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A Comparison of ICT Knowledge and Usage among Female Distance Learners in Endowed and Deprived Communities of a Developing Country

OLIVIA ADWOA TIWAAH FRIMPONG KWAPONG
University of Ghana, Legon–Accra, Ghana

ABSTRACT Working with the premise that information and communications technology (ICT) has the capacity to make or unmake so far as women's empowerment is concerned, this article looks at the ICT situation among female distance learners in both endowed and under-served parts of Ghana, to check the user differentials among the two contrasting groups through a survey that covered 174 respondents. From the results one could not strongly say that there were vast ICT knowledge and usage gaps among the two groups considering the extent of the developmental gap that the regional differences presents. Factors like time or convenience, space, and income have to be considered in using ICT for education and development among women. Exposing the women to multiple usages of ICT is also critical. Another core observation from this study is that women who are generally categorized as not being technology friendly are overcoming at least that. This applies not only to women in relatively well-endowed areas but also to those in under-served areas. This is a good starting point for undertaking gender-specific projects that will promote e-learning, e-government, e-medicine, e-commerce and all other applications among women in both urban and rural communities.

Introduction

The marginalized situation of women cuts across all aspects of life, and information, and communications technology (ICT) is no exception. ICTs are clearly powerful, capable of serving both men and women, and can be important tools for those seeking to promote e-learning for women, gender equality, and to empower women. However, socio-economic factors that inhibit women affect their full access to education and utilization of ICT facilities. Many of the realities of life are more different for women than they are for men. In no society do women enjoy the same opportunities as men. The world over, most women are poorer than men, not as well educated, and have higher levels of illiteracy (Hafkin, 2003; Abdulkafi, 2008).

This article is set within the context that much as the socio-cultural situation of women affects their full access to ICT, conscious effort to enable them to make the best use of ICT will facilitate their journey to empowerment through technology-mediated learning. This task will be accomplished by doing a literature review to explore the potential of ICT for women in developing countries in particular, and by examining the situation among females in both endowed and deprived regions of Ghana, in order to identify possible ways forward.

ICT and Development

Numerous studies indicate the potential of ICT for development within the developing world and for the empowerment of women. Access to relevant information has become one of the discriminating factors between the rich and the poor communities in the world. Some popular views have it that up-to-date and readily available information is not a crucial concern for

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communities that struggle to satisfy more basic needs such as clean water and electricity. Other sources have also highlighted that ICT has a key role to play in contributing to improving the situation of communities that are already disadvantaged in so many other ways (Dalvit et al, 2007). Since the 1990s, there have been several initiatives, globally, that have applied ICT to addressing issues of poverty in developing countries (Ssewanyana, 2007). ICTs, especially the traditional ones, have been found to be an economic, social and political tool for the poor, since they are open to all individuals regardless of status. ICT has been described as encompassing a multitude of equipment, software and services. It can be broadly interpreted as technologies that facilitate communication and the processing and transmission of information by electronic means. This definition encompasses the full range of ICTs, from radio and television to telephones (fixed and mobile), computers and the Internet. In development contexts, the interface with traditional communication systems and tools is also important, as are applications in areas such as agriculture, business, governance, health, and education (GenARDIS, 2008). Internet protocols, optical networks, mobile telephony, broadband technology and wireless offer impressive opportunities for development since they enable fast and cost-effective access to information resources and the provision of services. They are especially valuable to people with reduced or negligible access to health care, government, education services and other facilities. As a result, current ICT protocols are applied to the areas of health care, agriculture, peace keeping, e-commerce, e-government, and e-learning. Through e-learning teacher training, skills development, dissemination of educational content and flexible access to training could be provided. E-learning has been used to improve distance learning and telemedicine as well (Maplecroft, 2006).

