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Adapting to the challenge of technology: The case of the home computer

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FOREWORD

This report describes the results of a study undertaken in 1983 by the Department of Communications at the University of Montreal. The purpose of this research was to analyze the dynamics of integration of home microcomputers.

Within the framework of the first phase of the study carried out in the fall of 1983 for Communications Canada, we analyzed, on the basis of the information provided by more than 2000 respondents, the process of diffusion of the microcomputer in Quebec homes.

In order to do this, data was collected on people displaying various behaviors towards home computers: some who had recently acquired a personal microcomputer (n=880); others who had taken this step more than a year before (n=120); and finally, those who did not have a home computer (n=1157), but who were interested in this technology.

This led to an initial review of the conditions determining the adoption or non-adoption of a home microcomputer. In addition, we were interested in the use that the buyer and his family made of their microcomputers, as well as the impact of the computer on the lifestyles of the users.

The second phase was carried out in the fall of 1985 also for Communications Canada. Its purpose was to determine, on the basis of answers provided by 400 families who owned a home computer (the same families who had taken part in the first phase of the study), any changes in their views, attitudes, and behaviors towards their machines. To this end, we collected two types of data using questionnaires and semi-directive interviews, which necessitated two complementary types of analysis: statistical and thematic content analyses.

This longitudinal form of survey and analysis--it is one of the few that have approached the problem in this way--made it possible to obtain a better grasp of the human dimension of the technological innovation represented by the home microcomputer.

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STATEMENT OF THE RESEARCH PROBLEM

1.1 Technologies and Society

Parallels are often drawn between present-day technological change and the industrial revolution that took place at the beginning of this century. If the change to the industrial society inspired reflection on the relation between technological development and social evolution, much of that speculation was based on the question: is technology the cause or the effect of social change?

Although this question is too complex to permit an unequivocal reply, two general approaches to this problem, based on neutralistic and deterministic assumptions, respectively, can be distinguished. The neutralist hypothesis, on the one hand, is based on a view that technology has no intrinsic meaning; that the economic, political and cultural repercussions of its insertion in a given society are under human control. In this perspective, technology is defined as one of the consequences of social change.

On the other hand, technological development is conceived of in the deterministic paradigm as being the result of the independent logic of scientific progress. This is a "technocentric" view of society in which technology is the main catalyst of social change. The clashes between those who espouse one or other of these two positions about the effects of the "new media" are cases in point of this debate. It is normal to question the way in which new technologies are already affecting our daily lives.

Nonetheless, there are relatively few in-depth studies on the way these media or technologies are perceived or adopted by the public at large and they are often too compartmentalized.

Whichever of the two positions we adopt, it is not necessary to take the "technicist" point of view to acknowledge the considerable transformation potential of the "new media". Rice (1984) for example, has emphasized that not only new situations, but also novel communication behaviors have been generated by their interactive nature. In the same vein, Gumpert and Cathcart (1982) suggest that "new media" change our very perception of reality, as well as our understanding of our own environment. In other words, these authors see technological innovation as an active agent of social evolution, with the capacity to change perceptions, behaviors and attitudes.

Certain authors have nevertheless shown that it is necessary to take into account socio-economic as much as technological factors in order to analyse the integration of a new technology in society (Pool, 1978; Flichy, 1980). Basing his analysis on the example of the telephone, Pool suggests that an innovation does not necessarily become what its creator expected when it was invented: it may be redefined according to the perceptions of its potential users and the socio-economic context within which it is diffused. From this point of view, the user's perception plays as important a role in defining the dynamics of the integration of a technological device into society as does its actual technical capacity. This position is attractive because of the active role it bestows on the

individual. It is in this sense that Rogers (1983) speaks of the power of the user or groups of users to reinvent or redefine the innovation. The innovation is no longer studied as an immutable object; on the contrary, from the moment of its introduction on the market, it is exposed to the perceptions and reactions of individuals so that it is necessarily forced into a dynamic process of redefinition. Christians (1973) has also pointed out that many predictions about the diffusion of new communication technologies fail because they are based on a theory that is too reductionist. Citing Pool's analysis, he notes that all new media are considerably affected by the social structure within which they are generated, and that this creates a wide discrepancy between their initial potential and their subsequent actual utilization.

