

**Home Computer Uses and Impacts –  
Family Life, Children and Feminization of Computing**

**Alladi Venkatesh\***  
**Debora Dunkle**  
**Amanda Wortman**

**Personal Computing Industry Center (PCIC)**  
**Paul Merage School of Business**  
**University of California, Irvine**  
**Irvine, California 92697-4650**

**(Not for citation or distribution)**

**\*(Contact Author: [avenkate@uci.edu](mailto:avenkate@uci.edu))**

**(Forthcoming as a chapter in  
Richard Harper's *At Home With Smart Technologies*,  
Springer )**

**(This project is funded by a grant from the National Science Foundation  
Grant No:0121232 for Project POINT)**

The Personal Computing Industry Center is supported by grants from the Alfred P. Sloan Foundation, the U.S. National Science Foundation, industry sponsors, and University of California, Irvine (California Institute of Information Technology and Telecommunications, The Paul Merage School of Business, and the Vice Chancellor for Research). Online at <http://pcic.merage.uci.edu>.

## **Introduction**

With the entry of new technologies into the home, we are witnessing a proliferation of descriptors for the emerging home environments. These include such terms as smart homes (Harper 2003; Chetty, Sung and Grinter 2007), home automation and devices (Hammill 2006, Neustadter, Brush and Greenberg 2007), the networked home and media consumption (Venkatesh, Kruse and Shih 2003; Haddon 2006; Little, Sillence and Briggs 2009), the home of the future (Venkatesh et al., 2001), digital living (Anderson and Tracey 2001; Bly et al., 2006), and so forth. In general, they all seem to be pointing to the same story that the “modern home’ in this new media/Internet age is undergoing a transformation and home life as previously understood may be subject to rapid changes. It is in this context that we examine the evolution of computer use at home and its impacts on family life. Our focus here is based less on speculation or scenario building, but more on empirical data that we have collected over a ten year period. During this time period that began in 1999, we completed four waves of national surveys of U.S. households (1999, 2003, 2008 and 2010). We present the results of these surveys as a way to summarize the developments during this 10+ year period.

Conceptually speaking, we can divide this time span into three periods: the early Internet (1999), the Internet intensive (2003 and after) and the period of consolidation (2008 - 2010). Our focus is on personal computer use in the home by American families. The project is funded by the National Science Foundation.<sup>1</sup>

## **Background and Study Focus**

---

<sup>1</sup> This material is based upon work funded by the U.S. National Science foundation under Grant No. 0121232. Any opinions, findings and conclusions reflected in the material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

A fundamental question we address in this study is what is the nature of computer use patterns in families over time and who are the key players in the family who account for this development? It is generally known that family structures are based on family membership (parents, children etc.), the life cycle of the family (younger or older families), gender roles and gender issues. Along the same lines, families can also be classified as single adult families or multimember adult families with or without children. Within all these categories, one can also examine the gender membership and their orientation toward computers, that is, is there a growing phenomenon of feminization of computing in the home? There has been much attention to children (Livingstone 2009) and gender issues (Dholakia 2006) concerning Internet use. That is, the issue we examine reflects what Strain (2003) calls the moral order of the household in relation to technology use and impacts.

Given these different configurations our focus here will be based on the following research questions:

- a) What are the longitudinal computer use patterns in families?
- b) What are the computer use patterns among families with and without children?
- c) What are the gender differences in use patterns?
- d) What are the age differences in use patterns?

We draw implications for future directions from answers to these questions. We grant that this is not an exhaustive list of all categories of families, but there is enough information here to arrive at some interesting patterns of computer use over time.

## Conceptual Issues

### *Longitudinal Trends - The Role of Technology and Transformation of Family Life*

Without resorting to technological determinism, the question that we continue to ask is, has the computer transformed the household in any fundamental way?

Conceptually speaking, the basic dynamic with respect to home-based technologies is that technologies play a key role in relation to home life and routines (Shklovski, Kraut and Cummings 2006). This can be identified in terms of three functionalities or possibilities: the *enabling* role of technology, its *mediating* role and its *transformative* role. We call this the EMT model of technology's role.

In the simplest of the three, the *enabling* role suggests that people use technologies to make things work faster, better or in some improved fashion and with greater efficiency. An example of the enabling function would be a family who has recently purchased a new coffee maker that can make coffee faster than before with some possible energy and time savings. A *mediating* technology is one that acts as a facilitator between the user and their living environment(s). The mediating role of technology is a bit more complex than its enabling role because it adds a higher order dimension to the application of technology for the user's benefit not present in its enabling role. For example, when the cable TV was introduced into the home, it opened up several channels for family viewing and acted as an intermediary between the user and the entertainment world. As a mediating technology, the cable (or satellite) TV connects the family with the world of entertainment.

A *transformational* technology is one which alters family life and activities in some fundamental ways. When the PC entered the home environment in the 1980s, that is, in the pre-Internet era, it seemed possible for individuals to bring work into their home

thus seemingly altering their work life and attempting to blur the line between work and home life (Vitalari, Venkatesh and Gronhaug 1985, Nippert-Eng 1997). Interestingly, many new homes being built now have what is called the ‘home office’. And, it did not stop there. In the ensuing years, or, as we now call it, in the age of the Internet, families have engaged in a variety of activities using the computer: shopping, email and other forms of communication, (e.g. telephoning), online banking, information search, home based learning, telemedicine, home-based business and so on. When we consider the impact of the Internet on family life, one can easily recognize its transformative role. If we now add digital or smart appliances, the possibilities increase dramatically.

