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Information technology and gender gap: toward a global view

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Received 17 August 2009
Revised 18 September 2009
Accepted 22 September
2009

Abstract

Purpose – The purpose of this paper is to present the gender gap in computer and internet usage from all over the world.

Design/methodology/approach – The paper addresses some issues on gender and information technology (IT) with focus on gender gap drawn from a review of the literature. It also applies Hofstede's model to justify the gender differences.

Findings – Information and communication technology has brought many changes in society in many aspects, has shaped new scenarios and provided new challenges for human beings. Women, comprising over half of society, are not waived of these changes, although, there is a gender gap to access and use of IT among all nations without exception. More recent studies, particularly in developed countries, show gender differences more than gender gap.

Originality/value – The paper provides insights into the current computer and especially internet usage by gender among different countries.

Keywords Communication technologies, Gender, Internet, Computers

Paper type General review

Introduction

The information technology (IT) revolution is driving a major shift in human civilization into the “information or knowledge society”. In spite of bringing many positive changes in society as a whole, information and communication technology (ICT) have not touched all of humanity. As a social product, these technologies are not gender neutral. IT, in general, has been in many ways traditionally considered and understood as fields of work and interest that predominantly belong to men. It has many features in many ways but the scope of this paper is limited to computers and the internet. This paper focuses primarily on gender gap and attempts to present computer and internet usage by gender throughout the world.

Since we are concerned about “information technology” and “gender” in this paper, a definition of these two concepts might be beneficial to the readers. According to Mitter “information technology” is a group of technologies that process rather than merely store or transmit information. At the core of IT is computers and software (Mitter and Rowbotham, 1995). Mörtberg (2000) defined the main point of the “information technology” as the integration of computer technology, communication technology and multimedia, so people use ICT as a new concept. Recently, computers are connected to networks that give people opportunities to interact, to co-operate, to talk, to exchange ideas and feelings and to create transnational relationships – cyberspace becomes reality (Mörtberg, 2000).

The term “gender” refers to the different roles men and women play in a society or a community. These roles are determined by cultural, social and economic factors and



differ within and between cultures and countries. Gender roles are different from sex differences in that sex differences are biological, and for the most part, unchangeable. Gender roles which are learned, change over time and vary widely within and between cultures (UNDP, 1999).

IT and gender-related factors

ICTs and the internet offer vast and new opportunities for human development and empowerment in areas ranging from education and the environment to healthcare and business, they are also one of the key contributing factors to social and economic disparities across different social and economic groups. The gender divide seems to be one of the most significant inequalities to be expanded by the digital revolution, and cuts across all social and income groups. Throughout the world, women face serious challenges that are not only economic but social as well as cultural – obstacles that limit or prevent their access to, use of, and benefits from ICTs (Primo, 2003).

Nevertheless, the United Nations Millennium Declaration (2005) has resolved to ensure that globalization becomes a positive force for all the world's people and to promote gender equality and empowerment of women as effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable, and to ensure that the benefits of new technologies, especially information and communications technologies, are available to all (World Bank, 2005). However, we may note here despite international recognition that the benefits of new technologies should be available to all, gender disparities persist with regard to ICTs.

Any technology including the internet may be considered as a social product and it is not value-free. The “value”, “perception” and “norm” of a society affect the acceptance and use of ICT including computer and the internet. It seems that men and women are socially constructed for different tasks and this may influence the pattern of IT usage.

Some of social studies have been shown that men and women differ in terms of their attitudes toward a technology. For example, Venkatesh and Morri (2000) reported gender differences in importance assigned to various factors for the adoption of ICT and Gefen and Straub (1997) reported gender differences in the perception and use of e-mail (Venkatesh and Morri, 2000; Gefen and Straub, 1997).

Men and women also differ significantly in terms of attitude toward risk and attitude toward technology in general (Brunner and Bennett, 1998). Since so-called “innovators” of a new technology have more favorable attitudes toward risk (Gatignon and Robertson, 1991), women's risk-averse behavior is likely to result in lower rates of technology adoption.

