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Differences in Information and Computer Technology by Socioeconomic Status, Gender, and Age

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ABSTRACT

This literature review will evaluate how information and computer technology (ICT) use differs by socio-economic status, gender, and age in social science research. After an introductory section, each of the three independent variables will be introduced and the findings within the literature pertaining to each variable will be discussed. As part of that discussion, I will also compare results cross-nationally to determine if significant relationships related to use are consistent across nations. Since a majority of the articles reviewed are quantitative in nature, most of my review will discuss each variable's statistical significance and whether it has a positive or negative relationship with ICT use. However, qualitative research is also represented in the literature, particularly in the area of gender, thus the quality of information and computer technology use will also be discussed. This review concludes with a summary of the findings, its limitations, and suggestions for future research.

Information and computer technologies (ICTs) refer to any digital technology used for communication or information gathering (e.g., mobile phones, personal computers, laptops, or the Internet (Ono and Zavodny 2007). Studying ICTs spans multiple academic and scientific disciplines, but research concerned with ICT use is at the heart of social science research. Specifically, social scientists are interested in the variations and differences of ICT use which has come to be known as the "digital divide," a term believed to have originated around the mid-1990s (Gutierrez and Gamboa 2010).

The digital divide is the gap that exists between those who do and do not use digital technology. However, many variations exist in how "use" may be defined. Whether or not someone has recently or ever used ICTs is a common definition used in the literature (Gutierrez and Gamboa 2010). Keep in mind that this definition does not have to specify the reason behind non-use, but could if method of measurement allows for it. Another definition may look more broadly at total time spent using ICTs or the number of different types used and comparing the difference between peoples' usage time or kinds of ICT used by them. Definitions have combined the previous two by looking at time spent and/or type used and included non-users at the bottom. These definitions are generally quantitative, but digital divide may also be considered in terms of quality of use (Park 2009). Quality of use can refer to how people use ICTs or the reasons behind why people use them the way they do; these results can then be subdivided by how the ICT is used and why. Researchers may also ask individuals to describe how they see their own ICT use, other's ICT use, and ICTs in general. As far as the word "use" is concerned, it generally refers to quantitative measures, but gaps and differences, as will be discussed later, can also apply to differences in the meanings ascribed to ICTs and the ways people use ICTs (Gutierrez and Gamboa 2010).

To better understand the digital divide and what it can look like, we should consider data from various countries that apply the binary use vs. non-use quantitative definition. At the start of the 1990s, computing had just begun utilizing Graphic User Interfaces (GUIs) to make using a computer, and by extension the Internet, much easier. In the United States, this resulted in a skyrocket of diffusion from 10-20% of people using a computer to access the Internet to around 60% in 2000-2001. Following 2001, the rapid increase of Internet use tapers dramatically, resulting in a gradual rise in the use percentage between 2002 and 2010. If that data is graphed and current trends continue, then the rate of Internet use will reach

about 70% before the increase in the rate will level out (Sangmoon 2011). In this case, the gap between those 60-70% of users and the remaining 40-30% of non-users can be considered the divide.

Researchers have also arrived at similar figures from studies of other nations. Willis and Tanter (2006) pegged Australia's diffusion rate at around 70% by the time of publication in 2006. Gutierrez and Gamboa (2010) also report that in 2006, 58% of people in "developed countries" use ICTs, but that 11% of people in developing countries and 1% of people in the least developed countries in the world use ICTs (P. 346). Gutierrez and Gamboa's (2010) analysis was cross-national which has the consequence of expanding the concept of the digital divide to possibly include the gap between countries with higher and lower rates of ICT use by people using a given definition.

I must also note that the rates previously discussed relate to Internet use as only one type of ICTs. Data on mobile phone are also present and differ from rates of internet use in that mobile phone ownership surpasses internet use, ranging from 60-93% of people using mobile phones depending on the location (Cotton, Anderson, and Tufekci 2009). The difference between the rate of internet use and the rate of mobile phone use demonstrates that, for any future discussion on use differences and the digital divide, data concerning one type of ICT does not necessarily apply to all unless it has been specifically defined by researchers. Unless otherwise specified, researchers use the term “ICTs” as a composite of multiple types of ICT including desktop and mobile computers, mobile phones, and the Internet.