Mercier et al (1984) also illustrate the power of theories which posit the process of integration of a new technology in society as based on a dynamic interaction taking place between technical sectors and social habits, each of these domains affecting the other and interacting by turns. Even though, because of its potential, a technology is capable of transforming our perception of reality, this perception itself, and our reactions to it, will in turn modify the original concept. This is precisely what Mercier et al (1984) define as the potential reappropriation of the technology by its end users. If we accept their notion, it becomes essential to examine the point of contact between the users and the technology. This is the theoretical point of view that we have selected with

which to study the case of the microcomputer, particularly in the domestic setting.

Numerous investigations, as much in the policy as in the academic sphere, have attempted to determine the effects of computerization. In the workplace, for example, the impact of office technology has been studied and in the schools attempts have been made to determine the impact of the use of computers on the learning process.

At this time, we believe that it would be particularly appropriate to extend these investigations to the domestic context which has been somewhat neglected in earlier research. Within a period of ten years, the rate of penetration of home computers has climbed to 17% of British homes (Le Devoir, 1986), 16% of American homes (Yankee Group, 1986) and 13% of Canadian homes (CROP, 1985). Home computing can no longer be described as a marginal social phenomenon. Reaching as it does individuals in their daily lives, it may become so commonplace as to make the computerized society a reality.

1.2 The Case of the Home Microcomputer

The following section focuses on two areas: first, a review of the evolution of the concept of home computing and second, a review of studies that have emphasized the conditions determining the adoption of the microcomputer. This will allow us to illustrate certain changes both in technological design and in the needs

expressed by the users, and to confirm the validity of an approach based on the notion of the potential reappropriation of microcomputers by their users.

1.2.1 Evolution in the Concept of the Home Microcomputer

Even though the personal microcomputer was introduced in the United States at the end of 1974, it was not until the beginning of the 1980's that it truly started to conquer the domestic market. In fact, at first, this new technology was thought to be the preserve of a certain small class of enthusiasts with a personal knowledge of electronics (Ringle, 1981; Rogers et al., 1982; Hazan, 1984). A study carried out at that time by Venture Development with 1500 personal microcomputer owners showed that 40% of them were employed as programmers or electronic engineers, and that 74% used their computers for job-related purposes (Muller, 1977). According to Muller, these "pioneers" of home computing saw their acquisition as a sophisticated electronic gadget reserved for the use of a few initiates. For this reason, at that time, it was not possible to talk of "home computing" as we know it today. It was a new elitist pastime that did not have any social repercussions worthy of consideration. In other words, the microcomputer could be essentially defined as a privileged activity carried out for its own ends; something that the English language translates rather well by contrasting the concepts of "hobby computing" and "home computing".

Be it as it may, the placing of the micro-computer into a special hobby category seems to have hidden its actual spread as the social phenomenon that it would become (Isaacson, 1977; Hazan, 1984). This became especially evident after 1980, when companies such as Apple Computers and Commodore developed new software programs for traditional applications, that were more easily understood by the public at large (text editing, etc.).

Certain data bear out this advance in the home market, particularly in North America: in 1980, almost one million computers had been purchased in the United States (Nilles, 1981), and by the beginning of 1982, these devices could be found in 1.2 million American households (Rogers et al., 1982). By 1984, the figures were 9% in Quebec (CROP, 1984) and 13% in the U.S. (Yankee Group, 1985). At this stage in the diffusion process, ownership of a computer no longer denoted marginality though, strictly speaking, it did not yet involve the public at large.

In the last two years, we have witnessed a slowing of microcomputer sales, even though, up to that date, sales had increased extremely rapidly. Some have seen this reversal as the downfall of a domestic gadget which owed its moment of glory to the "valiant efforts" of its promoters, and the support of massive publicity campaigns. Other authors are inclined to agree that the present fluctuations in this industrial sector should instead be interpreted as a period of readjustment in the home microcomputer market. If this is really the case, we are then right in the middle of the reinvention process we have already described. Thus, we can

justify our interest in the point of contact between the users and the technological invention offered to them. In order to determine whether there will, in fact, be a reinvention initiative on the part of the user, and if possible, the form that the reinvention will take, we must examine that meeting point.

