Computer Utilization, Social Capital and Basic Social Service Accessibility in Central America

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ABSTRACT

The purpose of this paper is to assess the relationship between computer utilization, community participation, and basic social service accessibility. Social capital theory and technological development theory are used to develop a theoretical model of basic social service accessibility. The relationship was tested on two levels; first confirmatory factor analysis was used to develop measurement models of latent factors. Secondly, structural equation modeling was used to test the proposed model of basic social service accessibility. Data for testing the model were extracted from a study on democratic behavior and social capital in four Central and South American countries. The sample consists of 600 respondents, 300 each from Nicaragua and Honduras. Even in a poor country such as Nicaragua, extensive use of computer brings about significant improvements in basic social service accessibility.
***Key Words*:** Basic social service; Social development; Social capital; Central America

Introduction

Economic development projects in developing countries have for a long time paid close attention to meeting basic needs (Holden & Linnerud, 2007; Afxentioua, 1990; Rodinelli, 1989). The definition of basic needs is characterized by a large variation in human needs that are considered basic. However, most definitions would include food, shelter and clothing (Sen, 1990). The goal of meeting basic needs figures prominently in most national plans of developing countries. In sharp contrast to the consequences of failure to meet national goals in the past, there is international pressure now on developing countries to meet basic needs through their commitment to meet Millennium Development Goals (MDG) (Modi, McDade, Lallement and Saghir (2005). A popular strategy for meeting the basic needs within the framework of the MDGs in developing countries has involved the provision of basic social services (UNICEF, 1998). The UNICEF approach to the provision of basic social services has focused on health, education, water, sanitation, reproductive health and nutrition (Mehrotra, 2006). Sen (1990) called for a broader listing of services that enable individuals to convert primary goods into their ability to promote their own ends and well-being. As a result, availability of services such as transportation and electricity are now seen as essential components of basic social services.

The advent of Internet and computer technologies in general have not only brought about an increase in the demand for basic social services but have also considerably improved the ability of social service delivery systems to meet the demand through efficient processing, managing and storing of information (Pick & Azarib, 2008). With an increase in the utilization of computers, accessibility to basic social services is expected to increase over time.

The relationship between computer utilization and accessibility to basic social services is moderated by levels of economic development (Braverman & Gruskin, 2003). While the association between level of computer utilization and basic social service remains well-researched (Monnickendam & Eaglestein, 1993; Cameron, Graham & Sieppert, 2000) in developed countries, there is a severe dearth of studies in this area in developing countries (Kumar & Best, 2006). In developing countries such as in South America, in spite of inadequate attention to the role of computer utilization on basic social service accessibility, very few studies have attempted to examine the issue empirically.

Several studies have suggested that improvement in the current level of access to computers is likely to increase accessibility and delivery of basic social services (Compaine & Weinraub, 1997; Jardines, 2007; Hughes, Joo, Zentall & Ulishney, 1999). With steadfast increases in the utilization of computer technology in basic social service delivery systems, computer literate clients are at an advantage in accessing and utilizing basic social services. Additionally, according to social capital theory, as community participation increases, access to services is expected to increase (Bourdieu, 1986; Coleman, 1988; Palmer, Perkins, & Xu, 2011). In communities with high levels of social capital, the computer literate are more likely to help others in accessing basic social service delivery systems (Rosenheck et al, 2001). Therefore, the two factors, the degree of computer utilization and level of community participation may positively influence basic social service accessibility. As technology continues to improve and impact social relationships, basic social service accessibility may be influenced by levels of computer utilization as well as by the intensity of information sharing facilitated by community participation.

The purpose of this paper is to develop a model of basic social service accessibility in developing countries such as Honduras and Nicaragua taking into consideration modern technological developments that have spurred both levels of computer utilization and individual level participation in the life of the community. In order to understand the impact of computer utilization and community participation on service accessibility within developing countries, data were obtained from an international study on social capital including two South American countries: Honduras, and Nicaragua (Diaz et.al.,2008). Specifically, community participation refers to attendance at church or church related activities, school concerts, and craft exhibitions.

Technical innovations have grown exponentially over the last several decades, providing increased access to technology for people world-wide. Additionally, the Internet has transformed the means of communication, information collection, modes of delivery of socialservices, and overall access to knowledge. Prior research has examined the relationship between technology and client access/outcomes in terms of basic social services. For example, O'Leary and Mason (2011) found technological innovations in human services often yield dramatic improvements in client outcomes and client access to services. Additionally, studies suggest that computer utilization positively influences social service accessibility in general and quality of life of the clients (O'Leary & Mason, 2011; Kincaid, 2004; Lefkovitz, 2009). It is likely that computer technology utilization has a positive impact on access to basic social services.