These definitions and concepts may be well and good, but why would the gap between that 70% and the remainder matter? Without data on the subject, it is impossible to know if the proliferation of ICTs will reflect or address other forms of inequality and how those who cannot or will not use ICTs will be seen or treated. The guiding premise behind digital divide research is to address with empirical data the assumption that ICTs in the so-called "information age" have proliferated universally or evenly (Rasanen 2008). Aside from better understanding our society in the age of digital technology, empirical research on the digital divide will serve as an important base of information for policy makers and organizations on a wide range of issues. As public and private services, including education and employment, increasingly rely on the Internet and other ICTs, those who do not use them will be excluded and those less proficient in their use will be increasingly at a disadvantage (Rasanen 2008). These inequalities especially hold true at the international level, where national development and growth in the globalized world is inextricably tied to citizens' ability to utilize ICTs for cultural, political, and economic advancement (Sangmoon 2011). ICT use could be another way that certain countries can fall behind and become excluded from the benefits of ICT use on the level of leading nations (Ono and Zavodny 2007). Leaders in developing countries increasingly look to research on the digital divide when crafting initiatives and policies to assist their own countries in catching up (Gutierrez and Gamboa 2010).

SOCIOECONOMIC STATUS

Socio-economic status (SES) is a variable that, like ICT, is more of a composite variable than a single one. Research tends to focus on three component parts that traditionally compose SES: education, income, and occupation status. All are significant predictors of the digital divide, meaning that none are unrelated or irrelevant in accounting for the divide and predicting likelihood of ICT use. Of the three variables, education is the most consistent predictor between the articles reviewed that looked at SES. Rasanen (2008) conducted a study comparing Sweden, Finland, Norway, and Denmark where education, alongside age, was found to be the most statistically significant variable in predicting likelihood of ICT use. In the Nordic countries discussed, the most educated category is 27 times more likely to use the Internet than the least educated. Using another statistical model, Rasanen (2008) found that the same comparison yields a 13 times greater likelihood that the most educated will use ICTs more than the least educated. Sweden is the exception, where the relationship between Internet use and education was statistically weaker compared to all other nations.

The results are similar in other parts of the world, including less developed countries as well as various leading industrialized nations. Gutierrez and Gamboa (2010) conducted a study of ICT use in Latin American countries, specifically Mexico, Peru, and Colombia. Similar to Rasanen (2008), they found that level of education is the most important factor in determining who are more likely to use ICTs (Gutierrez and Gamboa 2010:357). Also, Ono and Zavodny (2007) find that compared the United States, Sweden, Japan, South Korea, and Singapore and found that more educated individuals were more likely to use the internet regardless of location. The largest gaps, in terms of Internet use, seem to be between college graduates and all others below. Singapore exhibited the starkest difference where the odds of use between college graduates and non-high school graduates are 40:1. Instead of considering a broader range of education levels, one study focused more narrowly on a sample of students from an American middle school. Cotton et. al. (2009) found that each grade was responsible for a nearly 68% increase in likelihood of mobile phone ownership and 51% increase in likelihood of use. It must be noted that the study does not address the factor of age independently of grade increase, making the presence of an aging effect possible.

In contrast with the other articles, Sangmoon (2011) found a more complicated relationship between education and ICT use. Stratifying data by year, college education was not a statistically significant predictor of ICT use after 2001, whereas prior to 1998, college education was a significant predictor of ICT use. Sangmoon (2011) offers a possible explanation: "access to the Internet was more available outside campus in 2000–1 than it was in 1997–8" (p.609). This may also reflect the overall success of the U.S. in diffusing ICTs to young people following 2000-2001. However, in the process of addressing user vs. non-user definitions, Sangmoon (2011) also added a dimension, time of adoption, to the article's analysis.

The consequence of this delineation is that another relationship between ICT use and education was observed. Users were split into four categories: early adopters, drop-outs (people that started using but stopped who would otherwise be classified as non-users), late adopters, and true non-users of the internet. Early adopters of internet use were the most educated, drop-outs and late adopters less educated, and true non-users the least educated. Aside from Sangmoon (2011), all studies discussed so far have found a straightforward and positive statistically significant relationship between education and ICT use in which a greater education level resulted in a greater likelihood of ICT use.