Furthermore, at school level, it appears that girls and boys interact with technology differently. While girls use the computer for word processing and skill building, boys use them mostly for games. Girls use technology as a way to connect with people and solve real-life problems, whereas boys view technology as a way to extend their power, preferring computerized games and entertainment that build upon competition and contest. Males also find the workings of the technology itself as enthralling as the uses of the technology (Viadero, 1994).

The studies reviewed above shows that socially constructed gender roles has some impact on the adoption of ICT by men and women because ICT as a social product is not value-free. We may not be able to explain gender gap in ICT usage by this issue but we can justify the differences between men and women.

IT and culture

In addition to gender, culture is also an important factor in adoption of ICTs among different nations, therefore, it is useful to look into culture as well. We are going to use Geert Hofstede's model that identifies five primary dimensions to differentiate cultures. Hofstede conducted a comprehensive study on data collected by IBM between 1967 and 1973 covering over 70 countries of how values in the workplace are influenced by culture. Hofstede analyzed the data from over 100,000 individuals from 40 countries and later developed his model (www.geert-hofstede.com/). His five dimensions to differentiate cultures are:

- (1) Power distance index (PDI) focuses on the degree of equality, or inequality, between people in the country's society.
- (2) Individualism (IDV) focuses on the degree the society reinforces individual or collective, achievement and interpersonal relationships.
- (3) Masculinity (MAS) focuses on the degree the society reinforces, or does not reinforce, the traditional masculine work role model of male achievement, control and power.
- (4) Uncertainty avoidance index focuses on the level of tolerance for uncertainty and ambiguity within the society, i.e. unstructured situations.
- (5) Long-term orientation focuses on the degree the society embraces, or does not embrace, long-term devotion to traditional, forward thinking values.

Considering the differences of gender in terms of their attitudes toward technology, risk, social values, roles and Hofstede's model, we review the use of computers and the internet in different countries which are reported in the literature.

Computer usage by gender

Use of computers started much before use of the internet. Use of the internet as an advancement of IT requires use of computers. Males and females seem to be different in their use of computers, however, we should consider other parameters such as the socially constructed nature of gender roles, different attitude toward technology and cultural differences.

A long-term study during ten years about general levels of computer literacy among undergraduate students at the University of Edinburgh in Scotland showed that gender was a powerful predictor of the responses that students gave in the early years of the survey. In all areas of the questionnaire, gender differences were present and were highly significant. Women reported themselves as less likely to own computing equipment, believed themselves to be less experienced than their male colleagues in IT related-related skills, and were generally less positive in the attitudes they expressed toward the importance and relevance of IT to their academic studies and future careers. All the students used the computers provided by the university and 74 per cent of students had access to computers in the home. However, the female students reported that although they may have computers in their home they had more problems with access such as having to share the computer with other family members or friends. About 49 per cent of the female students reported they did not have priority access to the computer in the home, whereas none of the males reported this (Gunn *et al.*, 2003). One of the reasons for these results may be attributed to the different attitude

(being less positive) toward technology among female students. The Geert Hofstede analysis for the UK reflects a high level of individuality and MAS.

In a study conducted in Australia it is been reported that the proportion of women using computers is less than males for all regions; however, the greatest difference is in the major metropolitan centers. While more males use computers than females, the difference was never greater than 6 per cent (Armstrong *et al.*, 2003). The Geert Hofstede analysis for Australia reflects the high level of individuality. The IDV index for Australia is 90, the second highest score of any country in Hofstede survey, behind the US ranking of 91.

This individuality is reinforced in the daily lives of Australians and should be considered when traveling and doing business in their country. Privacy is considered the cultural norm and attempts at personal ingratiation may meet with rebuff. PDI is relatively low, with an index of 36, compared to the world average of 55. This is indicative of a greater equality between societal levels, including government, organizations and even within families. This orientation reinforces a cooperative interaction across power levels and creates a more stable cultural environment.

A computer usage study in Korea showed that 75 per cent (16.85 million) of all male and 62.6 per cent (14.08 million) of all female use computers at least once a month, and the difference between the genders is 12.4 per cent. The main purpose of using a computer is for internet access (82 per cent), followed by playing games (41 per cent) and information and data management (30 per cent) (Ministry of Information and Communication of Korea, 2004).

