is measurable. Determinant criterion in digital gap can be expressed as follow:

1. The number of users or the rate between the number of the computers and the population of the country or an area.

2. The rate between communication networks and connection to the personal computers.

3. The number of the people who are capable to pay for the connection costs

4. The number of the people who has the sufficient skills to use the network

5. The amount of the information in local, regional, or official language in comparison with the whole information

6. The amount of special usages of the internet in an area such as: Electronic Commerce.

7. Possibility in access to the networks in an area (Dehghan, 2006)

It seems that most of these criterions are focused on the amount of the accessibility, capability in using computer networks and the way to use these networks. In researches related to digital gap, different kinds of the accessibility are classified in four continuous levels: figure 1 illustrates these levels.

The validity of the various kinds of the access has confirmed in several studies. We must look at this subject as a process with social, mental, and technological reasons and causes not as a phenomenon in which we get a product or a special technology. In continuous access level model, physical access is after motivational access and then followed by professional access and at end is the applied access. When allocation or ownership process of a technology is done completely, based on this model, innovation or a new technology has emerged and the process will repeat again (Van Dijk, 2006). Here we have explained all continuous access level model and related studies in details.

3. Motivational access

Before physical access, there should be an intent and motivation to have computer and be connected to the internet. With attention to the studies related to digital technologies show that, its not only about having no computer or internet, but also it is about unwillingness among people. Unfortunately, the studies about who are not users and who don't use the internet are not sufficient. The field surveys' results in 2000 show that the main reasons for acceptance or rejection the internet and connection to it, can be:

- The feeling that they don't need to use the technology or the lack of the meaningful imagine in using the technology

- Lack of time or intent to use the technology

- Rejection the internet and computer ejection as a dangerous media

- Lack of money and financial resources

- Lack or shortage of the skill (Van Dijk, 2006).

Determinant factors in motivational access are consisted of both cultural-social and mental-psychological factors. A primary perception is that internet is not attractive for the people who have not high income or academic degrees. Though, mental-psychological factor is the most important factor. This factor is consisted of computer anxiety and technophobia[2]. Computer anxiety[3] demonstrates unhappy feeling, stress, pressure or fear of experiencing to work by computers (Rice & Katz, 2003). Technophobia, demonstrates fear of the technology and as a whole shows the lack of the trust to effects and results of the technology. Computer anxiety and fear of the computers are the most important barriers to access to the internet among elders, uneducated people, and a part of the women. Side effects of this kind of fear may be remained even after long time of using the technologies (Van Dijk, 2006).

4. Physical access

The concept of physical access is consisted of the access to informational and communicational tools such as: having computer and peripheral equipment, access to internet, and …ect. A big part of the researches in digital gap have been focused in evaluating the physical access gap to desktops and internet among various social classes with different demographic characteristics such as: income, education, age, gender, and so on. Since 2000 physical access gap in developed countries has decreased. Though this gap among developing countries has been wide and still is huge. Nordis (2001) has assessed usage and access to the internet in 179 countries. Results show that the global gap between developing countries and developed countries is very significant, and the gap between rich and poor was evident as well. It seems that income, education, and job are the criterions with high correlation with physical access gap and are among the most important ones. Multi- Regression analyzes by Structural Equation Modeling (SEM) in Van Dijk et al, (2000) effort, show that income is the most important factor in physical access, age and education factors are respectively after income. Although the computer price recently has decreased but low income is still the most important barrier in poor countries. It seems that in terms of physical access, digital gap in most of the developed countries is finishing or has finished already (Van Dijk, 2000).

5. Professional access

After getting sufficient motivation to use computers and getting physical access to them, a person must learn how to manage software and hardware. The problems of lack or shortage in skills are located in informational frameworks such as: computer knowledge, informational knowledge, or multimedia knowledge and computer profession and informational capital. Van Dijk (1999, 2003, and 2005) and Staiet (2000) had expressed digital skills as a continuous of three of the skills. The most basic skills and capabilities are the instrumental or operational skills that mean how to work with hard wares and soft wares. Informational skills are a kind of skills for search, information's choosing and editing in computer resources and networks. Two kinds of informational skill are needed: formal information skills and substantial information skills. The third level of skills is about strategic skills that are the tools in getting to special purposes and are defined to as tools in enhancing and improving a person's situation in the society.