The increase in the number of studies dealing with home computers from one point of view or another seems to be an other important indication that there has been a certain "social recognition" or legitimation of these questions. As could be expected, the first studies carried out in this area were especially concerned with understanding the "why" behind the adoption of a personal computer: Who buys them? For what reasons? And for what purposes? An analysis of the results obtained by these studies will make it possible to sketch the evolution of the buyers' profile and of the principal uses buyers envisage.

1.2.2 Adoption Conditions of the Microcomputer: Profile of Owners, Motivations and Uses

The studies carried out by Dickerson and Gentry (1983), Rogers et al. (1982), and Day et al. (1983) were particularly concerned with comparing the characteristics of computer adopters and non-adopters. On the one hand, most microcomputer owners were described as being male, 30 to 35 years old, with higher than average incomes, interested in seeking new information and opinions. There were people whom we could describe, in the terms used by Rogers(1983), as "innovators" or "early adopters".

The three main uses reported by Rogers (1982) were electronic games, text editing, and educational uses for adults and children. The main reasons for purchase of their computers given by the owners in the Day et al (1983) sample were the educational potential, curiosity, to help with their jobs, or to manage household expenses.

Some authors have refined their analysis by attempting to go beyond the strictly socio-demographic characteristics associated with personal computer buyers. In a study carried out by the LINK Company (1984), for example, a distinction was made between two types of buyers in terms of the potential and cost of the selected model. The first and largest category purchased inexpensive models with relatively limited technical capacities (TI 99, Commodore, etc.). The purchase seemed to be motivated by a need to become familiar or play with computer technology, and translated into a less assiduous and serious use of the device. The second group of owners invested in more powerful machines (IBM, Apple, etc.), and their interests seemed to be much more professional. Moreover, the second type of owner tended to buy more additional equipment for his computer. In this respect, we would like to mention that, according to some (Channels of Communication, 1985), the second type of buyer category represents the richest potential market for the future. The behavior of buyers has already evolved in the last few years (in terms of a demand for much greater technical sophistication: bigger memories, etc.). These new users are starting to buy as a function of various potential applications of the

machine. Also, they seem to be more aware of the cost/benefit aspects of their purchase. Thus, it is clear that even though we are not, strictly speaking, talking about the general public, these individuals no longer have much in common with the first pioneers in the area of home computing.

The analyses carried out during the first phase of our study (Caron et al., 1985a) seem to confirm this evolution, and, more specifically, from a Quebec perspective. First of all, amongst the population we studied, our users overall no longer correspond to the profiles of "innovators" or "early adopters" often observed in previous studies. In our sample, the geographic distribution shows that they are as likely to come from rural and semi-rural regions as from urban settings; their family incomes are above the national average, but this difference is less clearly marked than in the studies carried out in the United states by Day et al. (1983), and Rogers et al. (1982). Women are still in the minority, but they are nevertheless present in greater numbers than before. On the other hand, the group studied is employed mainly in the service sector (professionals, teachers, white-collar workers), even though the group also includes a good number of blue-collar workers.

There is also a remarkable evolution in the use that our respondents said that they make of their home computers. Even though they may have purchased a personal computer in order to become familiar with the technology, this objective "it turned out" was only partially achieved, since a large part on the use is allocated to games.

This said, and regardless of the variations related to the rapidity of its diffusion, at present, there seems to be a certain consensus developing among researchers that sees in the home microcomputer a medium, that will surpass the fashionable phenomenon that it has already become (Dutton, 1983; Nilles, 1982; Schneider and Schneider, 1984; Rogers, 1983; Caron et al., 1985b). It is within this context of social transformations and the reorganization of our daily lives that the process of the integration of the microcomputer into the home is situated. Thus, we are proposing an analytical framework that encompasses not only the conditions of adoption that were the object of our first investigation, but also the dynamics that are set in motion.