Our intent in this study is to show that based on the nature of computer use at home and its impacts on family life one can say it has been a transformative technology in addition to playing the two other roles. In particular, as is well known, the Internet has been a major factor in the growth and integration of the home computer into family life, as well as ushering in the transformation of the home environment and the Internet’s indispensability in the context of family life (Hoffman, Novak and Venkatesh 2004). With the Internet, the home computer connects to the environment outside of the home and in many respects blurs the boundary between the internal family and the external social world.

### ***Technology and Family Life - Children and Gender Issues***

In order to capture the changes in family life our research has to take into consideration the participation of different members of the family in technology use. In this research we would like to explore children and gender issues based on longitudinal data. Thus, in this paper, our main focus is on the role of children and female adult

members of the family. For comparison purposes we have included families without children as well as computer use by male adult members.

Previous studies have shown that in order for technologies to be integrated into home life, the members of the family need to be actively involved in using them on a regular basis and establishing daily routines around them (Harper 2000). Of course domestic technologies differ based on their application potential and the users of the technologies. For example, very rarely do young children use vacuum cleaners. However, watching a television begins at very early age. Such practices have to do with the nature of the technology and the roles and functions of the members of the family. Given the versatility of computers, it is not difficult to imagine that everybody in the family from young children to the oldest member of the family do engage in computer use. Previous research has indeed shown some trends along these lines.

## **Methodology and Research Findings**

### ***Methodology and Study Sample***

Data from national surveys of home computer use completed in 1999, 2003, 2008 and 2010 are used in this report.<sup>2</sup> The surveys are part of a larger study of personal computer use conducted by researchers at the Center for Research on Information Technology and Organizations (CRITO) located at the University of California, Irvine. These telephone surveys focused only on those households where there was a personal computer in use in the home. The

---

<sup>2</sup> The 1999 survey was conducted as part of Project NOAH (National Outlook for Automation in the Home); 910 households were interviewed by telephone with a response rate of 36.3%. The 2003 and 2008 surveys were conducted as part of Project POINT (People, Organizations and Information Technology); 1200 telephone interviews were completed for each survey with response rates of 44.3% (2003) and 26.2% (2008). The 2010 survey (also part of Project POINT) sampled both landline and cell phone only households with response rates of 24.1% for the cell phone only sample and 30.7% for the landline sample (landline sample also included cell phone users).

households were selected through random digit dialing. All those within a household who were knowledgeable about the household computer use and were over the age of 18 were eligible. Respondents reported on their own behavior as well as the behavior of other members in the household. They were asked about the use of the home computer, their attitudes regarding the home computer, other electronic devices in the household as well as the contribution of the home computer to the household activities.

In 1999, according to the *US Department of Commerce* (2010), 65% of the US households owned a computer (a desktop or PC) and this increased to 78% by the year 2009. In 1999, of the households with computer 38% had broadband connection and this increased to almost 90% by 2010.

We present some key results from our ongoing study (1999 to 2010) in the following sections. First, we provide a detailed description of computer uses by families during the period of our study. Second, we examine how household computer uses vary between families with children and without children. Third, we examine some relevant gender related issues. In the final section we draw some conclusions for future research in this area.

Our results are presented in Tables 1 thru 6. In Table 1 we provide a description of the different roles technology plays using the EMT model based on the perceptions and experiences of survey respondents. Table 2 is a summary of the types of uses during the periods of data collection and changing patterns of use over time. Table 3 provides a summary of results based on the composition of households (children vs. no children). Table 4, which is an elaboration of Table 3, provides a summary of results based on the size and composition of households. Table 5 presents parental views and concerns about

children's use of computers. Table 6 is a summary of data focusing on gender based uses of the computer.

### ***EMT (Enabling-Mediating-Transforming) Model of Technology's Role***

To capture the role of technology in terms of the EMT model, we asked our respondents to indicate how computers have affected their lives. The computer has certainly played a key role as seen from the information gathered from our samples of respondents over the ten year period (Table 1). Its transformative role is quite evident from the responses from our subjects. While it has played a vital role in terms of its enabling and mediating functions, a larger number of its impacts are in terms of its transformation role. Our respondents have recorded progressively their agreement over the four periods of data collection on various impact statements. In this summary here, for the sake of convenience we focus primarily on the 2010 column in the Table 1 but other time periods as necessary if data for 2010 is not available..

(Table 1 about here)

A good percentage (66%) of respondents feel that they are better informed about the world because of the Internet. Computers are also seen as contributing significantly to family social life in terms of establishing contacts with friends and relatives (55%) and also the use of social networking sites (21%) – which though small, is a recent phenomenon and likely to grow. Certainly there is agreement that those that are not knowledgeable about computers are falling behind (70%). Computers are seen as replacing newspapers as an information source (40% in 2008) – a sign of digital living. A large number (61%) agreed that it would be difficult to imagine life without a computer and a larger number (72%) feel that the computer has become part of the daily

routine. Time savings (55%) is also reported because of the computer as well as being more productive (48%). However, very few (15% in 2008) feel that the computer has replaced the telephone which is still the most important tool for voice communication. In this context, it would be interesting to see what role smart phones would play especially because smart phones do have computer like capabilities.

In sum, the transformation is occurring in terms of technological dependence and initiatives, and the indispensable nature of computers to conduct family activities and especially in the areas of communication, information, home management and social networking. While these results demonstrate people's attitudes we will now present some actual behaviors as reported by our respondents.

### ***Computer Uses in the Home – Some Longitudinal Trends***

In the 1999 survey, the number of types of computer activities queried was 9. By the time of the 2003 survey, the number of activities had jumped to 14, and by 2008 and 2010 it had increased to 16 types of computer activities (see Table 2). This increase reflects the advances in technology, user competencies and learning, increased application areas as well as other structural factors over the years. For example, the use of social media (e.g. Facebook, MySpace) did not show up in our 2003 survey but does appear in more recent years. Table 2 shows the frequency of computer use for each of the surveyed time periods along with the rate of change for those activities common across the time periods.