Four interconnected characteristics of the new, advanced ICTs have been noted by Baryamureeba (2007). The first is their capacity for interactivity. Thus the new forms of ICT offer effective two-way communication on a one-to-one or one-to-many basis. Second, the new ICTs are available 24 hours a day on real time, synchronous or delayed, and asynchronous bases. Third, through its interconnected infrastructure ICT now has a reach over geographic distances that was not possible even in the recent past. The fourth feature of the new ICT is the continuing reduction in the relative costs of communicating, although this differs by location. ICTs such as radio, television, telephone and email provide relevant information to the poor that can help them to access education and information on health, financial, and government services; production, storage and marketing of farm and non-farm products. As a result of the information, they are able to improve on their productivity and income. A combination of mobile phones and radio has enabled the African population to participate in phone-in programmes over important issues including political debates, health issues, agriculture, education, environment and gender issues, which have a high impact on their lives.

Both rural and urban people are interested in learning how to incorporate new forms of technology into their lives and their work, and ICT could also be one potential tool in helping to build rural capacity and a crucial tool for the capacity of rural and remote communities to survive in today's changing social and economic landscapes. Agriculture is of special relevance to Africans, making it critical to harness the potential of ICT. It is important for most developing countries to change to meet today's needs. Sufficient food must be produced to feed the ever-increasing global population, while raising living standards of the poor and preserving the natural resource base. This calls for the adoption of more knowledge-intensive sustainable farming practices to make farmers more knowledgeable about the new techniques. E-learning will no doubt be a viable and cost-effective way to facilitate knowledge development among agricultural professionals and farmers (Bruce et al, 2007; Abdon et al, 2008).

As much as ICT can be highly useful in connecting and improving networks and services across geographically separated localities, there nonetheless are certain challenges associated with its utilization in the developing world. Bruce et al (2007) have observed that although much time and effort has been spent on creating local Internet access points for rural and urban communities and on bringing high speed Internet to rural areas, very little time has been directed towards expanding local capacity for developing and making effective use of ICT systems within these communities. This makes such people continuously dependent on the external sources for ICT protocols and expertise. Initiatives to involve the user community in the design and implementation of ICT facilities will not only transform the beneficiary communities but also

contribute to building their capacity and promoting sustainable development to a much higher level.

Women and ICT

The factors that inhibit women's development affect their full access to and utilization of ICT as well. One could even argue that the growing application of ICTs to almost all aspects of life has contributed to create a developmental gap for women, who are often considered to be challenged by technology and other science-related applications. This article holds the assumption that these same ICTs that expand the gender divide comprise the tool that could facilitate women's empowerment as well.

Numerous factors inhibit women's access to and utilization of ICT protocols. Women in developing countries are less likely than men to have the requisite education and knowledge to use ICT effectively. Two-thirds of the world's 900 million illiterates have been estimated to be women (UNESCO, 2003; Daly, 2003). Women are also less likely than men to know the international languages that dominate the Web. Given their limited access to schooling, especially in rural areas, women are much less likely than men to have computer skills. Information literacy essentially includes using information contextually, but this is a skill that women are less likely than men to have, resulting from the comparatively limited exposure and isolation of many women. Although ICTs that do not require literacy are now being developed, they are available in only widely scattered pilot projects.

In almost all developing countries, communications infrastructure is weaker and less available in rural and poor urban areas, where the majority of women tend to live. Especially in Africa, Internet connectivity is frequently available only within capital and major secondary cities, while the majority of women live outside these cities. It is likely that in such communities, telephone lines are fewer, that there are no relay stations for mobile phones and no earth stations for satellites. Being the majority of the population in rural areas, women, therefore, have a smaller chance than men to access new technologies. As a result, African women's Internet access and usage lag behind those of African men. Estimates from Uganda and Senegal indicate that women Internet users constitute only about 31.5% and 12% of Internet users, respectively (0.1% of the total population in both cases), while in South Africa women users constitute 19% of Internet users (0.3% of the total population). Within most African countries women users are usually members of a small, educated urban elite. The urban bias in the dissemination of information technologies, and the fact that most poor women in developing countries live in rural areas, make the placement of infrastructure a gender issue.