Apart from computer technological developments, increases in community participation have been linked with progress in service accessibility. Zakus and Lysack (1998), define community participation as a strategy that provides people with the sense of solving their problems using "...careful reflection and collective action" (p.2). Community participation is often used interchangeably with the following concepts: consumer involvement/participation, citizen involvement/participation, orpublic involvement (Zakus&Lysack, 1998). A wide range of variation exists with regard to community participation (Felton &Stickley, 2004), and includes community forums, neighborhood committees, and other community events (Popay,2006). Interestingly, Xu and Chose (2006) report that as community service participation increases, the likelihood of quality of community life is also likely to increase

Model of access to basic social service

Social capital theory provides a useful framework to examine the relationship between the technology of communication and access to services. Social capital theory (Bourdieu, 1986; Coleman, 1988; and Putnam, 1993) proposes that participation in groups or networks leads to an increase in information channels resulting in increases in social support. Social capital is most often associated with social networks, cultural norms, and types of pro-social behaviors (Godoy et al., 2007). Social capital theory also assumes that "building social networks, trust, and cohesion lead to active participation in local services and voluntary associations; individuals thereby identify and support collective goals that reinforce norms of reciprocity and a more connected and caring community "(p. 91).In spite of disagreements among researchers about the definition and measurement of social capital (Godoy et al., 2007), the theory of social capital is widely used to explain the relationship between social capital and access to services (Dixon-Woods, Coleman and Stokes, 2010).

A second theory helpful in examining the phenomenon of basic social service accessibility is related to the concept of technological change. Brey (2008) states that a "critical theory of technology is a theory that interprets and evaluates how technology functions in society" (p.71). Technological change theories maintain that the advancement of technology has powerful implications for the differential distribution of power across social groups (Bojanik & Budimir, 2011; Brey, 2008; Kuriyan, et al., 2008). More specifically, technology development is expected to empower disenfranchised groups by enhancing their capacity for communication and, subsequently, increasing basic social service accessibility. Thus, social capital theory indicates that technological progress resulting in improvements in computer utilization is likely to increase basic social service access. We hypothesize that as the degree of computer utilization and level of community participation increase, basic social service accessibility is likely to improve significantly.

Method

The data for this study were obtained from a study examining demographic attitudes and behavior in four Central and South American countries: Bolivia, Honduras, Peru, and Nicaragua (Diaz et.al, 2008). This study was approved by the University of Texas at Arlington Institutional Review Board in 2006.