1.3 Analytical Framework: The Integration of the Home Microcomputer

Even though studies on the integration of media in the context of the home have a long tradition in the field of communications, they have often been limited to the description of a particular aspect of this process. Insofar as television, the medium by far the most studied for a long time, is concerned, certain analyses have been made, for example, of the reorganization of time, and others of family interactions. The microcomputer is no exception to this rule, and we can already detect this same trending to compartmentalize the study of its integration into the home. Thus, in this section, we have reviewed studies covering one or the other of the various aspects of this integration, because the objective of our own

analysis is to explore these dynamics as a whole, and to follow their evolution over time.

1.3.1 The Reorganization of Time as the Central Unit for Analysis

First, we must review the work of those authors who have based their analyses on the budgeting of time for various daily activities. Starting with the fact that, too often, we tend to limit ourselves to seeing in the home an accumulation of various consumer goods, these authors maintain that, above all, the home is a place where people carry out a variety of activities whose importance can be measured by the time they are allocated. In this respect, Mercier et al. (1984) divide these activities into two categories, depending upon whether the amount of time allocated was fixed or likely to change. On the basis of studies carried out in France , they concluded that the time periods allocated to certain areas of our daily life (sleeping, working, etc.) appear to be quite constant despite social changes, whereas some others are less firm and more likely to be overturned by the presence of a new technology in the home. They speak principally of leisure time, whether in terms of mass media entertainment (television, radio, etc.) or not (sports, study, etc.). Dutton et al. (1983) identify six areas of daily life that are likely to be directly affected by the presence of a microcomputer in the home: learning of skills-education, family interaction, individual development, leisure activities, work taken home, and various household routines.

However these same authors emphasize the difficulties involved in predicting precisely in which direction these various daily activities will be disturbed by the introduction of a microcomputer.

From this point of view, the equilibrium model proposed by Neuman and Pool (1983) seems to make an interesting contribution: conceptualized as a function of the home environment, the model postulates that an increase in the number of media available in a home will lead to a drop in both consumption and the attention given to the media that have already been integrated. In fact, according to this point of view, there is competition between the different media in the home as a function of the factors of attention, and time-budget management. When a new medium is introduced into the home, it upsets the established balance, and produces both a qualitative and quantitative drop in the attention given to the media already present. This theoretical model is particularly interesting for the study of innovations, because it assumes that the consumption of mass media in the home can be considered as a significant index of the way in which technology is integrated into the lifestyle of the individual. Moreover, it emphasizes the fact that changes that are engendered intervene very progressively over time, and justify, on this basis, the interest in carrying out a longitudinal analysis.

A study conducted by Venkatesh et al. (1983) confirms this theoretical model by its empirical results. Starting from the position that all systems tend towards equilibrium, and that changes take place gradually rather than suddenly (homeostatic

model, Robinson, 1980), these authors studied the impact of the introduction of the microcomputer into the home on the redistribution of the time allocated to other mass-media and interpersonal activities. Their results showed that changes do take place: many activities decrease, namely, watching television and family recreation. Other authors have emphasized the same trends: Rogers et al. (1982) note that one of the major changes is the decrease in the number of hours spent watching television.

Here again, the results of Phase 1 of our study (Caron et al., 1985) led to similar conclusions: in fact, 57% of our later adopters declared that they watched less television since they owned a microcomputer; 45% said that they spent less time with their hobbies (without specifying them); and 23% said that there was a decrease in the time spent listening to the radio.

Certain authors (Dutton et al., 1983) have based their work on social comparison theory, which poses as a starting point the hypothesis that individuals are largely influenced by the attitudes, behaviors, and values of people with whom they identify. In the familial context, we can then suggest that the microcomputer will have a measurable impact not only on the main user, but also on the other members of the family. This is the dimension to which we will now turn our attention.