Like education, occupational status is responsible for exposing people to ICTs, thereby increasing the likelihood of their use (Sangmoon 2011). Jobs that make ICT use more necessary are the ones that see the highest rate of ICT use by employees. Professional/managerial jobs --occupations that hold a higher occupational status in society-- were found to be highest in ICT use compared to all others. Conversely, jobs that hold lower status in society, such as manual labor, agriculture, and other blue collar work, were less likely than professionals and clerks to use ICTs; however this was not always the case. Willis and Tanter (2006), in studying Australia, provide a second high SES country to compare with the US. Both countries exhibit a high penetration of ICTs and a comparable prevalence of white-collar jobs. As a result, it should hold true that the relationship between occupational status and ICT use are similar in both cases; concerning the United States and Australia this assumption seems to hold true. Professionals and managers were much more likely than working class individuals to be Internet users. Additionally, they found that occupational status as a predictor for internet use diminished over time, but the gap between white and blue-collar workers was still significant. The authors attribute the diminishing effect to a general increase in ICTs in workplace environments across the board through the early and mid-2000s (Willis and Tanter 2006). Unfortunately, Sangmoon (2011) only models occupational status during the periods between 1997 and 2001 preventing a direct comparison, but given the similar results and national characteristics, it seems like the US behaved similarly during the same time period.

Meyen et. al. (2010) are German researchers who provide a qualitative study that further demonstrates the importance of occupational exposure to ICT use. The authors categorize people into seven groups of internet users ranked in order of frequency of use and whether they seek knowledge or

skills, defined as cultural capital, or create and maintain social ties, defined as social capital, through the internet. The groups that obtain the most amount of capital of either form and have higher status in society as a result mostly do so because ICTs relate to their jobs in some way. This also tends to correlate with higher frequency of use, but it must be remembered that this sample is less than 100 people and is qualitative, thus conclusions are not representative. The important point about this study, however, is that occupational status and ICT use is a reciprocal relationship. The lifestyles of high-end users on the internet reflect the values and commitment to their jobs and vice versa.

Income is the final of the three SES component parts. Income, like occupational status, is not consistently represented in the data. All studies that do examine income in this review, however, find it to be significant and positively related to ICT use and ownership. Between the U.S., Singapore, Sweden, South Korea, and Japan, "computer ownership is positively associated with income in all countries, and the results suggest a positive relationship between use conditional on ownership and income, significantly so in the U.S. And Singapore" (Ono and Zavodny 2007: 1143). In Australia, those households that earn more than $78,000 were four times more likely than those that earn less to use the internet (Willis and Tanter 2006). In Nordic countries, Rasanen (2008) found a statistically significant and positive relationship between income and internet use, but regression analysis revealed income as having a relatively lower relationship compared to other variables. Age and education both had at least tenfold probability differences between the bottom and top groups, whereas, at most, those who made less than 1000 Euros (~$1500) a month were half as a likely to use ICT's as those who made more. Exclusively examining low-income countries in Latin America, Gutierrez and Gamboa (2010) find that income, alongside education, is the most important predictor of use. However, they report that the marginal effect of income "was very low for Colombia and Mexico" (P. 355). They state the reason could be that income data could have been unreliable or that low-income people were predominant in the studies, thereby making the variance low.

Despite being considered one of the world's leading nations in economic strength and education, computer ownership in Japan is significantly lower compared to the United States and Sweden. One reason is that skills, such as typing on a keyboard and dealing with a mainly English-language internet, make it more difficult for Japanese people to use computer-based internet. Additionally, deliberate mobile phone internet service initiatives have made it easier for adoption to be universal, especially considering the lower cost of phones. These two factors combine to make mobile phone internet the dominant way users connect in Japan. This example shows that specific cultural factors may mediate and affect the relationship between SES and ICT use. However, SES is still significantly related to ICTs in Japan. Those who graduated college were 1.9 times more likely than high school graduates to own a mobile phone and 4.1 times more likely to own a computer. Similarly, college graduates were 1.7 times more likely to access a mobile internet service and 2.7 times more likely to access the internet from a home computer when compared to high school graduates. The results for income also followed this pattern. The critical observation to make here is that education and income gaps impact computer ownership and use more than mobile phones due to higher barriers to entry due to higher costs and difficulty of use. The one exception is income, which is not a significant predictor of either mobile phone or computer-based internet use upon ownership (Akiyoshi and Ono 2008).