(Table 2 about here)

Clearly a significant number of activities have shown an increase between 1999 and 2003. The major increases were in the areas of email (22%), news/weather/sports (25%), online shopping (48%), travel (50%), online banking (97%) and health-related

information (67%). Job related work (2%) was steady and school related work declined (-20%). (This decline is an artifact of data collection because we did not differentiate between families with children and without children. See Table 3.) In fact most major increases occurred during this period in both computer use activities and in usage frequency. The early 2000s were a critical period in technology development. This reflects partly the versatility of the computer, the increasing rise of the Internet and the introduction of broadband (wireless) connections over this period. In other words, as the technology became more versatile, the opportunities for different uses increased.

To more fully highlight the growth and changes in use over this 11 year period, we divided the percentage of users for each activity into three categories: top quartile (75% and above), second quartile (50%-74%) and the lower half (49% and below). In 1999 (the early Internet period), only two computer activities were engaged in by a significant number of users: hobbies and entertainment (86%) and email (78%). Activities favored by the second quartile of computer users in 1999 included job related work (71%), news, weather and sports (63%), school related work (59%), and travel and vacation planning (55%). By 2003, 95% of users reported using email and 88% were engaged in hobbies, games and entertainment uses. In addition, joining the top quartile were travel and vacation planning (82%), news, weather and sports (79%), online shopping (77%) and health-related information (77%). Job related work declined, relatively speaking, in terms of its rank. As we get closer to 2008/2010, we notice some significant shifts as well as some consolidation. Email use continues to be the highest (96% and 98%) and hobbies, games and entertainment emerge as a favored use (87% and 84%). Uploading and downloading of photographs and videos increased significantly from 55% in 2003 to 76% in 2008 and 84% in 2010. Although not as meteoric, online

banking continued to rise from 60% in 2003 to 67% in 2008 and 77% in 2010. Online networking, little known or used in 2003, demonstrates the speed at which new uses of the home computer have diffused. While in 2008, 44% of the households reported using an online network site such as MySpace, Facebook and LinkedIn, by 2010 a full 76% reported using these sites.

There are other significant trends of note. Job related work across the population stayed steady between 1999 (71%) and 2003 (72%), but declined in 2008 (63%) and continued steady in 2010 at 66%. Thus the prevailing view that the computer's main role is to transfer work from office to the home and is a work tool provided a limited vision of where the technology was going. It is true that school and job for many families formed the cornerstone of why the computer was initially purchased. However, other major shifts in usage reflect the changes in the use of the home computer over time. Initially, the introduction of the computer into the home was more utility driven and with progression of time, it has become an emotional as well as social technology within the family context.

Clearly, the volume of computer use has changed across the eleven year period under study. Some explanations are possible for these trends. First, as stated earlier, computers were seen less as merely work/education tools as was the case in the pre-Internet or early Internet period. Computers had become versatile, and also thanks to the power and potential of the Internet, the usage potential offered greater depth. That is, as technology advanced and other possibilities have emerged the relative positions of work/education related uses took a back seat, as it were. In addition, computer users had become quite comfortable and familiar with computers to the point the technology was no longer alien to the family environment and was considered a necessity and an integral

part of the domestic ecology. And, in the case of educational use the schools and educational institutions progressively became better equipped with computers than before and had become highly advanced presumably leading to greater and more sophisticated applications in the school environment.

Another way of looking at this is that at least in the case of educational use, there is indeed not a decline in the domestic front if we take into consideration those families with children compared to those without children. Since our sample includes both families with children and without children, our hypothesis is that educational use declines may not be recorded among families with children. To test this, we divided our sample into families with children and without children. In 1999, 83% of the households with children reported schoolwork use. In 2003, 64% (vs. 40%) reported schoolwork use which jumped to 78% (vs. 36%) in 2008 and 80% (vs. 51%) in 2010 (see Tables 2 and 3 for 2010).

### **Families With Children and Without Children**

Household composition is an important factor to consider when looking at the kinds of home computer uses. Table 3 breaks down home computer use by households with children versus households without children in 2010. It can be easily seen that for the year 2010, 80% of the families with children used computers for educational purposes compared to only 51% in those families with no children (as reported above). There are also other differences between families with children and without children. For example, differences are also observable in the use of the home computer for hobbies, games and entertainment (92% vs. 79%), for obtaining information regarding news, weather and sports (92% vs. 86%), uploading and downloading of photos and videos (91% vs. 81%), online banking (83% vs. 73%), online networking (87% vs. 70%), family and household

recordkeeping (64% vs. 56%) and even online journaling and blogging (48% vs. 41%). Clearly, the presence of children makes a difference.

One other explanation for the differences between families with children and families without children may be that there may be more members per family with children compared to families without children. In other words, it may be more a question of family size than the presence of children in the household. That is, families with more members may also be using computers to a higher degree whether children are present or not.

(Table 3 about here)

To address this issue and refining our analysis further, we divided our sample into the following four categories: single adult, two adults with no children, 3 or more adults with no children and households with children (Table 4). The idea behind this is to see if the real differences are between small families vs. large families under the realistic assumption that families with children are generally larger than families without children. Thus the differences between households with children and households without children mentioned earlier may cancel out if we take into consideration the size of the household. As can be seen from Table 3, households with children still account for differences in some major categories of use - - online banking, news, weather and sports, hobbies, games and entertainment, family and household recordkeeping, and, of course, school-related work. However, the 3+ adult households show greater values compared to children households on the following categories: job-related work; calendar; online journals and blogs, and travel and vacation planning. In all these cases, both categories of households (3+ adult households and households with children) score higher values than single person or and in many cases, two adults only households.