Researches and field surveys (Van Dijk et al, 2000; Park, 2002; Okla, 2001, 2003) show that professional access gaps in comparison with physical access gaps are very big. Although physical access gaps in developed countries are decreasing, professional gap, especially informational skills, are increasing. One the most important point in professional access evaluations was that the more educated a person is the higher levels of digital skills will have.

Another result shows that people will learn better those skills which they learn through trail and error (Van Dijk, 2003).

6. Applied access

Using and applying a digital media in the real form is the last phase and final aim of technology's preparing process that is recognized as the applied access. Having sufficient motivation, physical access and some skills for using and applying digital media, are very necessary. Using the media can be assessed through four ways:

1: time of using

2: variety in using the digital media

3: use of broadband

4: reactive using or innovative using (Van Dijk, 2003)

In this paper we are looking to determine the situation of each one of these four forms of access in Sistan and Baluchestan rural areas. Then we will provide, research model, hypothesizes, statistical techniques, and finally we will present the results of the research.

7. Research model and hypothesizes

According to the literature in digital gap and different levels of access, needed criterions are extracted. Figure 2 illustrates the research model.

8. Hypotheses

1. Rural areas in Sistan and Baluchestan are in good situations in terms of motivational access

2. Rural areas in Sistan and Baluchestan are in good situations in terms of physical access

3. Rural areas in Sistan and Baluchestan are in good situations in terms of professional access

4. Rural areas in Sistan and Baluchestan are in good situations in terms of applied access

9. Statistical universe

To determine the situation of each level in Sistan and Baluchistan's rural areas we designed the questionnaire based on the research model (fig 2) and then we administrated them among experts, ICT offices in rural areas and to some of the academic members in Sistan and Baluchestan as well. We used the data from 40 questionnaires to determine the access levels. We designed the questions based on Likret multi options model that is from very low to very high. An example is providing in table 1.

10. Credibility and validity of the research tools

Their credibility has been proved by some of the experts and academic people and some of the people in information technology sector. For evaluating their validity we used the Kronbakh model and get 0/85 that shows its validity is in a very acceptable level.

11. Statistical techniques

For testing hypothesizes in this research we used of parametric tests because our society is a normal society and research's variables are not too much. For analyzing the data first of all we analyzed the demographic data then to determine whether ruralsss situation is good or not we applied "T" test.

12. Statistical universe description

Demographic data have shown in table 2 as follow:

Insert table 2 here.

13. Hypothesizes testing

1:

Ho**:** rural areas in this research don't have good situation in terms of motivational access

Ho: $\mu \leq 18$

H1: rural areas in this research have a good situation in terms of motivational access

H1: μ □18

Because in this access level there are six questions the average is 18, so we compared the average with the 18 that we got.

13.1 Test parameter evaluation

The test parameter in this test is: a = 0/05 and degree of freedom is 39 (df = 39) and by using SPSS through T student test this number is equal: 4/178.

Because the meaningfully number (0/01) is smaller than 0/05 so Ho is rejected. As a result rural areas in this research have a good situation in terms of motivational access.

2:

Ho: these rural areas are not in good situation in terms of physical access

Ho: $\mu \leq 21$

H1: these rural areas are not in good situation in terms of physical access

Ho: $\mu \square 21$

Because in this level there are 7 questions so the average is 21 therefore the average is compared with 21.

13.2 Test parameter evaluation

The parameter is equal to 1/617 and meaningfully number is 0/167 so we can accept Ho at 0/05 level.

As a result rural areas in this research are not in a good situation in terms of physical access

3:

Ho: these rural areas are not in good situation in terms of professional access

Ho: Ho: $\mu \leq 18$

H1: these rural areas are in good situation in terms of professional access

Ho: Ho: $\mu \square 18$

Because in this access level there are six questions the average is 18, so we compared the average with the 18 that we got.

13.3 Test parameter evaluation

The parameter is equal to 0/502 and meaningfully number is 0/634. Thus we can accept Ho at 0/95 level. Therefore these areas are not in good situation in terms of professional access.

