

The Characteristics of Information Technology Use in Finland 1987-2000

A paper to be presented at the 25th IATUR Conference in Brussels, 17-19 September 2003

Pekka Räsänen

Department of Sociology
20014 University of Turku
Finland

Phone: +358 2 333 6519

Fax: +358 2 333 5080

Email: pekka.rasanen@utu.fi

Introduction

The Nordic countries share many characteristics that have been associated with 'information societies'. Particularly the role of new communication and other information technologies is often seen as the implicit determinant of the information revolution (see Castells & Himanen 2002; Viherä & Nurmela 2001). In the Nordic countries traditional manufacturing has developed rapidly toward technology-driven industries and innovation-based economies. The diffusion of the new information technologies can be recognised also at the individual level. International comparisons show that people are especially well equipped with mobile phones, computers and Internet connections. Measured by the penetration of these appliances, the Nordic Countries are, in fact, the leading ones in the OECD (*Nordic Information Society Statistics 2002*).

This paper discusses information technology (IT) use in Finland. The paper concentrates on the diffusion of home computers into the Finnish households and compares time use on computing between the late 1980s and 1990s. It is examined what kind of socio-demographic differences there are in the possession of home computers and the patterns of time use on computing. Can we find any differences by economic activity, socio-economic status, age, gender and educational level? It is also asked how these structural differences have changed between the late 1980s and 1990s.

Data from the Finnish Time Use Surveys of the year 1987/1988 and 1999/2000 are used in the empirical analyses. Both of these data sets are based on time diary studies and they are collected by Statistics Finland. In time use surveys respondents are asked to fill in a diary for two days (one weekday, one weekend day). They are asked to record, in their own words, their primary activity, and what else they were doing at the same time.¹ In addition to time-use question, data sets include information about respondents' socio-demographic characteristics, accommodation and possession of various durables. Some of this information is also utilised in this paper. Time use surveys cover Finnish population aged 10 and over. The data aim to describe all central time use categories that do not vary much by day of the week or population group. The number of cases (days investigated) is

¹ The record keeping was done on a 10 minute-basis. If respondents are doing several things at once, they are asked to specify their 'main activity' and 'secondary activities'. In this paper, the attention is confined to 'main activity' alone. 1987/1988 data was collected between April 1987 and March 1988; 1999/2000 data between March 1999 and March 2002.

approximately 15 400 in 1987/1988 and 10 500 in 1999/2000. (see Niemi & Pääkkönen 1990, 11-12; Niemi Pääkkönen 2002, 111-112.)

Approaching computer use from a cultural perspective

There is a conflicting symbolic value related to IT in the present day societies. On one hand, many ideas about the privileged role of information specialists in the work and stratification research have been presented (see Bell 1973; Berkeley 1971; Drucker 1968). It is assumed, for example, that the 'technocratic' power of information specialists can challenge the old managerial-based authority in the work-places. Their professional authority is considered to be based on the task, not on the managerial rank (Lewin & Orleans 2000). But at the same time, leisure-time computing as such does not represent a typical pattern of culturally distinctive consumption. This is because there is no clear value of 'high' culture attached to it. The use of new technologies or other computer-related activities cannot easily be associated with the activities of the upper classes similarly as, say, opera, theatre or literature. Despite this, those who adopt new innovations faster than the general consumer market can be seen as pioneers who are able to make sense of the advantages of the new technology.

Many factors can affect how uses for innovations are perceived. Everett Rogers (1986), for example, has proposed that the characteristics of new products, as perceived by members of society, determine the rate of their adaptation. According to him, there are a total of five important attributes of an innovation. These are: 1) relative advantage, 2) compatibility, 3) complexity, 4) reliability, and 5) observability. In Roger's view, these five attributes explain the success of any new form of technological innovation; how comfortably and how easily it fits into people's life. Other writers have stressed that also familiarity is an important attribute of innovations considering the easy adaptation of new products or services within consumer market (e.g. Dickson 2000; Fidler 1997; Räsänen 2003). In general, familiarity refers to the bridges that the earlier innovations have provided. New forms of doing something are not often adopted without familiar links to earlier or existing forms of doing something rather similar. Successful innovations do not emerge from nowhere. This means that each new innovation is assumed to "evolve from its origins as a recognisable extension of an earlier form into distinct form all its own" (Fidler 1997, 16).