(Table 4 about here)

Given the above analysis we reach two major conclusions. First, somewhat obvious, household size matters in terms of level of use. That is, the larger the household size, the greater the number of uses and levels of use. A more important result is that households with children out score any other type of household. *Thus a very important result is that one meaning of computers is that in order to call it a family computer, children's presence does matter.* This may be a typical conclusion that we may reach about some other technologies in the home. For example, one can make a reasonable hypothesis that households with children have a greater use of kitchen appliances (e.g. refrigerators, stoves, dish washer/dryer), other appliances (e.g. clothes washer/dryer), television (entertainment), digital camera and so on. The implications for technology producers can be quite profound.

***Parental Concerns and Issues Regarding Children's use of Computers.***

The question of parental concerns and exercise of power and control over children through the construction and operation of rules is an important topic in the family literature (Grieshaber 1997). Such controls are instituted in everyday life settings that include mealtime rituals, educational/recreational activities and other issues concerning personal grooming, attire, language use, leisure time activities and so forth. Thus the context of home computer use may be considered another instance of parental responsibilities and supervision. On the other hand, one may ask the question, are computers qualitatively different? This is also an issue of moral ordering of the households as discussed by Strain (2003).

The context of children's use of computers is a rapidly growing area of research (Livingstone 2009, Subrahmanyam 2000). The question we pose in this section is what

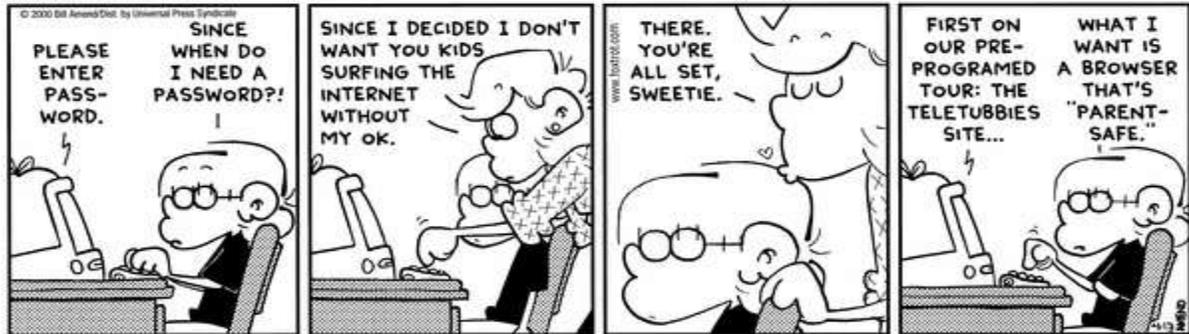
are the parental views and concerns regarding the use of computers by their children? (See Table 5 for results). Certainly, the computers are viewed as an important educational tool (75%). On a very positive note, a large percentage of parents (75%) feel that children are more knowledgeable about computers than adults. This gives credence to the fact that there has now emerged a computer generation, that is, youngsters who are growing up as users of computing technology and take to it like fish to water. However, an equal number of our respondents (75%) also express their concern about what their children are accessing on the Internet. At the same time, only a small percentage (36%) feel that computers make children anti-social, while 32% disagree with this view. Roughly half of the sample (48%) think that their children are spending too much time on the computer. On the other hand, a very small percentage (27%) feel that computers discourage creativity and nearly half the sample (48%) disagree with this statement. In other words, computers are not viewed as inhibiting creative aspects of children's learning.

Parents also pursue some control measures to keep their children in check. For example, 57% of the parents checked to see what websites their children visited. Almost equal numbers of parents (58%) worked along with their children on computers. We have to presume that this is true of families with much younger children rather than teens. A half of the sample limited the amount of time children can be on the Internet. Control measures were also extended to school activities. Half the sample (51%) reported using email to communicate with teachers and half of them (53%) said they go on the school website to check for homework assignments.

(Table 5 about here)

The tension between parental concerns and children's mildly irritable reaction to their parents' interference is humorously yet realistically captured in the following "Fox Trots" comics.

Fox Trots Classics by Bill Amend



(Accessed: <http://www.gocomics.com/foxtrotclassics/2011/04/13/>)

To summarize the parental concerns and views, our results show that they range from positive to cautious to negative. Reading between the figures, we might say that most parents view computers as beneficial to the educational experience of their children and their development.

## *Gender Related Issues – Feminization of Home Computing*

Over the years, there have been active debates and issues concerning differences in technology use by females vs. males both at home and at work (Dholakia 2006, Klawe, Whitney and Simard 2009). In fact, some have argued and contested that the word “technology” itself is male oriented because of connotations associated with complex machinery, and technical-rational, non-emotional qualities -- in general the meanings attached to “tool” orientation and work related artifacts (Cockburn 1994). On the other hand, history tells us that women have engaged in industrial and farm labor as well as in operating office equipment and doing production work in factories, textile mills and the like. In addition, in the domestic sphere, there has been research showing that women, because of their domestic roles, have been the main users of many household appliances and gadgets associated with their roles and in fact are more knowledgeable than men when it comes to everyday technologies and artifacts – the implication being that there is no natural division in terms of competencies or predilections between males and females but one based on social roles men or women play. This is not the place to revisit these debates in a major way, but it is important to contextualize our present study.