In another study which was conducted on middle and high school students in the USA it has been reported that girls and boys both are competent in using computers. Girls are more likely to use the internet to e-mail friends and family than boys are. They are also more likely to use the internet for schoolwork and chat rooms than boys. On the other hand, as reflected in studies elsewhere, boys reported using the internet more for entertainment and games (Daniel, 2005).

In another US school study, it is observed that boys see the computer and the internet as a source of entertainment whereas girls see it as a tool to help achieve a specific task or goal. However, it has been found that despite the positive opinion and perceptions reported by girls, they were less likely to enroll in elective computer classes than boys. The elective computer classes are more complex and give students the option to try computer programming and web design. Very few girls were enrolled in these more advanced classes. On the other hand, the number of boys who chose computers as an elective far outweighed the number of girls. Girls use the internet to research their favorite celebrities and to obtain the latest beauty and fashion news, whereas boys search for new product information, sports news and the latest technologies. In general, no significant differences were found in terms of access or the amount of time spent using computers and the internet, however, differences were found in the way girls and boys use computers and the internet (Humby-Hoff, 2002). The author may justify that in a developed country such as the US its gender gap is not as wide as developing countries, but results of the gender-related studies go beyond gender gap and actually show different ways of using the internet which can be attributed to the socially constructed nature of gender roles.

In a further recent US study gender differences were found with regard to the estimated time spent in after-school activities as well as in use of the computer.

Girls estimated that they spend more time than do boys using the phone and doing homework. Although some previous research suggests that the gender gap in computer usage is closing, this study indicates that there continues to be a gender gap in the types of computer use. Boys tend to use the computer without the internet more frequently, and girls tend to use the computer with internet access for homework purposes most often (Hunley *et al.*, 2005). Considering the Hofstede model, there are only seven countries in his research that have IDV as their highest Dimension: namely the USA (91), Australia (90), the UK (89), The Netherlands and Canada (80) and Italy (76).

The high IDV ranking for the USA indicates a society with a more individualistic attitude and relatively loose bonds with others. The populace is more self-reliant and looks out for themselves and their close family members. When the IDV is high in a society it means men and women focus on themselves so that gender gap may be low but the differences between men and women are shown more clearly. The differences between men and women in using ICT reveal gender difference not gender gap.

However, we should keep in mind that IDV on the one side versus its opposite, collectivism, that is the degree to which individuals are integrated into groups. On the individualist side Hofstede found that in societies in which the ties between individuals are loose then everyone is expected to look after him/herself and his/her immediate family. On the collectivist side, he found that societies in which people from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) continue to be protected by group members in exchange for unquestioning loyalty. The word “collectivism” in this sense has no political meaning: it refers to the group, not to the state. Again, the issue addressed by this dimension is an extremely fundamental one, regarding all societies in the world.

It may be noted here that the majority of studies on the use of computers were completed before the internet emerged. The internet has radically changed the meaning and use of a computer. Since the 1990s, computers have undergone a dramatic transformation. Computers are no longer isolated machine and users are no longer restricted to the information stored locally on their computer hard drives. Instead, they have become a part of a network of computers – first perhaps locally and then worldwide in the global network known as the internet. The computer has become a communications tool that allows people to engage in instantaneous and two-way communication with others. We may justify gender gap and gender differences in computer usage by Hofstede IDV to some extent but the emergence of the internet has given other dimensions to the gender gap.

The internet usage by gender in the world

It seems that obtaining precise data on internet usage by gender is difficult especially from developing countries, however, reviews of statistics on internet access and use across countries reveals gender as one of the most important factors influencing the internet usage.

In a study conducted by the UCLA World Internet Project in 14 countries showed that there is significant “Digital Gender Gap” in many countries. They found an average 8 per cent gap between men and women using the internet. This figure was not as large as they might have expected, given the gender disparities that persist around the world. However, in several technologically developed countries, the gap was

surprisingly large – in some cases almost twice as many men as women use the internet. The gender gap in internet use was as high as 20.2 per cent in Italy (men, 41.7 per cent; women, 21.5 per cent) to as low as 1.6 per cent in Taiwan (where 25.1 per cent of men are internet users, compared to 23.5 per cent of women). According to this study, in the USA, 73.1 per cent of men use the internet compared to 69 per cent of women – about half the average gap of countries in the UCLA World Internet Project (Lebo, 2004).