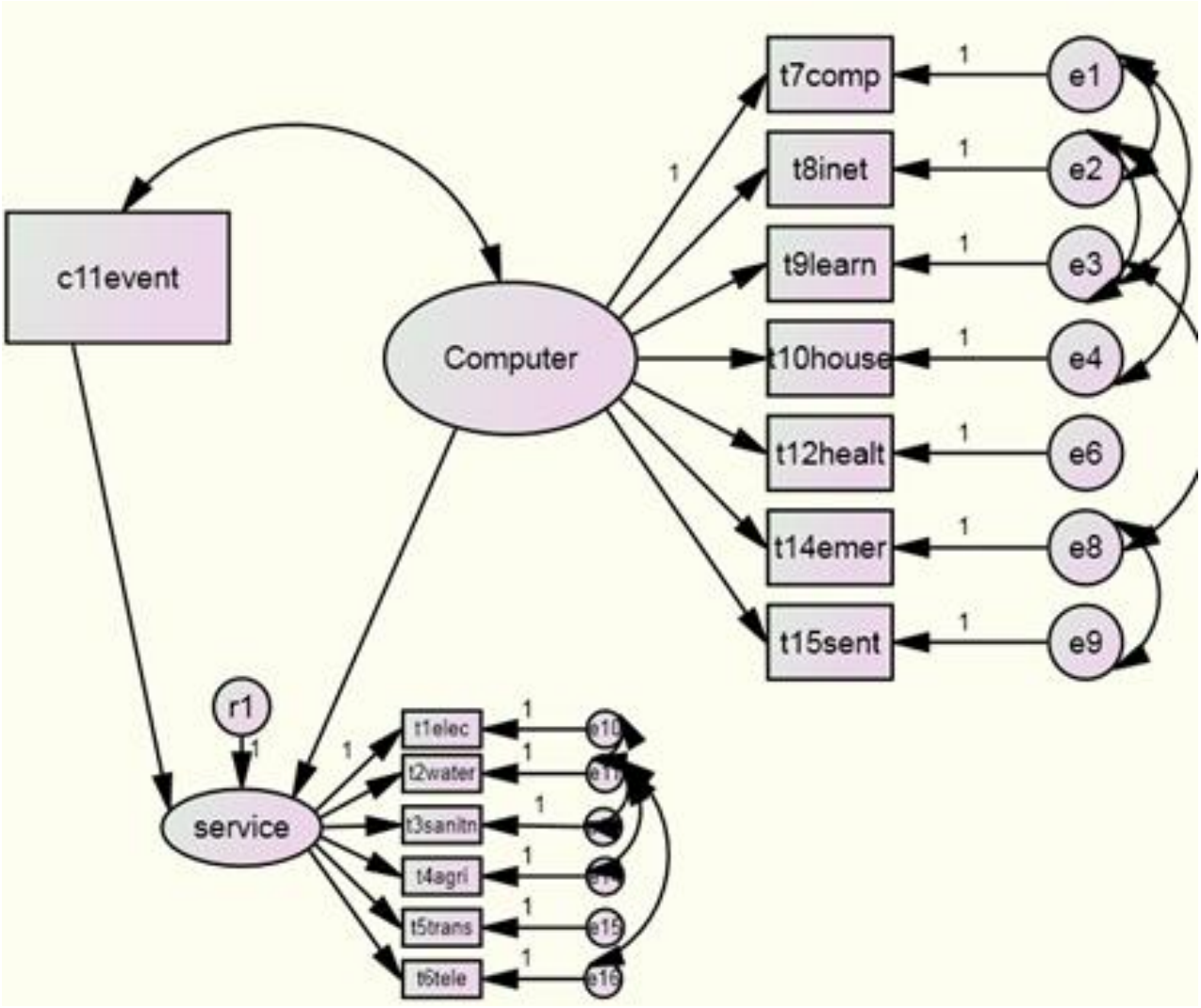
The purpose of the original study was to identify the impact of ADRA, an international Non-profit organization, on developmental outcomes such as social capital and food security in communities receiving support from ADRA. The sampling design of the study was quasi experimental with communities receiving ADRA based community support labeled experimental and the rest, comparison communities. Several criteria were used to select comparison communities. First, communities had to be located within the same political district as the experimental communities. Second, the ethnicity composition of the experimental and comparison community residents was roughly similar. Finally, all communities needed to be of similar socio-economic levels. From the several comparison communities satisfying the selection criteria, a similar number of comparison communities were randomly drawn as there are experimental communities in each country. From among all the residential households in the experimental and comparison communities in each country 300 households were randomly chosen. Nearly half of the selected households were from experimental communities. Data available from the four-country study on the variables of crucial interest to the proposed model of basic social service accessibility were limited to two countries only. Among the four countries: Honduras, Peru, Bolivia and Nicaragua, data were not collected from Bolivia and Peru. The size of the sample households selected for this study is six hundred.

'Community Participation' was measured by a dichotomous item assessing individual participation in the community during the six months prior to the survey. Seven survey questions related directly to level of computer utilization were used to measure computer utilization. Basic social service accessibility is measured through six items. The items related to Community Participation, and the latent factors computer utilization and basic social service accessibility, are presented in Table 1. All the survey questions were constructed to elicit responses in the same direction, from low to high. Response values sought from respondents were restricted to the range between one and ten .A diagrammatic presentation of the proposed model is presented in Figure 1.

Table 1: Description of the Latent Factor's Computer Utilization, Service Accessibility, and Community Participation

Item No.	Question/Description	Latent factor
Computer Utilization Assessment		
t7comp	Do you have access to a computer?	Computer Utilization
T8inet	Can you access the internet to get information?	Computer Utilization
T9learn	Are their places in your community where you could go to learn how to use the computer?	Computer Utilization
t10house	Would you use a computer to help you find a house to live in?	Computer Utilization
T12health	Would you use a computer to help you get health information, or a doctor?	Computer Utilization
t14emer	Would you use a computer to help your family in case of a disaster, or emergency?	Computer Utilization
T15sent	Can you use a telephone, or a computer, to request food or other articles to be sent to you when needed?	Computer Utilization
Basic social service Accessibility		
t1elec	How possible is it for you to obtain electric service in your community?	Service Accessibility
t2water*	How possible is it for you to obtain a clean drinking water service in your community?	Service Accessibility
t3sanitn	How easy is it for you to own sanitary services in your community?	Service Accessibility
t4agri	How possible is it for you to obtain fertilizers and pesticides?	Service Accessibility
t5trans	How easy is it for you to obtain transportation when you need it?	Service Accessibility
t6tele	How easy is it for you to have access to a telephone when you need it?	Service Accessibility
Participation Assessment		
C11event	Have you attended a local community event in the past 6 months (e.g., church fete, school concert, craft exhibition?	Participation