There are also issues surrounding infrastructure. The development of infrastructure presents many choices concerning location of facilities, the nature and choice of technology, costs and pricing decisions. If the decisions on location, technology choice and costs do not explicitly consider providing access to women, especially in remote and rural areas, but instead favour urban areas with high-end and expensive communication services and technologies, women will continue to have less access than men (Daly, 2003; UNESCO, 2003). Meanwhile, current studies are revealing that the ICT impact is trickling down to remote communities, leading to a growing interest of women in those localities to utilize ICT protocols, such as mobile telephony.

In traditional communities where access is provided in public places, socio-cultural factors that prohibit women from sharing common places with men or impose competing demands on their time prevent them from utilizing such facilities. Hence, women tend to have less access than men to ICT facilities that do exist for common use in traditional communities. Such facilities could be information centres or cybercafés. Given gender-defined multiple roles and heavy domestic responsibilities, women's leisure hours are few, and the public centres may not be open when women can visit them, or they may be open in the evenings or at night when it is riskier for women to go out. For some women the challenge could be obtaining permission from their husbands. This, however, should not sound like women are trying to find a series of excuses to deprive themselves of using existing opportunities. A way out could be drawing schedules that will suit the lifestyle of both women and men so that both sexes can benefit equally.

There are gender issues as well in the applicability of ICT protocols in developing countries. Most women's use of ICT has been limited to radio programmes and phone-ins, private phone calls, emails and sometimes to list serves, and some networking activities. Relatively few women have used it for business, formal and non-formal education, or for purposes of livelihood and well-being for themselves and their families, such as accessing health and nutrition education. Poor exposure, cost of access and limitations of time, bandwidth, and technical skills could be the factors accounting for the limited usage (Asraf et al, 2007; Gurstein 2007; Abdulkafi 2008).

The various divides that have been discussed as especially affecting women in the Third World result from low levels of literacy and numeracy, lower skill levels, location and geography, with rural and remote areas being particularly ill served in terms of infrastructure, issues of security and other gender-related issues that require particular attention and need to be adequately addressed. Promoting women's use of new technologies for development is an important undertaking. As such, the mainstreaming of ICTs as a tool to facilitate democratic processes, improving economic development, and achieving development goals, is highlighted among the stated objective of many developing countries (Bisnath, 2004).

In spite of the above challenges to women's utilization of ICT facilities, there are cases to show the usefulness of ICT for promoting the cause of women. Making reference to Uganda, Ssewanyana (2007) states that ICT as a sector has provided employment opportunities to people directly and indirectly. Many women in various parts of Uganda have invested in village phones to earn income by selling communication time to people in their communities, conduct business transactions, communicate with friends, participate in phone-in radio shows, check prices of agricultural goods, and as a money transfer tool using text messaging.

The availability of ICT enables women to acquire knowledge that can be used to increase their social and economic standing in society, as they are able to use the knowledge to tap various income-generating opportunities and to influence the services they require from government. There are growing numbers of cellular and mobile telephone networks, mobile radio communication, paging services, private radio and television stations, and multipurpose community tele-centres providing communication services of fax, telephone, email and Internet, media services, and computer services that are targeted at women. A case in Kenya is presented below.

Wakunga ICT Livelihood and Education Project, Kenya

In partnership with the Suganthi Devadason Marine Research Institute (SDMRI), India, and the Nykopings Folkhogskola School of Sweden, Coastal Oceans Research and Development Indian Ocean (CORDIO) is organizing a life-changing ICT initiative with support from the Swedish Program for ICT in Developing Regions (SPIDER) for mostly poor residents in coastal areas of rural Kenya.