To provide a deeper understanding of these issues we present some gender-based trends in our study. Our results are summarized in Table 6 which is reconstructed from our survey results. To keep it simple, we are presenting 2010 survey results in the table. In order to capture gender differences in usage patterns, we identify situations where differences between males and females show up in our results. We also feel that in order to refine these results, we need to take into account whether these differences show up within age categories. Thus one hypothesis is that since computers are a recent phenomenon, perhaps younger females show different patterns of use compared to older

females. Consequently, their uses may be more similar to males and in some cases may even exceed male patterns based on specific contexts of use and relative familiarity. In general, as more women begin to use computers at home, this phenomenon may be described as *feminization* of computing technology at home.

(Table 6 about here)

As shown in Table 6, here are some highlights. In terms of overall sample, there are no gender differences in the use of email, online shopping, online banking, games/entertainment, uploading photos and instant messaging. However, there is a tendency towards more male engagement in the following categories: news and sports, pursuing hobbies, job related work at home, watching a video, calendar, online networking, online journals and blogs, and making phone calls. Conversely, in the overall sample, a higher percentage of females are involved in health related information, and maintaining a webpage. These results show that males report higher percentage than females in their use patterns. However, if we control for age, different gender based use patterns emerge. Here are some interesting results.

More females in the age group 18-30 use email. In the educational use of computers, there is no difference between males and females in the 18-30 age group. More females are engaged in uploading photos in the age groups 18-30, 31-45, and 46-60. As far as online journal/blogging is concerned, females and males use it in the same proportion in all age groups under 60 and there are no differences.

To sum up, in the aggregate, a higher percentage of males are involved in nine activities, more females are involved in two activities, and an equal proportion of males and females in six activities. But that is not the correct story. Once we control for age, a higher percentage of younger females are more involved than males in online

networking, email, and uploading photographs. In addition, more females are involved in online banking within the 31-45 age group. In other words, in order to study the phenomenon of feminization of computing in the home, we need to look at the data not just in the aggregate level, but across age categories. Clearly, the younger females are at the forefront of computerization as compared to older females. The really laggard group, unsurprisingly, is females in the 61+ age segment. In addition, if we examine the broad category of communication, social networking, and some aspects of home management and health related matters, females are ahead.

At the risk of generalization, one might say that there is a growing feminization of computing in the home front based on the differential roles and interests and not technical competencies.

### **Conclusions**

The results clearly reveal the following trends during the ten year period. Computers have become a source for communication, information, online shopping, online banking, home management and recreation and travel. The following are the major trends:

- Communication (increased)
  - Email, Networking
- Information (increased)
  - -General, shopping, health, news/sports, information sharing
- Home Management (increased)
  - -Online banking, record keeping
- Social dimension (increased)
  - -Networking

- -Sharing photos and family events
- Family leisure (increased)
  - -Travel
  - \_Hobbies, Games
- External
  - -Community (increased)
  - -Job (decreased)
  - -School (slight decrease)

Finally, computer use is quite prominent in the presence of children and the growing phenomenon of feminization of computing shows that a new phenomenology of computing is emerging.

Table 1. EMT Model (Enabling-Mediating-Transforming) of Computer Use

|                                                                                   | Percent<br>agreeing<br>1999 | Percent<br>agreeing<br>2003 | Percent<br>agreeing<br>2008 | Percent<br>agreeing<br>2010 | Role of<br>technology |
|-----------------------------------------------------------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------|
| The computer has saved us time at home                                            | 48                          | 51                          | 51                          | 55                          | Enabling              |
| Computers are difficult to use                                                    | 16                          | 11                          | 13                          | --                          | Enabling              |
| Computers have made it easier to organize family/social events                    | --                          | 34                          | 33                          | 43                          | Enabling              |
| Households with a computer are run more efficiently than those without a computer | 15                          | 22                          | --                          | ---                         | Enabling              |
| Computers in the home take away from family interactions                          | 23                          | 27                          | 30                          | --                          | Enabling/Disabling    |
| The computer has increased the amount of job related work I do at home            | 43                          | 37                          | 33                          | --                          | Mediating             |
| Computers are more useful than in the home                                        | 40                          | 39                          | 37                          | --                          | Mediating             |
| I have more contact with friends and relatives now that I have email              | 50                          | 54                          | 48                          | 55                          | Mediating             |
| It would be difficult to imagine life without a computer at home                  | 44                          | 50                          | 58                          | 61                          | Transforming          |
| The computer has changed the way we do things at home                             | 40                          | 45                          | --                          | 52                          | Transforming          |
| The computer is as essential as any other household appliance                     | 38                          | 51                          | 59                          | 63                          | Transforming          |
| Having the Internet makes me much better informed about the world                 | 47                          | 56                          | 61                          | 66                          | Transforming          |
| Computer give status to their owners                                              | 13                          | 11                          | --                          | --                          | Transforming          |
| Those that are not knowledgeable about computers are falling behind               | 68                          | 68                          | 68                          | 70                          | Transforming          |
| Watch less TV as a result of the Internet                                         | 29                          | 25                          | 23                          | --                          | Transforming          |
| The computer has become part of daily routine at home                             | 52                          | 62                          | 63                          | 72                          | Transforming          |
| The Internet helps me look for product information that was not possible before   | 58                          | 72                          | 72                          | 71                          | Transforming          |
| The computer has replaced telephone as major communication device                 | 10                          | 16                          | 15                          | --                          | Transforming          |
| Reduced our need of daily newspapers                                              | --                          | --                          | 40                          | --                          | Transforming          |
| I do most of my communication with friends using social networking sites          | --                          | --                          | --                          | 21                          | Transforming          |
| More productive because we have a computer                                        | --                          | --                          | 49                          | 48                          | Transforming          |
| Computer has enabled me to meet new people                                        | --                          | --                          | --                          | 22                          | Transforming          |