The gender gap of internet use in the countries surveyed on this question for the UCLA World internet Project is shown in Table I.

In another study reported by the International Labour Office in 2001, the most striking digital gender divide relates to internet use, with women in the minority of users in both developed and developing countries. For example, only 38 per cent of internet users in Latin America are women, while in the European Union the figure is 25 per cent, in Russia 19 per cent, in Japan 18 per cent and in the Middle East 4 per cent. Most internet users are male, college-educated and earn higher than average incomes, the report says. Only where internet access is well developed, for example in Scandinavia and the USA, has the gender gap in use of the internet closed (International Labour Office, 2001).

In a monthly-based research by Gemius Audience on the use of the internet in Lithuanian, it is reported that the proportion of female and male visitors on the Lithuanian internet has reversed. Comparing the data from June 2006 and December 2005 shows a significant change. In June 2006, it was observed that a relative balance in terms of the number of visitors. The share of women was 50.2 per cent while men constituted 49.8 per cent. It is interesting to notice, however, that in December 2005 the proportion of male and female visitors was totally different. In December 2005, the number of women amounted to 47.3 per cent and men constituted 52.7 per cent. In June 2006 a man, on average, spent 10 hours and 33 minutes on the internet, generating 720 page views, while for the average woman these numbers amounted to 11 hours 22 minutes and 783 page views. The difference in comparison with winter (December) results was mostly caused by reduced activity on the internet by men and great activity of women which has not been reduced as a usual trend in summer (News and Data, 2006).

Country	Men (%)	Women (%)
Britain	63.6	55.0
Germany	50.4	41.7
Hungary	20.3	15.1
Italy	41.7	21.5
Japan	54.7	46.2
Korea	67.8	53.8
Macao	37.8	28.8
Singapore	47.2	34.0
Spain	46.4	27.2
Sweden	67.7	64.4
Taiwan	25.1	23.5
USA	73.1	69.0

Table I.
Gender gap of
internet use

A study carried out by Riahinia and Azimi on women's use of internet in Tarbiat Moalem University in Iran showed that there is a significant relation between academic females' use of the internet and their social ranking. As social ranking increases the use of internet grows. E-mail was used most, although it is closely followed by other services such as "new discoveries" and "search for resources", and also "gaining information". Education also rates high – emphasizing that the internet and web content is accessed for research and learning purposes in the main – as befits an academic environment. The use of the internet for social activities such as communication and finding like-minded friends is not a priority – in fact "seeking for friend" is at the bottom of the chart with only around 10 per cent admitting to it. The findings also revealed that as users navigate more through internet they would find more hidden threats and vague content. This study was focused on female users and did not provide information about male users (Riahinia and Azimi, 2008).

A study comparing the USA and Japan by using microdata from several surveys during the 1997-2001 period indicate that there were significant gender differences in computer and internet usage in both countries during the middle of this period and were even reversed in the USA but remained in Japan. People (not currently working) had lower levels of IT use and skills in both countries regardless of gender, but working women in Japan had lower levels of IT use and skills than prior to the 1990s. By 2001, these gender differences had disappeared. This finding suggests that employment status *per se* does not play a large role in the gender gap in Japan, but type of employment does. The prevalence of nonstandard employment among female workers in Japan accounts for much of the gender gap in IT use and skills in that country (Ono and Zavodny, 2004). The author believes that this comparative study between the USA and Japan shows mostly gender differences (not gender gap) in computer and internet usage and the results also can be explained by the socially constructed nature of gender roles among two countries.

In addition, the Hofstede model shows that the country experiences a higher degree of gender differentiation of roles as the USA has the highest IDV (91) in the World. As we mentioned earlier when the IDV is high in a society means men and women focus on themselves so that the differences between men and women are shown more clearly as this study revealed. The Hofstede analysis for Japan is dramatically different from other Asian Countries. In Japan MAS is the highest characteristic. The lowest ranking factor is IDV, which coincides with their high ranking in uncertainty avoidance. Japan is a more collectivist culture that avoids risks and shows little value for personal freedom.