The project aims at alleviating poverty, promoting sustainable development and empowering self-help groups through an integrated approach. The intervention with women's groups seeks to unlock principal barriers and empower women to exploit their potential through the use of ICT. The objective of the project is to introduce ICT into a poverty alleviation strategy as part of an adult education programme to empower villagers. The project supports environmentally sustainable livelihood activities in order to help improve the standard of living among coastal communities. It also seeks to enhance women's household income, health, education, food security and self-reliance. The areas of focus can play a fundamental role in lifting women out of poverty to become more self-determined and less vulnerable to environmental and economic shocks. The initiative is assisting five women's groups in the Kwale District that have over 130 members. Some of the activities include poultry and duck cultivation and tourism. At the click of a button, members of well-organized rural self-help groups are able to search for markets for their farm products, make inquiries and even secure orders. By so doing the power of ICTs as a force for socio-economic change is being realized by the poor rural women.

As part of the intervention, the women's groups are assisted with ICT training and facilities to engage in alternative livelihood activities. Some have been trained in operating the community payphone project after which they are supplied with the necessary equipment and mobile phones.

The training covers topics like phone operation techniques, security and its benefits. Members of the group have acknowledged that having a community phone enables them to obtain market information and technical services. These help them to sell their products or services and generate direct income. It is reported that the programme is helping the rural women in the community to close the digital divide and survive in the fast-changing world.

However, despite the current success, the initiative faces many hurdles, including inadequacies in infrastructure, access to electricity, security of housing facilities and Internet connectivity. Other obstacles that have been listed include a lack of ready market for products, mishandling of gadgets and political instability, as well as difficulties in accessing market prices and sharing information on experience and best practices. The inability of the groups to organize and function efficiently and equitably to maximize shared benefits from their livelihood activities is a further recognised hindrance (Albirini, 2008).

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The above discussions and the Kenyan case have shown that as much as there are challenges in the utilization of ICT facilities for women, especially in under-served areas, ICT has the potential to improve the lot of women and close the digital and gender divide. The question is whether developing countries should ignore the ICT gap among women or undertake some forward-looking interventions. A strategy such as promoting availability of more computers, widening the telecommunications network, and hastening the growth of Internet service providers (ISPs) could be a good starting point. Meanwhile as observed by Gurstein (2007), among many others, simply providing access does not necessarily result in bridging the digital divide. It could even interfere with the provision and access to basic needs such as education, health care, capital, shelter, employment, clean water and food for those who are not able to process the information if not strategically implemented. The debate concerning the digital divide has recently broadened beyond physical access to computers and telecommunications. Current concern is about access to information and the additional resources that allow people to use technology for e-commerce, e-medicine, e-learning, e-agriculture and e-health. Though ICT can be a catalyst for effective development for women, it must be combined with appropriate developmental strategies. In a developing country, for instance, an ICT development programme should focus on a combination of programmes, such as poverty alleviation, education, health, human skills building, and the creation of a social environment that is conducive to the provision of universal access to basic welfare systems. ICT interventions in developing countries for women in both urban and rural communities must, therefore, address these issues and align with the development programmes of the country being dealt with (Asraf et al, 2007; Gurstein, 2007; Abdulkafi, 2008). The Ghana case discussed below shows the extent to which women in both deprived and endowed regions of the country are utilizing ICT protocols.

Survey

Profile of the Study Areas

Ghana has 10 administrative regions. This study covers the Greater Accra Region, where the capital city of the country, Accra, is located. It is, consequently, the best endowed in terms of infrastructure and economic resources. The three regions in the northern part of Ghana comprise the most underdeveloped regions of the country. Northern Ghana is made up of three regions, the Northern, Upper East and Upper West regions. A brief outline of the various regions is provided below.