1.3.2 Family Interaction or the Individual as the Central Unit for Analysis

One of the fundamental aspects of home computing is the machine's availability to several individuals, some of whom did not necessarily want it initially, but who have the choice of subsequently becoming interested in it. In the first phase of our study, we observed that most respondents (67%) said that they used their microcomputer with another member of the family regularly or from time to time. This was mostly for games (42%), and to a lesser extent for learning to program (16%). Ayotte and Noreau (1984) affirm that this collective use of the microcomputer is most often organized around the pattern of "one adult, plus one or more children", and that men are significantly more likely to prefer using the computer alone. Also, these authors emphasized that 75% of adult respondents think that their computer can facilitate their relationships with their children; while 44% mentioned their spouse. It is also important to emphasize that both these studies make a point of differences according to the gender of the user, which remain significant both in terms of perception and of use. In this sense, Bonner (1984) indicates that women think of the computer as a tool to achieve an end, while their masculine counterparts use it as a rational partner whose main quality is its obedience. In fact, a whole "popular" literature has developed around the transformation in conjugal relationships that takes place following the introduction of a microcomputer into the home. Hollands (1983), talks of the "Silicon Syndrome" where the man

becomes so totally involved in this work that he neglects his family, particularly his wife. Nevertheless, as Schneider and Schneider (1984, p. 66) have correctly pointed out, "The idea of losing one's husband to a computer mistress suggests a more subtle and more alarming sex role issue than one concerning the use of computers in the family". This growing interest in gender-based differences perceptual has logically led to studies of children or adolescents.

Most authors who have shown an interest in the relationships between children and computers agree on one point: children undeniably display a more positive or enthusiastic attitude towards computing than adults (Lieberman, 1985). The principal explanation factor here is quite probably their low "resistance to technology", a resistance which is very common among adults. Nevertheless, this author emphasizes that gender based differences develop proportionally to children's age. Thus, while studies dealing specifically with children show no significant differences between girls and boys, those dealing with adolescents come to very different conclusions. Adolescent girls are initially generally less interested in computing (Chen, 1985; Lieberman, 1984; Lockheed and Frakt, 1984). However, if we believe the results of many empirical studies carried out on this subject, this difference is not limited to a simple question of the "attraction" of the computer, but by the kinds of use made of the machine. Thus, Lieberman (1984, 1985) emphasizes that boys show a much greater interest in programming, while girls base their use on applications such as

word processing or graphics. From the same point of view, Watkins and Webb (1984) mention that even though, for all adolescents, it is the games that seem to remain the main attraction there are different according to gender: boys are clearly more attracted to competitive games oriented towards action; while girls prefer games involving a creative dimension such as graphics or music. Finally, it is important to point out that, for Chen (1985), who studied the effects of socialization models on the learning of computer programming by adolescents (girls and boys), this difference of relation to programming according to gender (e.g. "information gap") constitutes along with the question of income, one of the most worrisome dimensions over the long run, of the computerization of our societies.

To conclude this section, we review the study carried out by Giacquinta et al. (1984) of 20 New York families. These researchers approached the problem of the dynamics of the adoption of the microcomputer by focussing on the use of the machine by children, postulating as a hypothesis that it is mainly the presence or absence of educational goals which determines, on the long term, the more or less harmonious integration of the computer into the family. First, these authors emphasized the complexity of the integration dynamics, which are characterized by significant variations in behaviors and attitudes. These dynamics lead to totally contrasting situations: in three of the homes, nobody used the computer, and in three others it was used only by a single individual, in this case, an adult, who used it for his work. On the other hand, in the fourteen

other households, the machine was used more or less faithfully by many members of the family, including the children, even when they were not included in the initial utilization plans. These authors also emphasize that there is a very interesting contradiction within parental motives : parents want their children to acquire the computer culture in order to avoid being penalized in the future, but at the same time, they fear the potential repercussions that this may have on their social and human growth.