However, as noted the USA has the highest IDV in the World and IDV is a significant factor in the life of Americans. The next highest Hofstede Dimension in the USA is MAS with a ranking of 62, compared with a world average of 50. This indicates the country experiences a higher degree of gender differentiation of roles. The male dominates a significant portion of the society and power structure. This situation generates a female population that becomes more assertive and competitive, with women shifting toward the male role model and away from their female role.

A study by the Pew Internet Project (reported by BBC) found that roughly the same percentage of men and women in the US are serious internet users. But the research found that men value the Net for the freedom it gives them to try new ways of doing things. By contrast women like the opportunities the Net gives them to make and

maintain human connections. One finding suggests that the number of women online already outnumbers that of men. Figures gathered by Pew suggest that 68 per cent of men are Net users, compared to 66 per cent of women. However, the total number of internet-using women is higher because there are more women than men in the general US population. In some sections of the population online, this divide is more pronounced. For instance, 60 per cent of black women are internet users compared to only 50 per cent of black men (Gender Gap Alive, 2005).

Use of ICT in libraries by gender

In this part, we review some studies on ICT application among libraries and their users to see the gender differences perhaps gender gap.

A study on crop farmers' access to agricultural information in rural areas of Nigeria showed that farmers of both genders experienced obstacles to information use, although findings revealed that there were also differences between male and female crop farmers with respect to their information needs and sources of agricultural information. Female farmers reported that they have a greater need for agricultural information than the males. This may simply reflect a lower level of confidence on the part of female farmers in their own knowledge, or it may reflect a genuinely greater need for information. Farmers rely heavily on personal experience as source of information for their farm work as 53 (73.6 per cent) males and 51 (69.9 per cent) females indicated it as the source of their agricultural information. In addition, female farmers report a slightly greater preference for written information than male farmers, and a slightly lower percentage of them depend on the main oral forms of information (such as neighbours and friends) that are the preferred options of male farmers for agricultural information (Adomi *et al.*, 2003).

A study on public library uses in Bangladesh showed that the use and value of public libraries, in relation to particular socio-economic features of a developing nation, are significant mainly for two reasons. First, social factors are unavoidable to understand the magnitude of social inclusiveness of libraries and the strength of its impact, and second, to ascertain the ways of comprehensive access to libraries by acquiring indication of realistic policies from the field level survey. This study shows that some factors like age, income and gender are very important depending on the particular socio-economic features of Bangladesh as these influence use and impact of libraries. For example, the absence of book borrowing services to home, as expressed by 83.33 per cent users, is one of the major problems that limits user access to public library services specially to the large section of women readers and low income group of the country given the barriers of religion and travel cost to a specific branch. Unsatisfactory distance of library locations (65.83 per cent) also limits the economic benefit given the cost to reach libraries. Though the study reveals dissatisfaction in library resources, it shows a strong library impact on recreation and culture, self-learning, social welfare and on economic development of the country (Nasir Uddin *et al.*, 2006).

In Japan, two series of surveys were conducted in suburban/rural cities in 2004 and 2006 to identify residents' lifestyles and their views and attitudes toward public libraries. The 2004 mail survey was conducted among the residents of Toride City and the gender ratio was 43.8 per cent male and 56.2 per cent female, a significant bias toward female when compared to the demographic statistic of about 50-50. The gender

ratio in 2006 study was 52.9 per cent males and 47 per cent females, which represents a higher male percentage than the demographic. The results showed that the number of male visitors has increased in the public libraries, a distinct change from a decade ago. The results also demonstrate that the libraries acquire new user groups according to their service innovations. However, it was found that people have already started to utilize search engines on the internet, regardless of the presence/absence of the corresponding service in the library to acquire various types of information (Nagata *et al.*, 2007).