The deprived areas – Northern, Upper East and Upper West regions of Ghana. Northern Region is the largest of the 10 regions of the country in terms of landmass, occupying 70,384 km^2 and accounting for 29.5% of the total land area of Ghana. The population forms 9.6% of the country's population. The Upper East Region is about one-eighth of the land area of the Northern Region but with four times the population density and almost half the population, a total land area of about 8842 km^2, and an estimated population of the region is 920,089, which is less than one-twentieth (4.9%) of the

national population. The population of the Upper East Region is primarily rural (84.3%) and scattered in dispersed settlements. The Upper West Region, on the other hand, covers a geographical area of approximately 18,478 km^2. This constitutes about 12.7% of the total land area of Ghana. The total population of the region is 576,583, representing 3% of the national population. The Upper East and Upper West regions are the two regions where the urban population is less than 20%. The majority of the people live in huts built of mud and roofed with straw or zinc

The Northern Region's growth rate of 2.8% per annum is relatively much higher than the growth rate of the Upper East (1.1%) and Upper West (1.7%). It constitutes a significant and important constraint on the siting of feasible and sustainable community facilities such as schools, health infrastructure, potable water supply, and most importantly, ICT infrastructure.

Infrastructural development is relatively low in the Northern Region compared to the entire country, but is higher than in the two other northern regions. The commonest sources of drinking water in the region are the rain, spring, river and stream. Over 70% of households in these regions use the kerosene lamp as their source of lighting, while a few use electricity. The low coverage of electricity could influence access to Internet facilities, television and radio and, therefore, access to information that may have a direct impact on health, education, economic and other developmental activities in the entire area.

There is a wide gap in educational attainment between the country as a whole and the regions. The highest educational level attained by the majority of the educated in the Northern Region is the primary school: 43.6% of males and 53.5% of females. About 22% of the population aged 15 years and older are classified as literate. The proportion who are literate is 12% higher among males than females. Available statistics on education in the Upper East Region indicate that only 21.2% of the population (15 years and older) is literate in either English only (12.9%), both English and Ghanaian language (6.6%) or Ghanaian language only (1.7%). The regional level of illiteracy (78.1%) is much higher than the national average of 45.9%. This proportion is higher for females (76.4%) than for males (66.8%). The proportion of males who have attended school before is consistently higher than for females at all levels. Although the proportion of females who had never attended school is still higher than that for males, the proportion reduced from 88.1% in 1984 to 74.4% in 2000. The situation is not better in the Upper West either, where 69.8% of the population aged 6 years and older has never attended school. Of this, 65.1% are males and 73.9% are females. It is noted that at the tertiary level, the proportion of males (5.7%) is slightly higher than that of females (4.6%). With this low level of literacy one may assume that general interest in ICT protocols could be very low in the entire area (Ministry of Local Government & Rural Development and Environment 2006; Ghana Living Standard Survey 4 2000).

The level of education has affected the economic activities in the area. The occupational structure is not very diverse. Agriculture, hunting, and forestry are the main economic activities in the area. Industrial activity is generally low. The majority of people operate in the informal sector where the incidence of poverty is relatively high (Ghana, 2003). Being predominantly rural, economic and social activities of the area are not the types that attract foreign labour.

If communities at grass-root level in the districts within the region are to be effectively involved in ongoing development affecting them, they need to be well informed and to have effective means of communicating their ideas and seeking further information. Post and telecommunication facilities are generally not easily accessible in the entire area. The current situation of access to a telephone facility is far from satisfactory in most districts. In the Northern Region, for instance, telephone facilities in the regional capital are within 15 km. Access to mobile phones in the region is very limited as well, due to the lack of an information technology network backbone. Only the Tamale municipality has access to mobile service providers. The situation is worse in the Upper East too. Having a teledensity (phones per 100 people) as low as 0.1 in the Upper East compared to the national density of 0.7 is not encouraging. All these have implications for availability, knowledge and utilization of ICT facilities among males and females.

Much as one may see the Northern Region as relatively well endowed compared to the two other regions in the north, infrastructural development such as electricity, access to potable water, levels of education and lucrative jobs are not encouraging, which could influence income levels, a substantial element of ICT use.