Figure 1: Full Model



Variable Description:
t7comp - Do you have access to a computer? ;
T8inet - Can you access the internet to get information?;
T9learn - Are their places in your community where you could go to learn how to use the computer?;
t10house - Would you use a computer to help you find a house to live in?;
t12health - Would you use a computer to help you get health information, or a doctor?;
t14emer - Would you use a computer to help your family in case of a disaster, or emergency?;
t15sent - Can you use a telephone, or a computer, to request food or other articles to be sent to you when needed?;
t1elec - How possible is it for you to obtain electric service in your community?;
t2water - How possible is it for you to obtain a clean drinking water service in your community?;

t3sanitn - How easy is it for you to own sanitary services in your community?;
t4agri - How possible is it for you to obtain fertilizers and pesticides?;
t5trans - How easy is it for you to obtain transportation when you need it?;
t6tele - How easy is it for you to have access to a telephone when you need it?;
c11event - Have you attended a local community event in the past 6 months (e.g., church fete, school concert, craft exhibition?

Data Analysis

Data analysis was conducted in two stages. First, Confirmatory Factor Analysis (CFA) was used to validate the measures of all the latent variables. Measures of computer utilization and basic social services accessibility were assessed using the goodness of fit indexes obtained from CFA.. Goodness of fit was measured using RMSEA, GFI, and AGFI. Generally, models scoring a .90 or above on both the GFI and AGFI, and a scoring less than .06 on the RMSEA are classified as a 'good fit' (Vanderberg& Lance, 2000). Secondly, Structural Equation Modeling was used to assess the level empirical support for the proposed model of basic social service accessibility.

Results

The factor loadings for the items on computer utilization and basic social services accessibility are presented in Table 2. The goodness of fit for computer utilization and basic social service accessibility is presented in Table 3. The final measurement models for the two constructs were obtained by correlating errors in variables using the values of modification indices. A few measurement errors were correlated as indicated by modification indices.

Table 2: Confirmatory Factory Analysis for: Computer of Utilization and Basic Social Service Accessibility

Factor	**Indicator**	**Factor Loading**	**C.R.**
Computer Utilization	t7comp	1.000	
	t8inet	.927	15.977
	t9learn	1.659	12.928
	t10hous	3.089	11.338
	t12healt	3.312	11.440
	t14emer	2.972	11.275
	t15sent	2.909	10.719
Services Accessibility	t1elec	1.000	
	t2water	-.318	-1.412
	t3sanitn	.421	2.279
	t4agri	1.292	5.376
	t5trans	1.978	6.446
	t6tele	2.533	6.217

Computer utilization has a$\chi 2$ value of 10.4 (GFI= .994, AGFI= .970, and RMSEA= .052). Basic social service accessibility yielded a $\chi 2$ value of 27.6 (GFI= .987, AGFI=.960, and RMSEA=.059). Based on these values, the goodness of fit is evaluated as adequate for both basic social service accessibility and computer utilization. Computer utilization has a Cronbach's Alpha of .946. This value indicates a high level of reliability. Additionally, Table 4 presents the values of corrected item-total correlation and Cronbach's alpha if any item was deleted. The values of the corrected item correlations are above the acceptable value of .6 for seven of the nine items. An examination of the values of Cronbach's Alpha if items are deleted suggests that the values remain stable with small changes around the overall Cronbach's Alpha level of .946. In general, the reliability of the 'computer utilization' construct is at the acceptable level.

Table 3: Goodness of Fit Indicators for Computer Utilization and Basic social service Accessibility

Computer utilization		
	χ^2	10.4
	df	4
	GFI	.994
	AGFI	.970
	RMSEA	.052
Basic social service Accessibility		
	$\chi 2$	27.6
	df	9
	GFI	.987
	AGFI	.960
	RMSEA	.059

Basic social service accessibility has a Cronbach's Alpha of .550 below the acceptable value of .70.The values of the corrected item correlations are below the acceptable value of .6 for all the six items. An examination of the values of the correlation Cronbach's Alpha, if items are deleted, suggests that the values remain below .70. The reliability of the 'service accessibility' is in general at the unacceptable level. These values are presented in Table 4.