A study by Hariri and Afnani in Iran was conducted using a LibQUAL+™ survey at the central library of Iran University of Medical Sciences and Health Services. The results did not show significant differences between mean values of gap scores for female and male users. The library exceeded female users' minimum acceptable level of service quality in 16 aspects of LibQUAL +™ survey, while that library fulfilled the minimum level of acceptable quality in just nine aspects for male users; however, according to statistical analysis, female and male users held similar opinions in relation to the quality of the library services. Despite the fact that female and male users of the library may be treated in rather a reserved and more formal way when receiving services from a librarian of the opposite sex, the results of this research show that this had no impact on the affect of service perception of both genders. Furthermore, using the separated reading desks and places in the library had no effect on the users' impression of the place of library. It is worth mentioning that the libraries in Iran try to allocate better parts of the reading areas of the library for female users (Hariri and Afnani, 2008).

A survey was carried out by Wilson at the Chester County Library in Exton, Pennsylvania in order to give insight into why and how women use the public library and IT, and how they learned to use the technology. In terms of using technology, the female respondents were fairly tech-savvy. About 74 per cent of respondents felt comfortable using computers. Only 5 per cent replied that using computers meant more work for them. About 82 per cent said they used a computer on a regular basis, and 98 per cent reported that they had used the internet. About 98 per cent of women who used the internet used a search engine such as Google or Yahoo to find information. Topics frequently mentioned were medical and travel information, information for their children and shopping. Men, by contrast, listed shopping and finding medical information as their second reason for using the internet. General research topics were most frequently cited by men. The library was also used as a place of solitude, where women could find a place and time for themselves. The author compared the men's results to the women's responses, and found that coming to the library for books was lower on the list, and very few men mentioned children's library services. Men came to the library more often than women to study or read (Wilson, 2009).

The above studies show that gender differences in library usage is more visible than gender gap, however, the results are justifiable by using Hofstede's model in their contexts.

Conclusion

ICT as a social product are not gender neutral. Access and use of ICT are interwoven with the socio-cultural issues and gender gap is seen among all nations in the world, however, the gender gap is wider in developing countries. The wider gap in developing countries can be attributed to the culture and social values. Considering Hofstede's

model, in general, developing countries have high Power Distance, low IDV and high MAS which all of these may led to wider gender gap. It is been found from the literature that men and women use IT in different ways which related to men's and women's role and value in a society, in the other words, men and women are socially constructed for different tasks and this may influence their pattern of IT usage.

Historically, IT has been considered as a male dominated field. The difficulty of access to new information and communication technologies for women is an important issue in the literature. Different attitude toward risk, especially accepting low-risk jobs from females is seen as a barrier to use of IT. A digital gender gap in using computers and the internet by men and women were obvious throughout all studies especially in developing countries. Nevertheless, in developed countries in which the gender gap is not as wide as developing countries, results of the gender-related studies go beyond gender gap and show differential preferences of internet usage which can attributed to the socially constructed nature of gender roles and culture in those countries. In addition, the Geert Hofstede analysis for developed countries shows a high level off IDV which led to high degree of gender differentiation of roles in developed countries. The review of literature on library usage shows that gender differences in library usage is more visible than gender gap.

References

- Adomi, E.E., Ogbomo, M.O. and Inoni, O.E. (2003), "Gender factor in crop farmers' access to agricultural information in rural areas of Delta State, Nigeria", *Library Review*, Vol. 52 No. 8, pp. 388-93.
- Armstrong, B., Comber, T., Dingsdag, D. and Fogarty, G. (2003), "Internet and computer usage: comparisons among metropolitan centers, coastal regional centers and inland regional centers", available at: http://spike.scu.edu.au/~bruce/files/2003_internet_and_computer_usage.pdf (accessed 14 March 2009).
- Brunner, C. and Bennett, D. (1998), "Technology perceptions by gender", *The Education Digest*, February, pp. 56-8.
- Daniel, A.J. (2005), "An exploration of middle and high school students' perceptions of deviant behavior when using computers and the internet", *The Journal of Technology Studies*, Vol. xxxi No. 2, pp. 70-80.
- Gatignon, H. and Robertson, T.S. (1991), *A Propositional Inventory for New Diffusion Research*, 4th ed., Prentice-Hall, Upper Saddle River, NJ.
- Gefen, D. and Straub, D.W. (1997), "Gender differences in the perception and use of e-mail: an extension to the technology acceptance model", *MIS Quarterly*, Vol. 21 No. 4, pp. 389-400.
- Gender Gap Alive and Well Online (2005), Thursday, 29 December, available at: <http://newsvote.bbc.co.uk/mpapps/pagetools/email/news.bbc.co.uk/2/hi/technology/4555370.stm> (accessed 20 April 2009).
- Gunn, C., McSporrans, M., Macleod, H. and French, S. (2003), "Dominant or different? Gender issues in computer supported learning", *Journal of Asynchronous Learning Networks*, Vol. 7 No. 3.
- Hariri, N. and Afnani, F. (2008), "LibQUAL+™ in Iran: a subgroup analysis by gender", *Performance Measurement and Metrics*, Vol. 9 No. 2, pp. 80-93.
- Humby-Hoff, C. (2002), "Girls, computers, and the internet: an end to the gender gap?", unpublished Master thesis, San Jose State University, San Jose, CA.