4:

Ho: these rural areas are not in good situation in terms of applied access

Ho: Ho: $\mu \leq 15$

H1: these rural areas are in good situation in terms of applied access

H1: $\mu \square 15$

Because in this level of access there are just five questions thus the average is 15. Therefore the average is compared with 15.

13.4 Test parameter evaluation

The parameter number in this test is a= 0/05 and degree of freedom is 39 (df =39). By using T student test in SPSS we got a=0/091 and meaningfully number equal to 0/928. Thus we can accept Ho and we can claim that these rural areas are not in good situation in terms of applied access.

Research results are summarized in table 3 as follow:

14. Conclusion

Results show that rural areas in Sistan and Baluchestan have a good and suitable situation in motivational access but physical, professional and applied accesses are not situation. According to previous studies we conclude that feeling of need, intention and necessary motivations for access to computer and connecting to internet, there are among people in rural areas in Sistan and Baluchestan. People in these areas are reinforced by government to use internet and computers, organizations, social groups, family's members, and peers and so on. According to rural situation in three levels of access we can conclude that people in these areas have a lot of problems in get to internet, access networks, use the computers, and needed skills. Based on our findings we recommend that government and related organizations in IT must provide some facilities such as: low price computers, providing communication infra structures, low tariff for internet connection, low interest loan, to enhance the level of

accessibility to digital media and improve physical access among people in these areas. To improve professional access, we recommend that they should set up education courses for example for ICDL. Finally if these three levels (motivational, physical, and professional access) being better, then by using the computer and internet in informational and communication affairs, applied access level will be improved as well.

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Table 1. Scale sample that is used in questionnaire

Items	Very low	low	medium	High	Very high
Analyzing special code	1	2	3	4	5

Table 2. Demographic data

Demographic variables	**Universe distribution**
gender	**Female: 14 persons (35%)** **Male: 26 persons (65%)**
Age	**Under 30 years old: 15 persons (37/5%)** **30-39: 22 persons (55%)** **40-49: 3 persons (7/5%)**
Education	**Associate degree: 2 persons (5%)** **Bachelor degree: 29 persons (72/5%)** **Bachelor and upper: 9 persons (22/5%)**

Table 3. T student test

	Sample number	Average	ds	Average of ds
First hypothesize	40	20/5897	3/87107	0/61987
Second hypothesize	40	19/3333	6/56252	2/67914
Third hypothesize	40	19/2857	6/77513	2/56082
Fourth hypothesize	40	18/1	6/93486	1/09650

One sample test

	Trust distance At 95%		Difference of average	The level of meaningfully	Degree of freedom	t Student
	Down limit	up limit				
First hypothesize	3/8446	1/3349	2/5897	0/01	39	4/178
Second hypothesize	11/2203	-2/5536	4/3333	0/167	39	1/617
Third hypothesize	7/5518	-4/9804	1/2857	0/634	39	0/502
Fourth hypothesize	2/3179	-2/1179	0/1	0/928	39	0/091

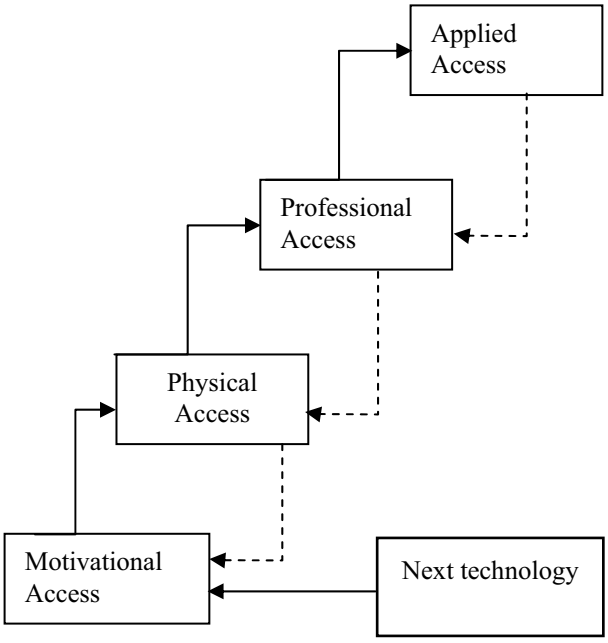

Figure 1. Digital access continuous level model (Van Dijk, 2006: 224)