GENDER

In comparison to SES and education, gender is a more dynamic and a less conclusive predictor of ICT use. Gender became an insignificant variable in the United States and Australia by 2003 (Sangmoon 2011; Willis and Tanger 2006). In Japan, gender is insignificant in relation to mobile internet use, but a statistically significant gap is observed between males and females in computer usage. Females are much less likely than males in Japan to use computer-based internet (Akiyoshi and Ono 2008). Ono and Zavodny (2007) found similar results when comparing the two Western nations to the three Asian countries they

studied. While there was no gender gap in ICT use observed in the United States and Sweden, this gap between males and females was present in Japan, South Korea, and most so in Singapore. Rasanen (2008), who focused on Nordic countries, found a degree of statistical significance associated with ICT use and gender in Sweden, Denmark, and, to a lesser degree, Finland. This finding seems to contradict Ono and Zavodny (2007) who find that neither gender is predicted to use ICT's more than the other. However, it must be remembered that each study uses different data and that statistical significance does not always account for magnitude. In the Rasanen (2008) data, the explained variance only went up 1% when gender was included which is contrast to age, which explained 23%, and education, which increased the variance by 10%. Finally, gender is statistically significant and predicted higher male use in Colombia but not Mexico or Peru (Gutierrez and Gamboa 2010). There is no evidence to account for this difference; the only assumption one can even make is that that gender gaps in Colombian society are potentially more severe compared to Mexico and Peru.

When a quantitative gap is generally inconclusive or unobserved, as is the case with gender, researchers studying ICT use turn to other measures to observe gender differences (Selwyn 2007). Park (2009) examines ICT use by activity type in South Korea and arrives at similar, but not as clear cut, conclusions as Ono and Zavodny (2007). Looking only at adult users reveals that, in South Korea, males on average participate in all types of computer activities except for shopping online. All types in this case include communication services, such as chatting, blogging, or visiting social network sites, which otherwise are assumed to be traditionally female, alongside things like gaming. The one activity adult females participate in more than males is internet shopping. Adolescents on the other hand are more gendered: girls used shopping and communication services more than boys and boys participated in gaming more than girls (Park 2009).

Another way to approach ICT and gender is to study an ICT that has high penetration (e.g., mobile phones) with no apparent gender gap in use and to examine differences in quality of use. Cotton et. al. (2009) studying a sample of American middle-school children found no difference in gender except when looking at *how* children used their phones. Girls viewed phones as a means to the end of communicating with their friends and family, and treated it as such. After controlling for affinity and skill (the desire and ability to use the mobile phone), researchers found that the only disproportionately female use type remaining was using the phone as a phone book. Controlling for the same variables increases the significance of males using the phone for gaming and music. Whereas communication uses are not related to gender, using the phone as a gadget skewed toward male use. Therefore, it can be concluded that amongst school children in the United States, the only gendered activity relates to gaming and appreciating the device as a gadget (Cotton et. al. 2009).

Another study focused on ICT gender gaps among older students. Selwyn (2007) surveyed around 400 university students in Wales and asked them to categorize different digital technologies and their use as either "blue" or "pink". Around half of that sample consented to a written, qualitative follow-up to the survey. The results indicate that, despite an overall lack of gender differences in actual use, ICTs are still seen in gendered terms. Results from the initial survey show that gaming and music downloading is once again considered predominantly male whereas art/painting, chat rooms, and studying online were considered predominantly female. Consistently found across male and female participants, higher technical and professional usage of ICTs were associated with more masculine qualities. According to Selwyn (2007), these perceptions are the product of student's first-hand experiences with ICTs and who uses them. Peoples' mental image and expectations of *who* uses certain ICTs and *why* is the largest reason students stereotype an ICT as masculine or feminine. Much in the same way that pre-existing inequalities are represented in ICT use according to SES (Sangmoon 2011; Willis and Tanter 2006), the lack of statistical differences does not preclude gender differences still being reflected in ICTs, albeit indirectly.

Other studies approach the ICT divide by examining the characteristics of frequent ICT users. Meyen et. al. (2010) finds the three highest intensity users, the Virtuosi, the Professionals, and the Addicts as defined, were characterized mostly, if not all, by males. The Virtuosi rank very high in use and attainment of both cultural and social capital -- they cannot imagine a life without the internet. The Professionals are high frequency users that primarily seek cultural capital, which often correlates with their work tying their high status in society to their internet use. The Addicts rank high in use frequency primarily concerned with social ties and the sense of feeling connected, often compensating for the absence of local ties. There are a few female Virtuosi and Professionals, but, by and large, the people most invested in using the internet beyond communication are males. Likewise, females characterize the categories primarily associated with communication and casual usage. This split seems to indicate that gender variations in type of use is present, especially in the intersection of the internet with career and personal ambition. Similarly, Willis and Tanter (2006) offer a concurrent view of the gendered ICT gap: "gender is not directly related to Internet access. It does have an impact on access, but its influence is more subtle, tending to cross-cut other social divisions, as gender interacts with occupation, income, age and educational dimensions" (P. 52).