**Table 2. Household level uses of computer Over Time**

| Percent using:                     | 1999 | 2003 | 2008 | 2010 | X <sup>2</sup> (p) | Rate of change<br>1999-<br>2003<br>(%) | Rate of change<br>2003-<br>2008<br>(%) | Rate of change<br>2008-<br>2010<br>(%) |
|------------------------------------|------|------|------|------|--------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Email                              | 77.9 | 95.0 | 96.3 | 98.1 | 0.00               | 21.951                                 | 1.368                                  | 1.869                                  |
| Job-related work                   | 71.0 | 72.2 | 63.4 | 66.0 | 0.00               | 1.690                                  | -12.188                                | 4.101                                  |
| School-related work                | 59.1 | 47.2 | 45.9 | 62.6 | 0.00               | -20.135                                | -2.754                                 | 36.383                                 |
| Online shopping                    | 51.9 | 76.7 | 79.7 | 84.6 | 0.00               | 47.784                                 | 3.911                                  | 6.148                                  |
| Online banking                     | 30.6 | 60.2 | 66.7 | 76.6 | 0.00               | 96.732                                 | 10.797                                 | 14.843                                 |
| News, weather and sports           | 63.5 | 79.5 | 76.2 | 88.6 | 0.00               | 25.197                                 | -4.151                                 | 16.273                                 |
| Health-related information         | 45.8 | 76.6 | 82.8 | 82.6 | 0.00               | 67.249                                 | 8.094                                  | -0.242                                 |
| Hobbies, games and entertainment   | 85.8 | 87.9 | 87.4 | 83.8 | 0.01               | 2.448                                  | -0.569                                 | -4.119                                 |
| Travel and vacation planning       | 54.8 | 82.0 | 85.2 | 77.6 | 0.00               | 49.635                                 | 3.902                                  | -8.920                                 |
| Calendar                           |      | 38.4 | 38.5 | 45.7 | 0.00               |                                        | 0.260                                  | 18.701                                 |
| Photographs and videos             |      | 54.6 | 75.9 | 84.3 | 0.00               |                                        | 39.011                                 | 11.067                                 |
| Instant messaging                  |      | 52.6 | 45.4 |      | 0.00               |                                        | -13.688                                |                                        |
| Family or personal webpage/website |      | 15.1 | 24.5 |      | 0.00               |                                        | 62.252                                 |                                        |
| Online networking                  |      |      | 44.4 | 76.1 | 0.00               |                                        |                                        | 71.396                                 |
| Online phone calls                 |      |      | 13.1 | 25.0 | 0.00               |                                        |                                        | 90.840                                 |
| Online journals or blog            |      |      | 25.6 | 43.5 | 0.00               |                                        |                                        | 69.922                                 |
| Family and household recordkeeping |      |      |      | 59.1 |                    |                                        |                                        |                                        |

Size of sample by year: 1999=909; 2003=1200; 2008=1199; 2010=1197

**Table 3. Uses of Home Computer by Presence of Children in Household, 2010**

---

|                                     | No<br>Children<br>(N=704) | Children<br>(n=479) | Total<br>(n=1183) | X <sup>2</sup> (p) |
|-------------------------------------|---------------------------|---------------------|-------------------|--------------------|
| Email                               | 98.2                      | 97.9                | 98.1              | .775               |
| Job-related work                    | 65.1                      | 68.1                | 66.3              | .299               |
| School-related work                 | 51.0                      | 79.7                | 62.7              | .000               |
| Calendar                            | 43.9                      | 48.6                | 45.8              | .112               |
| Online shopping                     | 84.2                      | 86.3                | 85.0              | .334               |
| Online banking                      | 73.0                      | 82.7                | 76.9              | .000               |
| News, weather and sports            | 86.3                      | 92.3                | 88.7              | .001               |
| Health-related information          | 83.5                      | 51.4                | 82.6              | .360               |
| Hobbies, games and entertainment    | 78.6                      | 92.5                | 84.3              | .000               |
| Travel and vacation planning        | 79.5                      | 75.8                | 78.0              | .131               |
| Photographs and videos              | 80.7                      | 90.8                | 84.8              | .000               |
| Online networking                   | 69.6                      | 86.7                | 76.5              | .000               |
| Family and household record keeping | 55.7                      | 64.2                | 59.2              | .004               |
| Online phone calls                  | 23.5                      | 27.5                | 25.1              | .116               |
| Online journals or blogs            | 41.4                      | 47.6                | 43.9              | .036               |

---

**Table 4. Uses of Home Computer by Size and Composition of Household, 2010**

| Percent using                       | Single-person household (n=149) | 2-person adult household (n=337) | 3+ adult only household (n=218) | Children household (n=479) | Total (n=1183) | X2(p) |
|-------------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------|----------------|-------|
| Email                               | 96.6                            | 98.5                             | 99.1                            | 97.9                       | 98.1           | .348  |
| Job-related work                    | 57.7                            | 61.4                             | 75.7                            | 68.1                       | 66.3           | .000  |
| School-related work                 | 33.6                            | 40.1                             | 79.4                            | 79.7                       | 62.6           | .000  |
| Calendar                            | 39.3                            | 38.7                             | 54.6                            | 48.6                       | 45.7           | .001  |
| Online shopping                     | 79.2                            | 84.5                             | 87.6                            | 86.3                       | 85.1           | .123  |
| Online banking                      | 71.3                            | 73.8                             | 73.1                            | 82.7                       | 77.0           | .002  |
| News, weather and sports            | 84.6                            | 85.6                             | 88.1                            | 92.3                       | 88.6           | .007  |
| Health-related information          | 71.1                            | 88.1                             | 85.3                            | 81.4                       | 82.7           | .000  |
| Hobbies, games and entertainment    | 68.5                            | 78.7                             | 85.1                            | 92.5                       | 84.2           | .000  |
| Online networking                   | 59.1                            | 65.7                             | 83.0                            | 86.7                       | 76.6           | .000  |
| Photographs and videos              | 72.5                            | 78.9                             | 89.0                            | 90.8                       | 84.8           | .000  |
| Travel and vacation planning        | 69.1                            | 80.9                             | 84.3                            | 75.8                       | 78.0           | .002  |
| Family and household record keeping | 51.7                            | 55.7                             | 58.0                            | 64.2                       | 59.1           | .017  |
| Online phone calls                  | 20.7                            | 21.0                             | 29.2                            | 27.5                       | 25.1           | .047  |
| Online journals or blogs            | 32.9                            | 34.1                             | 59.1                            | 47.6                       | 44.0           | .000  |