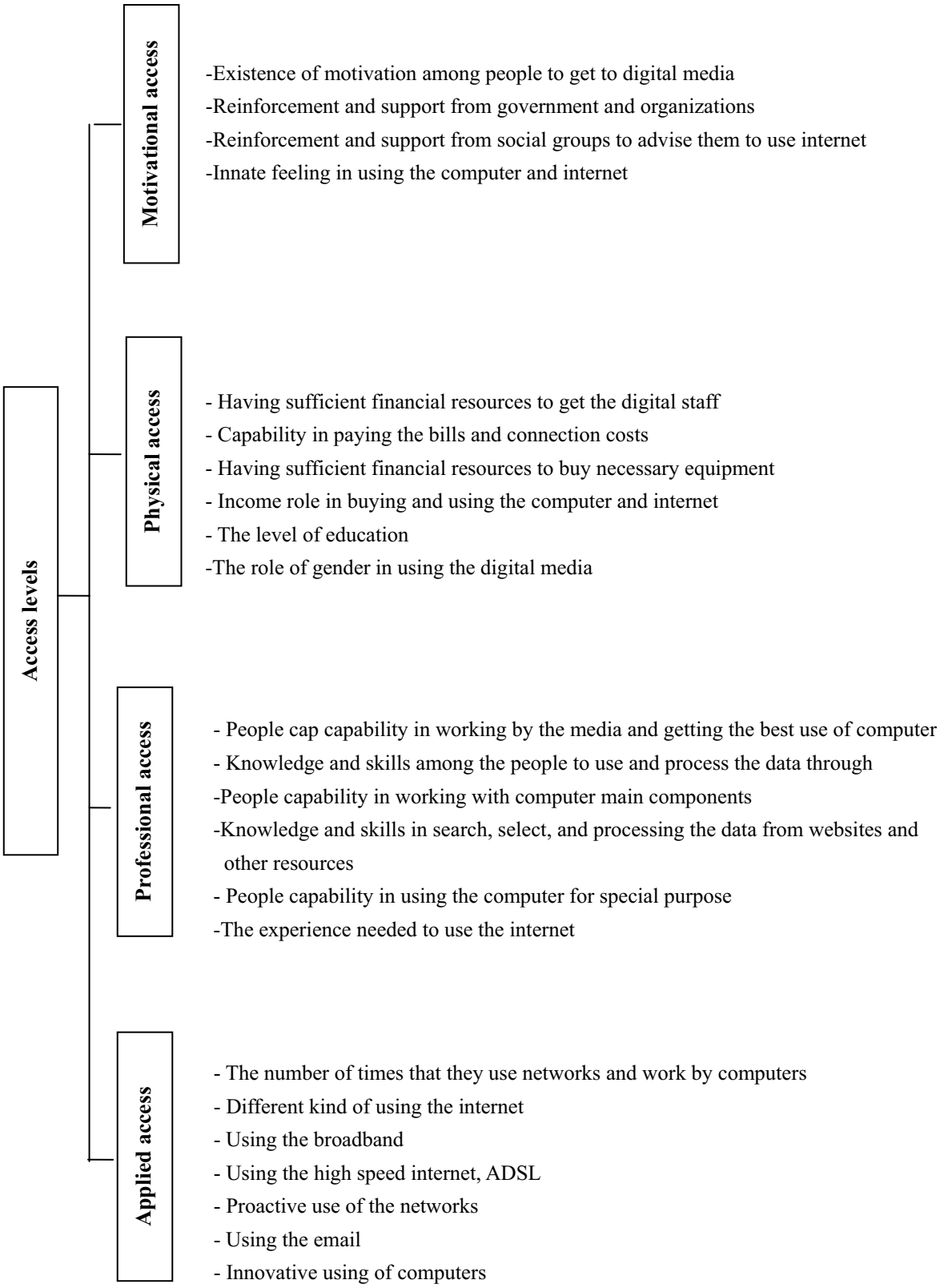

Figure 2. Research analyzing model