- Hunley, S.A., Evans, J.H., Delgado-Hachey, M., Krise, J., Rich, T. and Schell, C. (2005), "Adolescent Computer Use and Academic Achievement", *Adolescence*, Vol. 40 No. 158, pp. 307-19.
- International Labour Office (ILO) (2001), "Bridging the digital divide: harnessing ICT for economic development, job creation and poverty eradication", *World of Work*, No. 38, January/February.
- Lebo, H. (2004), "The ucla world internet project", available at: www.ccp.ucla.edu/ (accessed 24 May 2009).
- Ministry of Information and Communication National Internet Development Agency of Korea (2004), "Survey on the computer and usage: executive summary", available at: www.cnnic.net.cn/download/manual/international-report/ (accessed 10 May 2009).
- Mitter, S. and Rowbotham, S. (Eds) (1995), *Women Encounter Technology: Changing Patterns of Employment in the Third World*, Routledge, London.
- Mörtberg, C. (2000), "Information technology and gender challenges in a new millennium", paper presented at the Women and the Information Society Conference, Reykjavik, April 14.
- Nagata, H., Sakai, K. and Kawai, T. (2007), "Public library and users' lifestyle in a changing context", *Performance Measurement and Metrics*, Vol. 8 No. 3, pp. 197-210.
- Nasir Uddin, M., Quaddus, M. and Islam, Md. Sh. (2006), "Socio-economic-cultural aspects and mass information need", *Library Management*, Vol. 27 No. 9, pp. 636-52.
- News and Data (2006), "The proportion of female and male visitors on the Lithuanian internet reversed again", *News and Data: Insights into the Internet*, 2006-09-07, available at: www.gemius.pl/pl/welcome_to_newsroom (accessed 25 April 2009).
- Ono, H. and Zavodny, M. (2004), "Gender differences in information technology usage: a US-Japan comparison", available at: www.frbatlanta.org/filelegacydocs/wp0402.pdf (accessed 30 March 2009).
- Primo, N. (2003), "Gender issues in the information society", The United Nations Educational, Scientific and Cultural Organization (UNESCO) Publication for the World Summit on the Information Society, Paris.
- Riahinia, N. and Azimi, A. (2008), "Women and the web: an evaluation of academic Iranian Women's use of internet in Tarbiat Moalem University", *The Electronic Library*, Vol. 26 No. 1, pp. 75-82.
- UNDP (1999), "Human development report 1999: globalization with a human face", available at: <http://hdr.undp.org/reports/global/1999/en/> (accessed 25 March 2009).
- Venkatesh, V. and Morri, M.G. (2000), "Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior", *MIS Quarterly*, Vol. 24 No. 1, pp. 115-39.
- Viadero, D. (1994), "The electronic gender gap", *Education Week*, Vol. 14, pp. 37-8.
- Wilson, V. (2009), "Female public library patrons value the library for services, programs, and technology", *Evidence Based Library and Information Practice*, Vol. 4, No. 1 pp. 17-20.
- World Bank (2005), "Summary week II", February, available at: http://dgroups.org/groups/worldbank/wccd1/index.cfm?op=main&cat_id=9522 (accessed 27 April 2009).

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