**Table 5. Parental Views and Controls of Children's Use of Computers**

| <b>Statements</b>                                                             | <b>% Agreement</b>   |
|-------------------------------------------------------------------------------|----------------------|
| Computers contribute positively to Children's educational experience          | 75                   |
| Children are more knowledgeable about computers than adults                   | 74                   |
| Computers make children anti-social                                           | 36<br>(disagree 32%) |
| Computers discourage creativity                                               | 27<br>(disagree 43%) |
| Our children are spending too much time on computers                          | 48                   |
| We are really concerned about what our children are accessing on the Internet | 75                   |
| Checked to see what websites our children visited                             | 57                   |
| Worked on the computer with children                                          | 58                   |
| Limited the amount of time children can be on the Internet                    | 53                   |
| (I/WE) Used email to communicate with our children's teachers                 | 51                   |
| Checked school website about children's homework`                             | 52                   |

(n=479)

Table 6. Gender-Age Differences in Home Computer Use

| Category of Use           | Actual Use                                                                     | Total Sample - All Households(%) | Age differences                                                                          | Gender differences                         | Age/Gender Differences                                                                                                              | Summary: Female domination in general (Female, Same, Male) |
|---------------------------|--------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Communication             | Email                                                                          | 94                               | None. All ages report high level use.                                                    | None. Both genders report high level use.  | More females than males in the 18-30 age group (73 to 51) and more males in 61+ age group(70 to 50) daily users of email            | Female                                                     |
| Information               | Health Related                                                                 | 80                               | Highest use in the 18-30 group (85%) and the lowest in 61+ group (77%)                   | More females (82%) than males (78%).       | More females across all age categories below 60 years and more males in the older category.                                         | Female                                                     |
| Learning                  | Educational use<br>a)Households with children<br>b)Households without children | a) 78<br>b)30                    | a)31-45 highest<br>b) 18-30 group represents highest use                                 | Over all more males than females           | In the 18-35 group males and females are roughly the same. More males in all other groups.                                          | Same                                                       |
| Household Management      | Online shopping                                                                | 76                               | The lowest is in the 61+ group (66).                                                     | No gender differences                      | More males (72) than females (60) in the 61+ age group.                                                                             | Same                                                       |
| Information               | Reading News/sports                                                            | 71                               | The lowest is in the 61+ group (59).                                                     | More males (77%) than females (66%).       | In each age group more males than females. Males highest in (82%) in the 31-45 group and next highest (80%) in the 18-30 age group. | Male                                                       |
| Household Management      | Online banking                                                                 | 62                               | The highest (73) in the 31-45 age group. The lowest is in the 61+ group (45).            | No gender differences                      | Both females (75) and males (71) highest in the 31-45 age group . More males (58%) than females (34%) in the 61+ age category.      | Same                                                       |
| Entertainment/ Recreation | Hobbies                                                                        | 66                               | Highest in the 18-30 group (82%) Followed by 31-45 group (73%)                           | More males (79%) than females (61%)        | Males (83%) and females (81%) roughly equal in 18-30 age group.                                                                     | Same                                                       |
| Entertainment/ Recreation | Games and entertainment                                                        | 67                               | 18-30 age group the highest (88%) followed by 31-45 group (74). Other groups much lower. | No major difference. Males slightly higher | Males generally higher across all age groups.                                                                                       | Male                                                       |

|                      |                                                                                |               |                                                                        |                                               |                                                                                                                   |        |
|----------------------|--------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------|--------|
| Work/Employment      | Job related work                                                               | 56            | Higher % in age groups between 18 to 60. Fewer in 61+ group (30%)      | Overall Male (60) higher than Female (52).    | More males across all age groups.                                                                                 | Male   |
| Learning             | Educational use<br>a)Households with children<br>b)Households without children | a) 78<br>b)30 | 18-30 group represents highest use                                     | Over all more males (39%) than females (29%)  | In the 18-3- group males and females are roughly the same (46%)e. More males in all other groups.                 | Same   |
| Social               | Upload photos                                                                  | 70            | 18-30 group the highest (88%)                                          | Slightly more males (72%) than females (69%). | More females than males in all age groups under 60 except in the 61+ group.                                       | Female |
| Entertainment        | Watch a video                                                                  | 47            | 18-30 age group the highest users (67%) followed by 31-45 group (59%). | Slightly more males (50%) than females (44%)  | Across all age groups, more males than females. Highest difference in the 46+ categories.                         | Male   |
| Household Management | Calendar                                                                       | 34            | Younger age groups more likely to use the computer for calendar.       | More males (15%) than females (10%)           | Highest percentage of users are males in the 31-45 age group (47%).                                               | Male   |
| Social               | Online networking                                                              | 31            | 18-30 the highest use group (34%)                                      | More males (34) than females (28%)            | More females (72%) than males (67%) in the 18-30 age group. In general, dominated by 18-30 group in both genders. | Female |
| Communication        | Instant messaging                                                              | 35            | 18-30 age group the highest users (59%)                                | No gender differences.                        | More males in the 18-30 and 31-45 age groups.                                                                     | Male   |
| Social               | Online journal/blog                                                            | 20            | 18-30 the highest use group (34%)                                      | More males (23%) than females (18%).          | Males and females roughly equal in under 60 age groups, but more males in the 61+ group.                          | Same   |
| Social               | Maintain webpage                                                               | 20            | 18-30 group the highest 32%                                            | Males and females roughly equal (22 to 18%)   | More males in the 18-30 and 31-45 age groups.                                                                     | Male   |
| Social               | Phone calls on line                                                            | 11            | 18-30 group (16%) most likely to use                                   | Males higher (15%) than females (8%)          | Across all age groups more males than females.                                                                    | Male   |