1.4 Specific Objectives of the Report

The analytical framework that we have developed provides an insight into the impacts of the presence of the microcomputer in the home. The studies reviewed make it possible to affirm that the dynamics that occur after the introduction of the microcomputer in the home are much more complex than it would appear at first glance, and that they cannot be reduced to a simple question of whether or not adoption has taken place. Nevertheless, it is still necessary to determine whether the upsets associated with the introduction of this "new medium" will persist, decrease, or disappear over time. In fact, we must not neglect the element of novelty, and we have seen that many of the studies reviewed do not take into account the temporal perspective,

In other words, the integration of an innovation is a complex phenomenon which develops dynamically over time, particularly when this innovation is as malleable as a microcomputer. Thus, it seems particularly judicious to seek out data that permit us to

translate these variations within their dynamics of adoption in the context of the home. This is precisely the purpose of this study. On the one hand, we have attempted to discern the conditions surrounding the adoption of a home computer, as well as the initial reactions of the families who have purchased one. On the other hand, we have tried to follow the changes in the attitudes and behaviors of these families during the two years following the purchase of the microcomputer.

Thus, first (Chapter 2), we will present a summary of the principal results obtained during the first phase (1983) of the study. The object of this stage was to reconcile in a single analysis the three dimensions of the process of diffusion of a technological innovation in society: the diffusion of this innovation, the use that is made of it by those who adopt it and their immediate circle, and its impact on their attitudes and behavior. We refer the readers who are interested in a fuller exposition of this analysis to the various publications derived from it (Caron et al., 1985a; Caron et al., 1985b).

Secondly, the principal objective of the second phase of the study (1985), which is reported here in its entirety, was an analysis of the potential reappropriation of the microcomputer by its owner and the members of his family, in the years following the initial adoption. In order to do this, we employed a methodology that using both quantitative (statistical) and qualitative (thematic analysis of interviews) techniques. The results will be discussed in two separate chapters:

Quantitative Analysis (Chapter 3): It was essentially a question of carrying out a follow-up of the sample surveyed during the first phase of this study (1983). The data, which were collected on the basis of a mailed questionnaire, allowed us to follow rather closely changes in the use of the microcomputer, and its long-term impact on the daily lives in the homes where it was adopted.

Qualitative Analysis (Chapter 4): Since we were aware of the limitations of a written questionnaire, we then carried out more in-depth interviews with all the members of eighteen (18) households in the Montreal region. This section attempts to deal more closely with the respective roles and perceptions of the various family members regarding their microcomputers.

National Survey (Chapter 5): The third section focuses upon the present conditions of the home computer market in Canada. This inquiry was carried out in order to see how our own data (for Quebec) compare with the rest of Canada.

These results will be discussed in the final section of our report (Chapter 6).

CHAPTER 2

SUMMARY OF THE RESULTS OF THE FIRST RESEARCH PHASE (1983)

2.1 Analytical Model: Rogers' Innovation Diffusion Model (1983)

Some of the empirical studies that have been carried out on home computers have focused on an analysis of the process of its diffusion in society. When this is the case, the computer is considered to be an innovation in the sense of Roger's theory (1983), and the analysis focuses upon its adoption or non-adoption as an innovation. As these questions are similar to those raised in the first phase of this study, we employed the model proposed by Rogers, in order to develop our variables. On the other hand, we refined our own analyses by focusing largely upon the process of the integration (use and impact) of the microcomputer into the home.

In Rogers' model, the way members of a social system perceive an innovation determines its rate of adoption. Innovations are characterized by five perceived attributes: their relative advantage, their compatibility, their complexity, the possibility of experimentation, and the possibility of observation.

Time also plays a significant role in this process of diffusion: in the process of innovation-decision, the degree of innovation, and the rate of adoption of the innovation. The process of innovation-decision is a psychological one wherein the individual passes through five phases, from first acquaintance with the innovation, to the development of attitudes towards this innovation, the decision

to adopt or reject this innovation, the acceptance of the new idea, and the confirmation of this decision.

The concept of the degree of innovation of adopters refers to the extent to which an individual or any other adoption unit absorbs new ideas ahead of other members of the social system. Rogers defines five different profiles of potential adopters: "innovators, early adopters, the forward majority, the backward majority, and the laggards". Normally, these groups display different characteristics. The rate of adoption, is defined as the speed at which an innovation is adopted by individuals.