Besides the mentioned important attributes, also other factors influence the adaptation of new products. Economic and socio-cultural resources of individuals can be understood to be among the most important factors. It can be argued that when certain consumer goods are distributed in the general market, there are structural conditions that determine the rate of their adoption among different population groups. It is often possible to identify different categories of consumers, such as early adopters, the majority, and late adopters by using typical socio-demographic characteristics. The penetration of mobile phones, for example, was highly influenced by the socio-economic status of household in Finland. Mobile phones were first adopted among the entrepreneurs, professionals and managers (e.g. Nurmela 1997; Räsänen 2003). Similar differences have been found also in the study of computer and Internet use. The access rate of Internet and computers has risen significantly faster among clerical employees and entrepreneurs over the 1990s than among other socio-economic groups (see Nurmela et. al. 2000).

New innovations and products are in many cases adapted by the members of society in particular phases. First, there are usually strong status distinctions when an innovation is introduced. Later, as the new products or services become more commonplace, the links between social or cultural resources and consumption of these products or services begin to diminish. However, it has also been noted in sociological literature that the proliferation of consumer goods does not necessary weaken the connections between consumption behaviour and social background (e.g. Bourdieu 1984; Kraaykamp 2002). Certain patterns of consumption may remain distinctive for certain groups of people for relatively long periods of time. Such culturally determined differences, which seem to reproduce over time, may be related to many activities. Thus an examination of the differences between socio-economic positions and other socio-demographic factors can be seen as relevant.

Next, the basic socio-demographic features related to the possession of home computers in Finland will be discussed. What kind of differences we can find when the early penetration of home computers in the 1980s is examined by labour market position, socio-economic status, age, gender and educational level? Can we observe similar socio-demographic differences also in the late 1990s, or have home computers become evenly diffused into Finnish households?

Possession of home computers in the late 1980s and 1990s

In 2002, approximately 75 percent of Finns were able to use a computer, whether at home, work, school or somewhere else. At the same time, about 62 percent had a computer at home. (*Nordic Information Society Statistics 2002*, 13-14.) While the penetration of home computers is now rather high in the Finland, this was not situation in the 1990s. In the mid 1990s, for example, about 30 percent of the Finnish households possessed a computer (e.g. Nurmela 1997, 15; Raijas 2001).

<*Figure 1* about here>

Figure 1 shows the proportions of Finns possessing a home computer in 1987/1988 and 1999/2000. These proportions are based on the Finnish Time Use Surveys.² According to the figure, only 17 percent of respondents had a computer in their household late 1980s. Ten years later, however, 55 percent of the respondents had a computer in their household. This suggests that there have also been considerable socio-demographic differences in the possession of computers both in the late 1980s and 1990s. We can assume this simply because computers have penetrated only part of the Finnish households. But which factors explain the possession of home computers?

Diffusion of home computers by the basic socio-demographic characteristics is presented in Table 1. Households labelled as ‘other’ represent mainly those on pension and sickness allowance. As table shows, there were considerable differences both in the 1980s and 1990s by all the selected characteristics.

<*Table 1* about here>

Let us first take a closer look at the differences by labour market position and socio-economic status. As table shows, computers have become more frequent in all labour market and socio-economic positions. In both years the possession of a home computer was most common in student households; it is most uncommon with those who perform domestic work. Examination by socio-economic status reveals that computer access has

² The proportions indicate how many percent of the respondents represented in the data have a computer in their household. Thus, the percent values do not offer us the accurate estimations of total Finnish households possessing a computer.

been most common among other entrepreneurs than farmers and among upper level employees (professionals and managers). In 1987/1988, less than six percent of the farmers had a computer. Ten years later, however, more than half of the farmers had a computer at home. This result is, of course, affected by the changes in the structure of the employed labour force in ten years, but it also shows that computers have become rather widespread in all socio-economic groups. Otherwise, no interesting changes between the years can be observed in these groups. Possession of home computer was rarest in manual worker households in both years, with the exception of farmers in 1987/1988.