## References

- Anderson, Ben and Karina Tracey . (2001). "Digital Living The Impact (or Otherwise) of the Internet on Everyday Life," *American Behavioral Scientist*, 45(3): 456-475.
- Bly, Sara., Bill Schilit, David W. McDonald, Barbara Rosario, and Ylian Saint-Hilaire. 2006. Broken expectations in the digital home. In *CHI '06 extended abstracts on Human factors in computing systems* (CHI EA '06). ACM, New York, NY, USA, 568-573.
- Chetty, Marshini., Ja-Young Sung, and Rebecca E. Grinter (2007). How smart homes learn: the evolution of the networked home and household. In *Proceedings of the 9th international conference on Ubiquitous computing* (UbiComp '07) Springer-Verlag, Berlin, Heidelberg, 127-144.
- Cockburn, Cynthia (1994), "Male Dominance and Technological Change." in Heather Clarke, John Cnadle and Jim Barry, *Organizations and Identities*, Thompson Publishers, 197-203.
- Dholakia, Ruby (2006), Gender and IT in the Household: Evolving Patterns of Internet Use in the United States, *The Information Society*, V 22, 4 231-240.
- Grieshaber, Susan (1997), "Mealtime Rituals: power and resistance in the construction of mealtime rules," *The British Journal Of Sociology*, 48, 4, December 649-666.
- Haddon, Leslie (2006), "The Contribution of Domestication Research to In-home Computing and Media Consumption," *The Information Society*, V22,4, 195-203.
- Hammill, Lynn (2006), "Controlling Smart Devices in the Home," *The Information Society*, V22, 4, 241-249.
- Harper, Richard (2000), Domestic Design: An Introduction to the Research Issues Surrounding the Development and Design of Interactive Technologies in the Home," *Journal of Personal Technologies*, Special Issue on Domestic Computing, 4, 1, 1-6.
- Harper, Richard (ed.) (2003) *Inside the Smart Home* London: Springer Verlag.
- Hoffman, Donna., Tomas Novak and Alladi Venkatesh "Has The Internet Become Indispensable?: Empirical Findings and Model Development," *Communications of the ACM*, July, 2004, 37-44.
- Klawe, Maria., Telley Whitney, and Caroline Simard (2009), "Women in Computing – Take 2," *Communications of the ACM*, 52, 2, 68-76.
- Little, Linda., Elizabeth Sillence, and Pam Briggs. 2009. Ubiquitous systems and the family: thoughts about the networked home. In *Proceedings of the 5th Symposium on Usable Privacy and Security* (SOUPS '09). ACM, New York, USA 6-9.

- Livingstone, Sonia (2009) *Children and the Internet*, Polity Press.
- Neustadter, Parman., A./J.Bernheim Brush and Greenberg (2007), "A Digital Family Calendar in the Home: Lessons from the Field Trial of LINC," *Graphics Interface Conference*, Montreal, Canada 199-206.
- Nippert-Eng, Christina (1997), *Home and Work*, University of Chicago Press.
- Shklovski, Irina., Robert E. Kraut, Jonathon N. Cummings. Routine patterns of internet use & psychological well-being: coping with a residential move. In Proceedings of CHI'2006. pp.969-978.
- Strain, John D. (2003), "Households as Morally Ordered Communities: Explorations in the Dynamics of Domestic Life," in Harper, Richard (ed.) (2003) *Inside the Smart Home* London: Springer Verlag – 41-59.
- Subrahmanyam, Kaveri (2000). The Impact of Home Computer Use on Children's Activities and Development. *The Future of Children. Children and Computer Technology*. Vol. 10, No. 2- Fall/Winter 2000. Pg. 123-144.
- US Department of Commerce (2010), "Digital Nation: 21<sup>st</sup> Century America's Progress Toward Universal Broadband Internet Access," Accessed April 2010, [http://www.ntia.doc.gov/reports/2010/NTIA\\_internet\\_use\\_report\\_Feb2010.pdf](http://www.ntia.doc.gov/reports/2010/NTIA_internet_use_report_Feb2010.pdf)
- Venkatesh, Alladi., Erik Kruse and Eric Shih, (2003) "The networked home: an analysis of current development and future trends" *Cognition, Technology & Work*, 5(1): 23-32.
- Vitalari, Nicholas., Alladi Venkatesh and Kjell Gronhaug (1985), "Computing in the Home: Shifts in the Time Allocation Patterns of Household," *Communications of the ACM*, May 1985, 28 (5), 512-522.
- Venkatesh, Alladi., Stolzoff, Norman Stolzoff, Eric Shih and Sanjoy Mazumdar, (2001) "The Home of the Future: An Ethnographic Study of New Information Technologies in the Home," *Advances in Consumer Research*, 28(1): 88-97.