The endowed areas – Greater Accra Region of Ghana. The Greater Accra Region, regional capital of the country, is the smallest of the 10 administrative regions in terms of area, occupying a total land surface of 3,245 km^2 or 1.4% of the total land area of Ghana, but the second most populated region with a population of 2,905,726 in 2000, accounting for 15.4% of Ghana's total population.

The region is predominantly youthful. Access to electricity is relatively high with more than three-quarters of households in the region using electricity for lighting. Literacy is also relatively better compared to all other regions of the country, especially the three most deprived regions. Available data indicate that over 78% of household heads are literate, with proportions of 47.7% in English and a Ghanaian language, 23.8% in English only, 5.6% in Ghanaian language only and 1.1% in other languages. Occupational structure is comparatively diverse among both males and females. About 42% of the economically active population is engaged in sales and service occupations, while professional, technical and related workers make up 10.8%. The three largest occupational groups among males are production, transport operators and related workers (29.6%), sales workers (19.4%), and clerical and related workers (14.4%) while 42% of females are in sales occupation, 19.5% in production, transport and equipment, and 13.9% in service occupations. In total 1,377,903 or 70.8% are economically active, with an unemployment rate of 13.4%, which is higher than the national figure of 10.4% (Ministry of Local Government and Rural Development & Environment [MLGRDE], 2006; Ghana Living Standards Survey 4 [GLSS 4], 2000).

Telecommunication facilities are relatively better. Post office services are available in all districts. Availability of a post office facility ranges from 1.3% to 8.8%. Telephone facility is available in all the districts; though not all communities have this facility. Greater Accra is also covered by all the telephone operators of the country. The average teledensity is 3.2 per 100 persons, about five times that of the national average (0.7), which shows that most of the fixed line and mobile telephones of the country are concentrated in the region. All the seven telephone companies in the country operate in the region (Ministry of Local Government and Rural Development & Environment [MLGRDE], 2006); Ghana Living Standards Survey 4 [GLSS 4], 2000).

Compared to the three deprived regions, data on the various regions places the Greater Accra Region ahead in the areas of educational attainments, infrastructure development and employment opportunities. Being a state capital region, most of the resources and employment opportunities are available, which can improve the income levels of the inhabitants. The available information technology facilities, such as telephony and its facilitating item, electricity, will no doubt be provide a comparative advantage for the inhabitants.

Approach

This study sought to find out the ICT situation, with particular respect to knowledge and usage among women, in the most endowed and deprived regions of the country. The population for the study was distance learners of the University of Ghana Distance Education Programme. These learners were pursuing a first degree programme. The purpose was simply to test the knowledge and usage of basic ICT facilities such as the Internet, search engines like Google, ownership of ICT facilities, and to find out how much the students who were users invest and are willing to further invest in such services to support their studies at a distance.

A survey instrument was used to ask respondents simple questions like:

- Do you know what ICT is?
- Do you use the Internet café?
- Where do you access the Internet?
- How long on average do you stay on the Internet?
- How many times per week do you use the café?
- How much do you pay per hour?
- What do you use the Internet for?
- Are you aware of search engines such as Google that you can use to access web sites?
- How often do you use the search engines per week?
- Do you use search engines to access educational materials?
- Are you aware that Internet can enhance your knowledge in any area of your choice?

- Do you own a personal computer?
- Would you like to own one?
- Would you pay a flat fee of GH¢20-30 per month for Internet connection?
- Would you want to have Internet connection in your school, work or home?

The focus was on the Internet for two reasons. First, it has a high potential for promoting technology-mediated learning and reaching out to those in the remotest part of the world. Second, the author assumed that respondents could have a relatively high level of awareness about the Internet, which could enable them to relate to the issues and provide some responses. Introducing an unfamiliar ICT application could make it impossible to obtain responses if no sensitization was undertaken.