Comparisons by age, gender and level of education shows similar results. In 1987/1988, a computer was most common in the youngest age group. This has not changed in the 1990s. Women had fewer accesses to computers than men in both years, even though the difference has balanced considerably since the 1980s. Differences by level of education indicate that the most educated people possessed more computers than others in the late 1980s. This pattern has become less obvious but education appears to matter also in the 1990s. Half of the respondents with only lower secondary education had access to home computer in 1999/2000. At the same time, more than 80 percent of those having Master's degree had a computer at home.

The examination of the possession of computers indicates that Finnish people have indeed become well equipped with home computers. Differences in the computer access are not very large. The clearest differences can be observed by labour market positions, by socio-economic status and by age. However, these differences do not tell us anything about the differences of actual computer use between social groups. Next, the use of computers is examined by comparing the average times that people spent on computing.³ What kind of differences we can find by examining computer use in this way?

Time use on computing in the late 1980s and 1990s

As a time-use category, computing can be considered as a typical free time category. Free time means generally residual time: that time which is not spent on earning money or on housework or personal care. It thus consists of all kinds of activities that we engage in outside working hours. For example, one can play games, listen to music, or even compose own music with computers. Computers can also be used for communication purposes if

³ The following analysis is restricted to those respondents that possess a computer (1987/1988 N=2631; 1999/2000 N=4797).

there is an Internet access available. The World Wide Web is perhaps the most popular computer-based commercial service in the advanced societies (e.g. Dickson 2000; Franzen 2000). From the latest sport news and gossip columns to chat boards; almost anything that can be presented digitally has become accessible through net. But in addition to various leisure-time purposes, computers are commonly used for gainful employment.

Most remote workers all over the industrialized societies are working via computers (e.g. Florida 2002; Blom et. al. 2002). In many cases it is enough to have another clerical employee (or a research colleague) available over the phone or Email. In a way, computers are among the main reasons why remote work has become a realistic option for many companies. Besides this, it is true that many people work in the evenings and at home; these people are typical computer users. Of course, it is necessary to notice that work-related computer use does serve only a limited range of occupations (Blom et. al. 2002, 6-7). For example, most traditional working-class occupations, such as plumbers or carpenters, have remained rather untouched with the use of computers in their jobs. But how much time was spent on computing in the Finnish households in the late 1980s and 1990s?

<*Figure 2* about here>

Figure 2 depicts average time spent on computing in the late 1980s and 1990s. As we can see there has been a notable increase in ten years; from less than 10 minutes a day to over 20 minutes a day. However, this finding is not an exceptional one if we consider the development of the processor speed of computers and the increase in the supply of software after the late 1980s. For example, graphical user interfaces were used only in the Macintosh computers in the 1980s. Also the Internet was unavailable before the 1990s. These kinds of changes have probably influenced the primary purposes of home computers. In the 1980s computers were used for a very limited range of purposes. Computing meant 'serious' computing such as programming and word processing or just simple gaming. By the late 1990s computers have become almost 'basic tools' of work and entertainment for many households. The use of computer can range from Internet browsing to tutorial language

lessons, for example. However, our analysis is confined to the examination of time spent on computing in general.⁴

Table 2 shows the average time spent on computing by socio-economic characteristics and changes by year. At first look, it appears that the differences in the time use on computing are rather similar to differences in the possession of computers. Students spent more time on computing than respondents in other labour market positions in both years. However, those in the position labelled as ‘other’ spent the least time in 1987/1988, but in 1999/2000 those who perform domestic work appeared to spend the least time with computers. Unemployed did not use time on computing at all in the late 1980s but spent over 14 minutes a day in the late 1990s. Time use patterns by socio-economic position are also interesting. All socio-economic groups have increased their computer use since the late 1980s, except farmers. Socio-economic group that spent the most on computing in both years are manual workers. This is a rather surprising finding because the possession of home computers was not very common in ‘worker’ households in the 1980s or 1990s.

<**Table 2** about here>

Differences by age, gender and level of education show relatively expected patterns of time use. In both years, the youngest age group spent most time on computing. The average time spent on computing has increased also in other age groups, but not as much as in the youngest one. Both men and women use more computers in the late 1990s than in the late 1980s. However, men have increased their use clearly more than women. Differences between educational groups produced interesting results. Respondents with academic post-graduate degree report a ten-minute decline in the average time use between 1987/1988 and 1999/2000. This is an interesting finding since all other categories report considerable increase.