Thus, this is the model we have utilized as the basis for developing sampling and analytical tools for the first phase of our study, which was an exploration the process of microcomputer adoption.

2.2 Method

2.2.I. Sample

In January 1984, 4,300 questionnaires were mailed to a random sample selected from the 22,000 participants in the series of televised courses "Octo-puce". The main purpose of this series, which was produced by the Government of Quebec, was to initiate the public at large to micro-computing.

From the 2,307 questionnaires that were completed (a response rate of 53.7%), we retained the following three groups:

"Early adopters, Later adopters, Non-adopters". Of the 1000 respondents who owned a computer, 880 were later adopters who had owned their machines for less than one year; 120 others had owned a microcomputer for more than a year, and were considered to be "old" or early adopters. The third group consisted of 1157 respondents who did not have a microcomputer in their home. The responses of 150 respondents in a last group, who said that they had not themselves purchased their microcomputer, were not retained for the purposes of this study.

2.2.2. Variables of the Study

The questionnaire employed in the first phase (1983) contained fifty questions that can be grouped along eight dimensions:

1) Socio-Demographic Data. What are the characteristics of the respondent and the respondent's family?

2) Interest Development. Since when and why is the respondent interested in micro-computing?

3) Sources of Information. What sources are tapped for information during the period that initial interest developed? At the time the purchase decision was made?

4) Taking the Decision. Under what circumstances is the microcomputer purchased? What pieces of equipment are purchased initially? Subsequently?

5) Personal Use. For what purposes is the home computer used by the person who buys it?

6) Interpersonal Environment. Use of the microcomputer by other members of the family: who uses it, and for what purposes?

7) Impact of the Microcomputer. What is the effect of the introduction of the microcomputer on other recreational activities? On the lifestyle of the family?

8) Perception of the Technology. How are the long-term consequences of new computer technologies perceived?

The analysis of the results involved three stages. In our first stage, we will describe the respondents who have owned a microcomputer for less than a year (later adopters) (n=880). They represent the main subject of this study. Secondly, this group will be compared with households who have owned a computer for a longer time (n=120) (early adopters), in order to obtain an initial estimate of changes in behaviors and attitudes over time. Third, these two groups will be compared with non-owners (n=1157) (non-adopters), who are also interested in home micro-computing, but who have not yet decided to adopt this innovation.

2.3 The Later Adopters Group

2.3.I. Socio-Demographic Profile

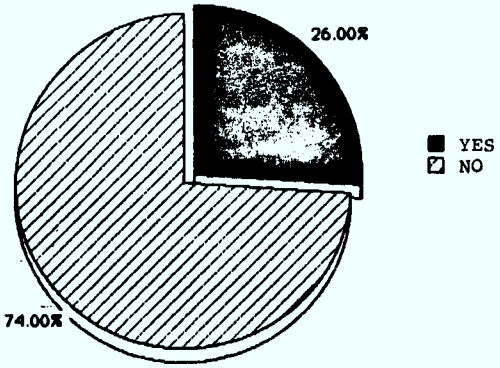
In general, the microcomputer buyer in this group is male (68% of the cases), about 35 years old (73% of the respondents were between 25 and 45 years of age). On the average, his family consists of 3.2 people, within an income about $3000 per year higher than the average for Quebec. In our sample, the geographic distribution of owners is very similar to that for Quebec in general. When the owner has a full-time job (82% of the cases), it is almost always a non-manual occupation: in fact, 26% are managerial or professional workers, 22% are professors, and 32% are specialized or non-specialized white-collar workers, versus 21% blue-collar workers. Thus, the buyer seems to be better educated than the average (see Appendix, Tables III and IV). For the later adopter, the microcomputer does not seem to be an extension of the job. In 74% of these cases, respondents had never used a computer for their work (Figure 1). In fact, these people often bought their computer without knowing how to use it: 31% of the respondents had never used a computer or even seen one demonstrated before buying it.

In most cases (82%), the purchase is very recent and took place within the last six months. Even though we can identify over 22 different brands of computers that were bought, four brands represent 87% of the purchases: Commodore 64 (30%), TRS 80 (27%), TI-99 (19%), and VIC 20 (11%).