Table 4: Reliability of Service Accessibility and Computer Utilization

Service Accessibility	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
How possible is it for you to obtain a clean drinking water service in your community?	.348	.487
How easy is it for you to own sanitary services in your community?	.215	.538

How possible is it for you to obtain fertilizers and pesticides?	.173	.562
How easy is it for you to obtain transportation when you need it?	.348	.477
How easy is it for you to have access to a telephone when you need it?	.284	.509
How possible is it for you to obtain electric service in your community?	.411	.442
Cronbach's Alpha =.550		
Computer Utilization		
Do you have access to a computer?	.526	.951
Can you access the internet to get information?	.526	.951
Are their places in your community where you could go to learn how to use the computer?	.656	.946
Would you use a computer to help you find a house to live in?	.904	.933
Would you use a computer to help you find employment?	.929	.931
Would you use a computer to help you get health information, or a doctor?	.935	.931
Would you use a computer to help you find out about the weather?	.928	.931
Would you use a computer to help your family in case of a disaster, or emergency?	.893	.933
Can you use a telephone, or a computer, to request food or other articles to be sent to you when needed?	.771	.942
Cronbach's Alpha .946		

Next, the proposed full theoretical model was assessed using Structural Equation Modeling. The SEM model resulted in a $\chi 2$ value of 324.1 (GFI=.939, AGFI= .910, and RMSEA= .065). The coefficient of the path from community participation to basic social service accessibility is not significant at the .05 level. Therefore, we removed the variable of participation and re-evaluated a reduced form model of basic social service accessibility. This model with computer utilization as the determinant of basic social service accessibility generated a $\chi 2$ value of 147.3 (GFI=.964, AGFI=.939, and RMSEA=.055). These values of the goodness of fit indices suggest that the reduced form model provides good fit with the data. See Table 5. The reduced form model was re-evaluated after adding 'age of the respondent' as a control variable. This variable was not significant at the .05 level.

Table 5: Goodness of Fit for Full and Reduced Model

Full Model		
	χ^2	246.8
	df	67
	GFI	.945
	AGFI	.914
	RMSEA	.067
Reduced Model		
	χ^2	147.3
	df	53
	GFI	.964
	AGFI	.939
	RMSEA	.055

The path coefficients are presented in Table 6.