The previous findings indicate that socio-economic differences in computing have converged in Finland since the late 1980s. The average time use on computing has increased quite much in all the examined social groups; only farmers and people with post-graduate academic degree spent less time on computing in 1999/2000 than in 1987/1988.

⁴ One of the main weaknesses related this study is that time use on computing is not at all disaggregated in the Finnish Time Use Surveys. This means that we are able to know only the total time spent on computing, but not what was done. More itemised time use categories (such as playing games, word processing, Internet browsing etc.) would thus be very useful.

These findings suggest that computing has become a common time use category which relates to the daily routines of most people. It has also become a category that can include time use for several leisure and work-related activities. This is because the basic characteristics of computing (i.e. what is actually done with computers) have probably changed quite much since the late 1980s.

Has computing become a ubiquitous activity?

According to time use researchers, our 'time budget', that is, how we spend time, is an important determinant of our life changes (e.g. Gershuny 2000; Robinson & Goodbey 1999). It is also believed that the differentiation of individuals' time use is considerably influenced by various economic and socio-demographic factors, such as income, class, age and gender. Many factors, ranging from disposable income to educational qualifications and gender roles, may lead to systematic time use differences among people. In this sense, it can be proposed that systematic exploration of individuals' time budgets provides good possibilities to evaluate individuals' positions in the social structure.

Empirical findings presented in this paper showed that there are structural differences both in the possession of home computers and time use on computing. These differences have become less clear by the late 1990s when computers became widespread in Finland. But considerable differences still exist. On the basis of our findings, we are able to observe a relatively clear socio-demographic pattern of computer use. Students and younger people spend more time on computing than any other social groups. On the other hand, however, the observed pattern does not seem to follow the basic social and cultural hierarchies. For example, the possession of computers is most common in typical 'middle class' households but people in these positions do not spend much time on computing if compared to manual workers, for instance.

It can thus be concluded that the differentiation of individuals' time use on computing is influenced by socio-demographic factors, but the connections of these are to some extent multidimensional. In other words, the patterns of computer use differ rather irregularly between individuals belonging to different social positions.

References

- Bell, D. (1973). *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic Books
- Berkeley, G. E. (1971). *The Administrative Revolution: Notes on the Passing of Organization Man*. Englewood Cliffs: Prentice Hall.
- Blom, R. & Melin, H. & Pyöriä, P. (2002). Social Contradictions in Informational Capitalism: The Case of Finnish Wage Earners and Their Labour Market Situation. *The Information Society 18:1*, 1-11.
- Bourdieu, P. (1984). *Distinction. A Social Critique of the Judgement of Taste* (translated by Nice, R.). London: Routledge & Kegan Paul.
- Castells, M. & Himanen, P. (2002). *The Finnish Model of Information Society*. Oxford: Oxford University Press.
- Dickson, P. R. (2000). Understand the Trade Winds. The Global Evolution of Production, Consumption, and the Internet. *Journal of Consumer Research 27:2*, 115-122.
- Florida, R. (2002). *The Rise of the Creative Class*. New York: Basic Books.
- Franzen, A. (2000). Does the Internet Make us Lonely? *European Sociological Review 16:4*, 427-438.
- Gershuny, J. (2000). *Changing Times. Work and Leisure in Postindustrial Society*. Oxford: Oxford University Press.
- Fidler, R. (1997). *Mediamorphosis. Understanding New Media*. Thousand Oaks, California: Pine Forge.
- Kraaykamp, G. (2002). Cumulative Advantages and Inequality in Lifestyle. A Dutch Description of Distinction in Taste. *The Netherlands Journal of Social Sciences 38:2*, 121-143.
- Lewin, C. & Orleans, M. (2000). The Class Situation of Information Specialists: A Case Analysis. *Sociological Research Online 5:3*.
<<http://www.socresonline.org.uk/5/3/levin.html>>. (August 2003).
- Lievrouw, L. A. (2001). New Media and the 'Pluralization of Life-Worlds'. A Role for Information in Social Differentiation. *New Media & Society 3:1*, 7-28.
- Niemi, I. & Pääkkönen, H. (1990). Time Use Changes in Finland in the 1980s. *Studies 174*. Helsinki: Central Statistical Office of Finland.
- Niemi, I. & Pääkkönen, H. (2002). Time Use Changes in Finland through the 1990s. *Culture and the Media 2002:2*. Helsinki: Statistics Finland.