Out of a sample size of 200 females, a total of 174 responses were obtained. Out of the total, 54 responses, forming 31%, were from the Greater Accra Region. From the three northern regions, Northern Region, Upper West Region and Upper East Region, 120 responses, forming 69%, were obtained. The data was analyzed using percentages and chi-square tests. All tests were at the .05 level of significance.

Results

Data on the demographics of the respondents provided interesting results. In both regions the majority of the respondents were between 20 and 30 years of age (72.2%) while the others ranged from 31 to 50 years. In terms of marriage, most of the respondents were single (82%), while the rest were married, divorced or widowed. With respect to professional background, most respondents from the deprived regions were students (54.6%), followed by teachers (18.1%), civil servants (16.3%), and 1.3% doing other jobs. Only 8.4% indicated that they were unemployed. For the endowed region, the majority were unemployed (29.4%), followed by teachers (24.6%), civil servants (18.8%), other jobs (18.1%), self-employed (5.8%) and students (2.9%). Household size was larger in the deprived communities than in the Greater Accra Region. Most of the respondents in the northern regions had between 6 and 10 people per household (41.4%), whereas most of the respondents in the Greater Accra Region had between 1 and 5 people per household (52.2%).

The chi-square tests provided the following results on the knowledge and usage of ICT facilities among the respondents. The results show a relationship between region and knowledge of ICT ($c^2 = 14.5$, $p < .05$). Thus 88.9% of females in the Greater Accra Region had knowledge about ICT whereas only 60% of females in Northern Region know about ICT. This could be as a result of the differential levels of infrastructural advancement which relates to the extent of exposure.

Though there is no relationship between region and internet café use ($c^2 = 6.16$, $p > .05$) and that most respondents in both regions use an internet café, a relationship does exist between region and how long respondents spend on the Internet ($c^2 = 12.3$, $p < .05$). Female respondents in the Greater Accra Region spend more time on the Internet than those in Northern Region. This could be a result of possible income differentials among the respondents in the contrasting locations. The test on the number of times per week respondents use the café, however, revealed that there is no relationship between region and the number of times per week respondents use the café ($c^2 = 7.7$, $p > .05$). As such, the number of times respondents use the café is not dependent on region. There also is no relationship between region and how much is paid for café use ($c^2 = 13.6$, $p > .05$). Female respondents in both regions spend a considerable amount of money at the café.

Probably as an influence of the different levels of infrastructural developments and possible exposure, there is a relationship between region and what respondents use the Internet for ($c^2 = 24$, $p < .05$). While females in endowed communities use the Internet for emails, chat, etc., those in deprived communities mainly use the Internet to send emails. Still influenced by the exposure factor, there is a relationship between region and knowledge of search engines ($c^2 = 55.7$, $p < .05$). Most female respondents (88.7%) in Greater Accra know about search engines whereas most of the female respondents (72.9%) in Northern Region did not. The percentage difference is not great, however, and might not be seen to be very significant considering the development gap.

The results revealed a relationship between region and how often respondents use search engines ($c^2 = 15.8$, $p < .05$). Most female respondents in Greater Accra Region use search engines once a week whereas most of the females in Northern Region use search engines twice a week.

This is interesting. Could it be as a result of the large number of the respondents from the deprived regions being students, in spite of the fact that the majority of all the respondents were in their early adult stage? In this case, female students could be a good target for promoting ICT usage irrespective of the level of development of the locality.

As to whether respondents use search engines to access educational materials, the results yielded no relationship between regions ($c^2 = 0.121$, $p > .05$). Most female respondents use search engines to access educational materials irrespective of their region. The results revealed no relationship between region and whether respondents are aware that ICT can enhance their knowledge in any area of their choice ($c^2 = 3.2$, $p > .05$). Most respondents are aware that ICT can enhance their knowledge in any area of their choice irrespective of their location.