Table 6: Path Coefficients

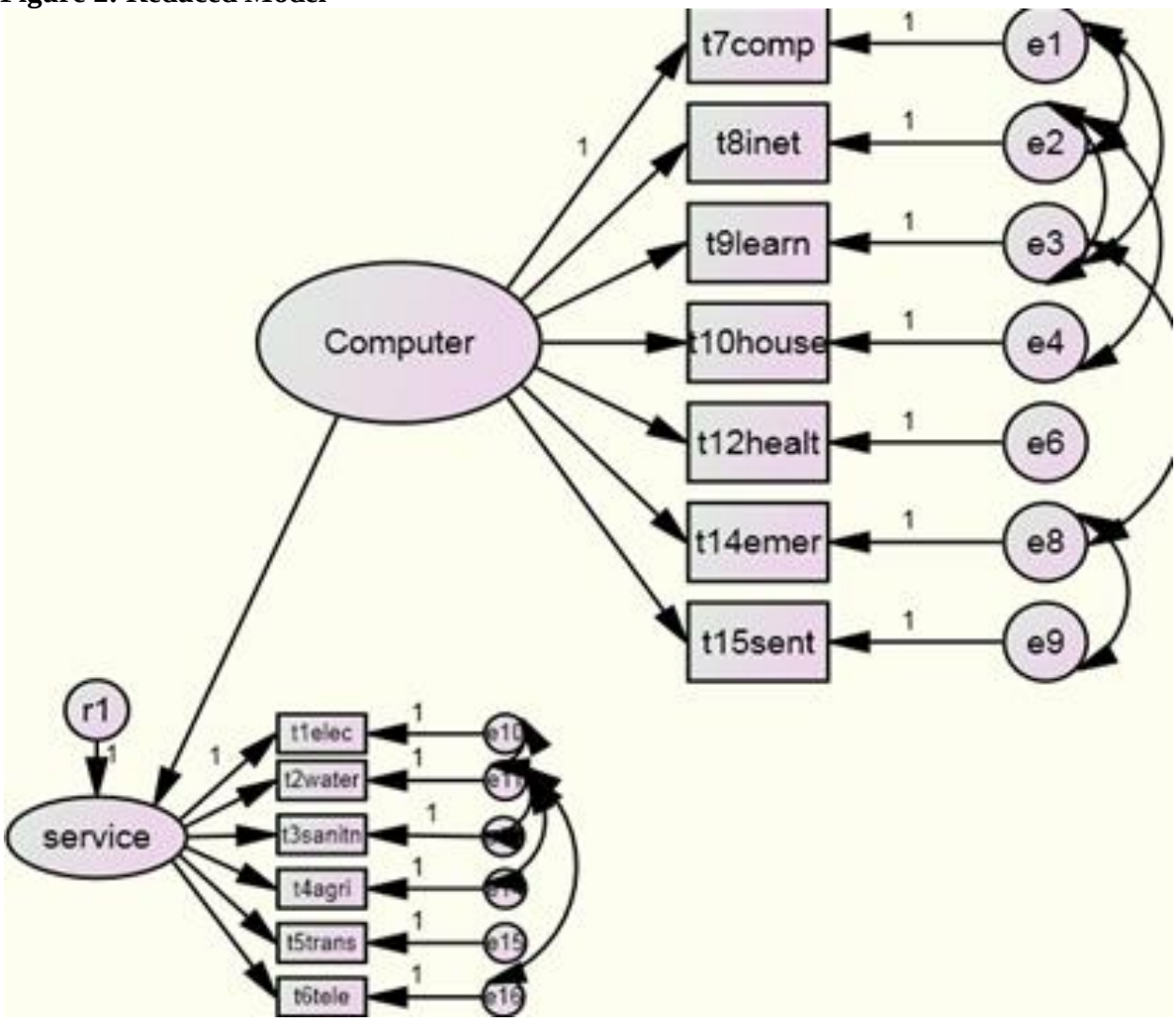
	Estimate	**S.E.**	**C.R.**
Path Coefficients Full Model			
Service Accessibility <--- Computer Utilization	**.289**	**.073**	**3.943**
Service Accessibility <--- Participation	**.028**	**.039**	**.721**
Path Coefficients Reduced Model			
Service Accessibility<---Computer Utilization	**.293**	**.074**	**3.976**

The un-standardized regression coefficient of service accessibility on computer utilization is 0.289- and the standardized coefficient is 0.243.The path coefficient of computer utilization increased from .289 to .293 once the community participation factor was removed. Our study suggests that in developing countries such as Nicaragua and Honduras, improvements in computer utilization have increased the accessibility to basic social services as well. The reduced form model is presented in Figure 2.

Discussion

The proposed model of basic social service accessibility suggested two significant determinants, community participation and computer utilization. An evaluation of the proposed model provided no empirical support for the hypothesized positive relationship between community participation and basic social service accessibility.

Figure 2: Reduced Model



By removing community participation we have altered the context of the proposed theory though parsimony is achieved. Future research conducted in an international context, particularly in developing countries, should consider the evolving context of computer utilization with respect to changes in the level of basic social service accessibility. Specifically as technology continues to grow and advance, communication through electronic media is likely to grow both more intensive and extensive than at present. Consequently, it is speculated that computer utilization at the individual level is also likely to increase. Regarding limitations, the data for this particular model were available for only two countries. Four countries were originally assessed; however, the data from Bolivia and Peru were excluded due to missing variables. Additionally, cultural and language differences between the individuals trained to collect data and the participants may have influenced the response set. Further, it is also possible that participant interpretation of survey items was impacted by different idioms or customs. Therefore one must consider the possibility that the constructs of computer utilization and basic social service accessibility may not be invariant across the two countries considered.

Future studies should evaluate the equivalence of the confirmatory factor analytic models of both computer utilization and basic social service accessibility cross nationally. This can be accomplished by utilizing multi-group modeling approaches which facilitate equivalence tests of models (Byrne, 2010).

Further research should be conducted in order to determine its validity among other populations outside of South America. This opens the door for additional research in other countries, particularly as computer utilization increases worldwide. Additionally, future research may also consider testing the reliability of the model questions among other international populations. Social service workers may consider creating programs promoting the use of computers and technology to further empower diverse populations. Improving computer literacy may also be necessary to improve service utilization as technology advances and integration of skills becomes essential.

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