Nordic Information Society Statistics. (2002). Nordic Information Society Statistics 2002. Helsinki: Nordic Council of Ministries.

Nurmela, J. (1997). Suomalaiset ja uusi tietotekniikka. *Katsauksia 1997/7*. Helsinki: Tilastokeskus. (Finns and the New Technology)

Nurmela, J. & Heinonen, R. & Ollila, P. & Virtanen, V. (2000): Matkapuhelin ja tietokone suomalaisten arjessa. *Katsauksia 2000/2*. Helsinki: Tilastokeskus. (Mobile Phone and Computer in Everyday Life in Finland)

Raijas, A. (2001). Kokemattomien käyttäjien näkemyksiä Internetistä ja sen tarjoamista palveluista. *Elektronisen Kaupan Instituutin Julkaisuja*. Helsinki: LTT – Tutkimus Oy. (Experiences about Internet among the Inexperienced Users)

Robinson, J. P. & Goodbey, G. (1999). *Time for Life. The Surprising Ways Americans Use Their Time*. 2nd Edition. Pennsylvania: The Pennsylvania State University Press.

Rogers, E. (1986). *Communication Technology: The New Media in Society*. New York: The Free Press.

Räsänen, P. (2003). Sosiokulttuurinen näkökulma: ovatko mobiiliuutispalveluiden lisäarvopalvelut tarpeellisia? *Futura 22:1*, 55-82. (A Socio-Cultural Perspective: Are the Additional Features for Mobile News Services Perceived as Useful?)

Viherä, M.-J. & Nurmela, J. (2001). Communication Capability as an Intrinsic Determinant for information Age. *Futures 33:3-4*, 245-265.

Figures and tables

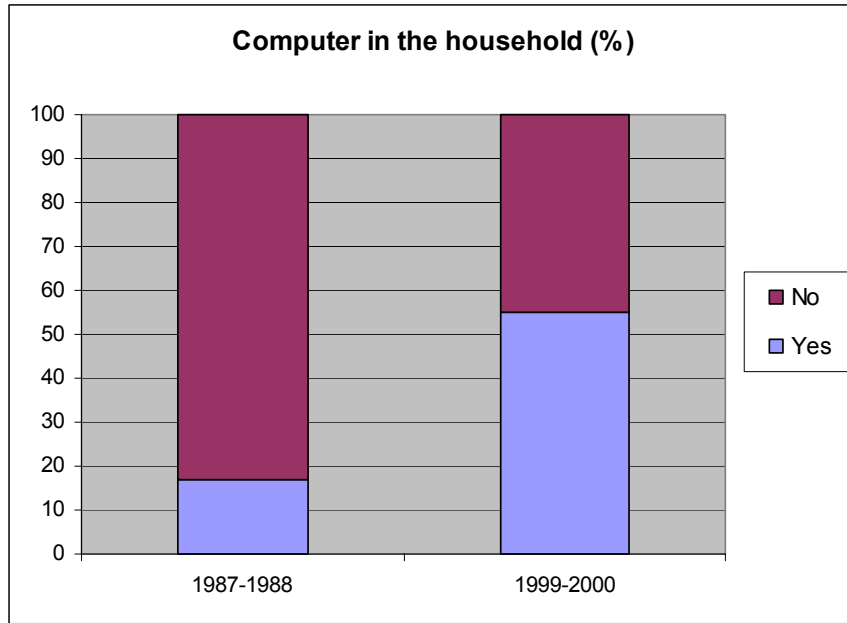


Figure 1 Possession of home computers in Finland by year (%)