There is no relationship between region and whether or not respondents own personal computers ($c^2 = 1.6$, $p > .05$). Most respondents in both regions do not own personal computers. There is also no relationship between region and whether respondents will want to own personal computers ($c^2 = 0.03$, $p > .05$). Most female respondents want to own personal computers irrespective of their region. No relationship again emerged between region as to whether respondents will want to have an Internet connection ($c^2 = 0.19$, $p > .05$). Most female respondents want Internet connection irrespective of their region. No relationship exists between region on respondents willingness to pay a flat fee of GH¢20-30 for Internet connection ($c^2 = 1.2$, $p > .05$). Most female respondents will want to pay a flat fee of GH¢20-30 for internet connection irrespective of their region.

The chi-square tests have yielded interesting results. Considering the infrastructural developmental gap among the regions of study, one would have expected a high level of relationship between regions, which is surprisingly not so. Women, no matter what their locations, are breaking free from the technology divide, which is a good indicator for development. Could age and education be the facilitating factors? This is possible. A study by Kwapong (2007) revealed that age, education and income influence technology choice and usage. In some instances availability and, for that matter, exposure to the facilities, were factors that gave the women in the endowed regions an upper hand over their colleagues in the deprived regions. Irrespective of the slight differences, the women in the deprived regions have proved by their responses that given a similar opportunity, they will make the best out of ICT resources. An area of intervention for women in the deprived regions could be orientation to the multiple uses of the Internet so that they do not just use it for chatting with friends and sending emails but most importantly be equipped to use it for development purposes such as e-learning, e-commerce, e-government, and e-health.

Conclusion

ICT has the potential to make and unmake. Much as ICT could be a dividing factor in development, a conscious utilization makes it an enabler for overcoming the gender digital divide irrespective of geographical locations. There are cases in various parts of Africa to testify to this. The literature review has revealed that women suffer numerous difficulties in relation to their participation as equal partners in the information society and knowledge economies. As indigenous people, women are disproportionately found in rural and remote areas, most of which are out of reach due to poor road and telecommunication networks. Their traditional geographic locales are often in areas of particular environmental or economic vulnerability. Their limitation in foreign languages and cultures also distinguish them from other communities. In these contexts, access to ICTs and the Internet often present significant barriers. Regional differences in economic development and population density across the country have also resulted in women considerably lagging behind.

Meanwhile, Gusrstein (2007) emphasizes that it is precisely through the use of ICT that such impoverished economic and social conditions (of women) can most effectively be alleviated. ICTs are seen to provide a means through which women may participate as equal members in the larger society and realize their aspirations for self-management and self-determination. A focus on endowed and deprived regions in Ghana has proved that not only those in the relatively endowed regions, but also in under-served areas have some level of knowledge and usage of ICT that could

form the basis for policy formulation for using ICT – particularly, for education – to empower the women.

The results have revealed that in making the effort to use ICT for women, certain factors, including purpose, time or convenience, space, age and income have to be considered. Exposing the women to multiple usage of ICT is also very critical. There was no response indicating that they use the Internet to enhance their studies at a distance, businesses or occupation apart from email communications, chatting and similar uses. A key observation from this study is that at least women who are generally categorized as not being technology friendly are breaking free, in relatively well-endowed areas and under-served areas alike. This is a good starting point to undertake gender-specific policy initiatives and projects that will promote e-learning, e-government, e-medicine, e-commerce and all other applications for women in both urban and rural communities.

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OLIVIA A.T.F. KWAPONG holds a PhD from the University of Ghana. She has studied as a special Doctoral Candidate at Harvard University. She is currently a lecturer at the Institute of Adult Education, University of Ghana. She promotes empowerment of women through adult education, distance learning and the use of ICTs. *Correspondence*: Olivia A.T.F. Kwapong, Institute of Adult Education, University of Ghana, LG 31, Legon–Accra, Ghana, West Africa (okwapong@ug.edu.gh).