AGE

In contrast to the complexities of the gender variable, age, like education, has a consistent and straightforward relationship with ICT use. The articles in this review generally surveyed people no younger than 15 or 16 years old, particularly in quantitative articles. This does mean that ages which likely saw the introduction and growing use of ICTs are not being considered. As a result, straightforward findings related to age reflect this gap between birth and whatever childhood age was not surveyed, leaving those young people surveyed having already reached a relatively higher level of ICT use.

Where gender and some SES variables lost significance in Sangmoon's (2011) article, age was consistently and negatively associated with use. That is, the older someone is the less likely they use of the internet. In Australia, despite some indications of change, "those in the under-30s age group are still over five times as likely to use the Internet than those aged over 50" (Willis and Tanter 2006). This effect is twice as potent in Scandinavia. Those under 30 are ten-to-thirteen times more likely than those aged above 60 to be frequent users of the internet. Within the same study, the relative importance of age versus something like gender is demonstrated when age explains 23% of the variance and adding age only increased that by 1% (Rasanen 2008). Once again speaking to this distinction beginning at age 30, all of the most involved users, the Virtuosi, outlined in Meyen et. al. (2010) were under 30 and the least involved, the Affiliated, were all over 30. Finally, both Sangmoon (2011) and Ono and Zavodny (2007) found that early adopters of the internet were predominantly younger.

There are some minor curiosities associated with age. In Japan, age is not related at all to computer ownership. This is not to say computer use, internet use, and mobile phone use are unrelated to age. In fact, age is negatively associated with ICT use when ignoring computer ownership and most negatively associated with mobile phone use. This exception then refers to an older person's reluctance to use a computer present in the household qualifying them as "owners" but not users. Therefore age is not a limiting factor in accessing ICTs but is for ICT use among older people in Japan (Akiyoshi and Ono 2008). Two cross-national studies present some findings that seem to be important or at the very least curious exceptions to their data, but are left largely unaddressed. In the Guterriez and Gamboa (2010) article, age is negatively related to ICT ownership and use in Mexico, Peru, and Colombia but is statistically insignificant in Colombia. The researchers do not discuss why Colombia is an outlier, which is strange in light of their assertion that age is, "the most striking" (P. 357) variable. Likewise, Ono and Zavodny (2007) found age to be negatively related to computer ownership in all countries except South Korea, which in this case includes Japan, and that all age relationships are significant except in Sweden. This contradicts Rasanen

(2008) who found age significant to ownership and use in Sweden whereas Akiyoshi and Ono (2008) did not find computer ownership related to age in Japan. However, the Akiyoshi and Ono (2008) article focused on Japan whereas the more general Ono and Zavodny (2007) article may have lost some detail when summarizing the variable of age for cross-national comparison.

More than any other variable, the research presents some indications as to why ICT use is diminished by increasing age. Akiyoshi and Ono (2008) attribute it to a cohort effect while Meyen et. al. (2010) identify socialization and life-course stages as being related to age, thereby explaining the relationship. Finally, Gutierrez and Gamboa (2010) assert that technology such as mobile phones are not designed or suited for older people.

CONCLUSION

This paper has provided substantial information regarding the relative significance of SES, gender, and age in explaining differences in ICT use. SES, broken into its separate components of education, occupational status, and income are all positively related and significant in predicting higher levels of ICT use. A few articles that analyzed gender did observe some intermittent statistical significance finding males more likely to own or use ICTs compared to females, mostly in Asian countries. However, a majority of the research, particularly looking at countries like the United States and Australia, find that use amount is not significantly related to gender. Quality of use, that is what people actually do with ICTs and how they personally related to them, is where gender differences are more apparent. Specifically, males are characterized and observed to be more likely to use ICTs for the purposes of consuming entertainment such as music and games and females more likely to use ICTs to socialize but not to the degree of male gaming. Finally age was observed as a near-universal variable in which it was negatively related to likelihood of ICT use. Almost all instances of its presence in research were found to be statistically significant.