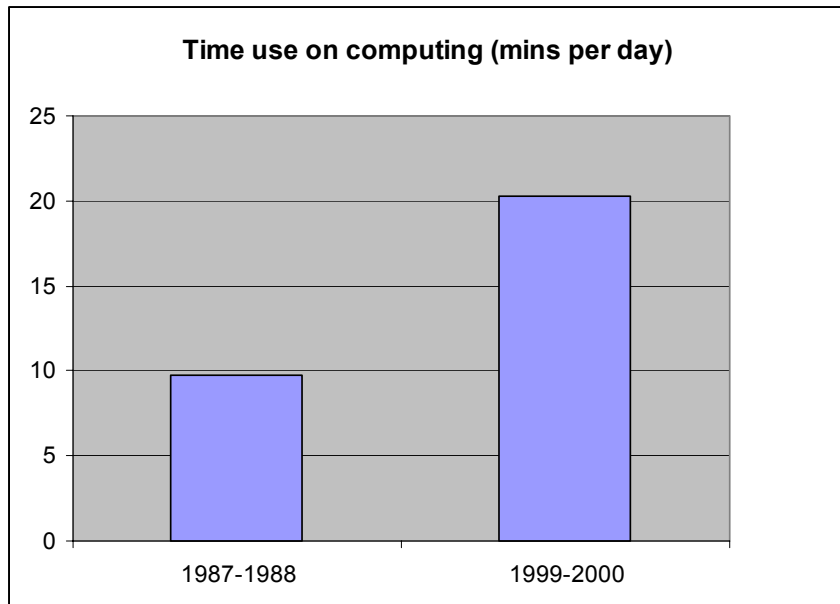


Figure 2 Time use on computing by year (mins per day)

Table 1 Possession of home computers in Finland by labour market position, socio-economic status, age, gender and level of education in the late 1980s and 1990s (%)

	1987-1988	1999-2000	N
Labour market position			
Employed	16,0	61,6	1476/3381
Unemployed	8,4	40,6	28/228
Homemaker	9,6	44,6	38/139
Other	2,8	16,9	64/335
Student	33,0	77,4	1025/1711
Socio-economic status			
Farmer	5,5	53,9	41/172
Other entrepreneur	24,5	65,2	171/238
Professional, manager	24,9	81,3	366/946
Intermediate non-manual	16,1	62,6	514/1140
Manual worker	13,4	47,4	464/778
Age			
10-17 years	37,6	79,8	905/1149
18-30 years	11,3	59,2	418/1221
31-45 years	21,5	66,5	952/1690
46-50 years	10,6	54,3	324/1464
Over 60 years	1,8	14,8	32/269
Gender			
Male	20,6	57,1	1527/2806
Female	13,9	52,9	1104/2988
Level of education			
Lower secondary	14,1	53,6	840/1902
Lowest upper level	23,2	64,4	127/895
Bachelor	22,7	76,6	70/416
Master	25,7	82,9	135/435
Ph.D.	31,3	83,3	15/50
Total	17,1	54,9	2631/4797

Table 2 Time use on computing in Finland by labour market position, socio-economic status, age, gender and level of education in the late 1980s and 1990s (mins per day)

	1987-1988	1999-2000	Change	N
Labour market position				
Employed	3,2	9,0	+5,8	1476/3381
Unemployed	0,0	14,2	+14,2	28/228
Homemaker	0,5	5,2	+4,7	38/139
Other	2,7	18,6	+15,9	64/335
Student	20,1	45,0	+34,9	1025/1711
Socio-economic status				
Farmer	4,6	2,8	-1,8	41/172
Other entrepreneur	3,8	9,1	+3,3	171/238
Professional, manager	2,0	8,4	+6,4	366/946
Intermediate non-manual	1,3	8,2	+6,9	514/1140
Manual worker	5,6	11,5	+5,9	464/778
Age				
10-17 years	23,2	52,0	+28,8	905/1149
18-30 years	6,2	24,0	+17,8	418/1221
31-45 years	1,5	8,5	+7,0	952/1690
46-50 years	1,3	6,5	+5,2	324/1464
Over 60 years	2,2	16,5	+14,3	32/269
Gender				
Male	15,8	31,9	+16,1	1527/2806
Female	1,3	9,4	+8,1	1104/2988
Level of education				
Lower secondary	3,0	13,8	+11,8	840/1902
Lowest upper level	0,6	9,7	+9,1	127/895
Bachelor	0,9	13,9	+13,0	70/416
Master	2,2	9,7	+7,5	135/435
Ph.D.	14,7	4,6	-10,1	15/50
Total	9,71	20,26	+10,55	2631/4797