Despite the general level of consistency across the research, there are limitations among the articles reviewed and the greater body of literature concerned with the digital divide. Within the articles, certain conclusions were seemingly contradictory unless the methodology was considered. Sangmoon's (2011) article, for instance, uses a data set with a sample size that approaches hundreds of thousands which can make more minute differences in data more pronounced. Likewise, despite the utility of cross-national comparisons, the Ono and Zavodny (2007) study was conducted by a Japanese body of researchers which may explain why it differs from intra-Scandinavian research such as Rasanen (2008). Another aspect of methodology to consider is the relative merit of quantitative versus qualitative conclusions. It may be easy to compare, but they are very different and seemingly quantitative conclusions drawn from studies such as Meyen et. al. (2010) or Selwyn (2007) must be done with caution. Furthermore, the relative impact of a variable is as important a consideration as statistical significance. Rasanen (2008), while finding gender statistically significant, demonstrated gender's meager impact compared to other variables.

Considering the body of literature outside this review, it must be remembered that this is a sociological paper. Socio-demographic variables were analyzed using methods traditional to the field including ethnography and regression analysis. A great number of research articles not included here belong to the fields of economics and political science. This means that a lot of research features entirely different metrics or indexes defined by world organizations and not a survey analyst. Sometimes the tone of the research does not even concern itself with observation but directly getting involved in the political process. Quite a number of studies focus on health policy in relation to ICT use and still more focus on suggesting policies to close the digital divide instead of studying the phenomena directly. With that said, not all studies excluded from this paper were done on this basis. Some variables, although sociologically valid, did not get as substantial representation in the research. Race, because it is not consistent across nation, was not as prevalent in the literature compared to what seemingly "universal" variables like age or gender. Likewise,

certain studies analyzed ability both in relation to language skills and physical disability of the person which are valid variables, but did not seem to represent the most prevalent ones.

ICT research is incredibly interdisciplinary, but the lack of explicit sociological research relative to economics or communication is disconcerting. After all, it has been demonstrated that ICTs are incredibly relevant to the role of digital technology in society and vice versa. The digital divide could be an incredibly effective way to either study pre-existing inequalities in society or explore the ways in which ICTs do or do not change them. Gender is the only variable that has a primarily qualitative angle which is a great starting point for future research to study the qualitative aspects to SES or age. More research in these areas could shed more light on the complicated nature of the digital divide as neither binary nor diminished (Willis and Tanter 2006).

REFERENCES

Akiyoshi, Mito, and Hiroshi Ono. 2008. "The Diffusion of Mobile Internet in Japan." *The Information Society* 24(5):292-303.

Cotton, R. Shelia, William A. Anderson, and Zeynep Tufekci. 2009. "Old Wine in a New Technology, or a Different Type of Digital Divide?" *New Media &Society* 11(7):1163-86.

Gutierrez, H. Luis, and Luis F. Gamboa. 2010. "Determinants of ICT Usage Among Low-Income Groups in Colombia, Mexico, and Peru." *The Information Society* 26(5):346-63.

Kim, Sangmoon. 2011. "The Diffusion of the Internet: Trend and Causes." *Social Science Research* 40(2):602-13.

Meyen, Michael, Senta Pfaff-Rudiger, Kathrin Dudenhoffer, and Julia Huss. 2010. "The Internet in Every Day Life: A Typology of Internet Users." *Media, Culture &Society* 32(5):873-82.

Ono, Hiroshi, and Madeline Zavodny. 2007. "Digital inequality: A Five Country Comparison Using Microdata." *Social Science Research* 36: 1135-55.

Park, Sora. 2009. "Concentration of Internet Usage and its Relation to Exposure to Negative Content: Does the Gender Gap Differ Among Adults and Adolescents?" *Women's Studies International Forum* 32(2):98-107.

Rasanen, Pekka. 2008. "The Persistence of Information Structures in Nordic Countries." *The Information Society* 24(4): 219-28.

Selwyn, Neil. 2007. "Hi-tech = Guy-tech? An Exploration of Undergraduate Students' Gendered Perceptions of Information and Communication Technologies." *Sex Roles* 56(7):525-36.

Willis, Suzanne, and Bruce Tanter. 2006. "Beyond the 'Digital Divide': Internet and Diffusion Inequality in Australia." *Journal of Sociology* 42(1):43-59.