Figure 1

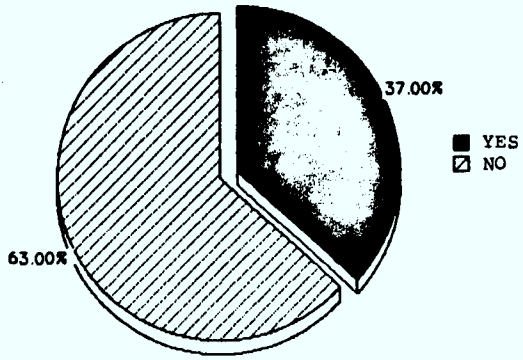
USE OF A MICROCOMPUTER

AT WORK BY LATER ADOPTERS



USE OF A MICROCOMPUTER

AT WORK BY EARLY ADOPTERS



2.3.2. Development of Interest

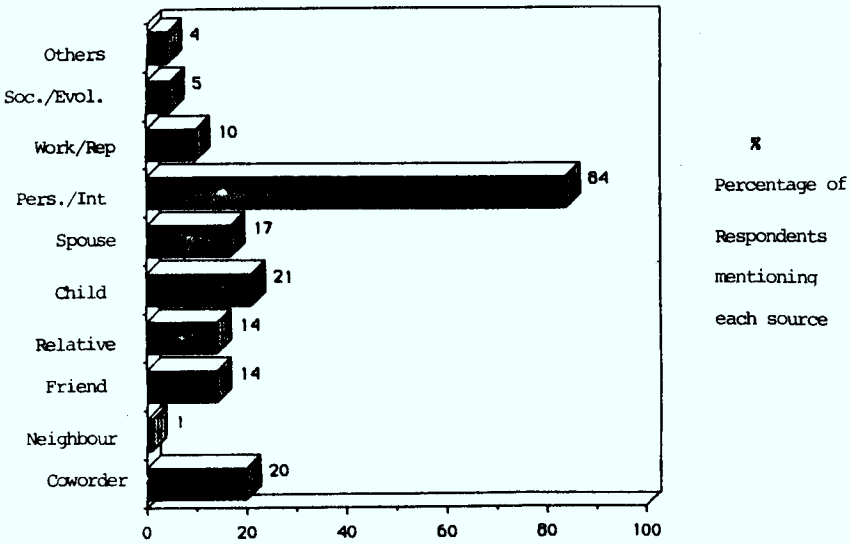
In the case of later adopter microcomputer owners, this interest developed recently: in most cases (82%), the respondents say that their interest dates from less than two years. Primarily, the interest is personal, even though the whole family is named as the second most important source (**Figure 2**); while job considerations come in only third place. When they first heard about microcomputers, it was predominantly the **technical** and **educational** advantages that were perceived by the buyers, rather than their entertainment value. The main disadvantages perceived at that time were first, cost, followed by difficulty of learning. Thus, at the beginning, future microcomputer owners are more interested in global capacities (speed, power, etc.) than in particular applications (word processing, etc.).

2.3.3. Sources of Information

Sources of information were identified for three distinct times: the moment of initial interest (stage of interest development), the time search for information (evaluation stage), and finally, the time when the brand was chosen (decision-making stage). For 46% of these respondents, interpersonal sources were the main contributors to interest development, while 46% mentioned mas media sources (radio, TV, magazines, etc.). At the information research stage, when the individual attempts to evaluate the innovation, 55% of the respondents mention mass media sources, versus the 45% who mention interpersonal sources. These results

Figure 2

SOURCE OF INFLUENCE TOWARDS MICROCOMPUTERS



differ from Rogers' theory which suggests that mass media sources are of primary importance in creating the initial interest, but subsequently give way to interpersonal sources. Finally, at the decision-taking stage, the two types of sources are of equal importance. However, we would like to point out that, at this stage, the respondent is more likely to adopt a "shopping around" behavior: 17% visited stores, 15% read specialized journals, and 21% mentioned that they listened to advertisements.

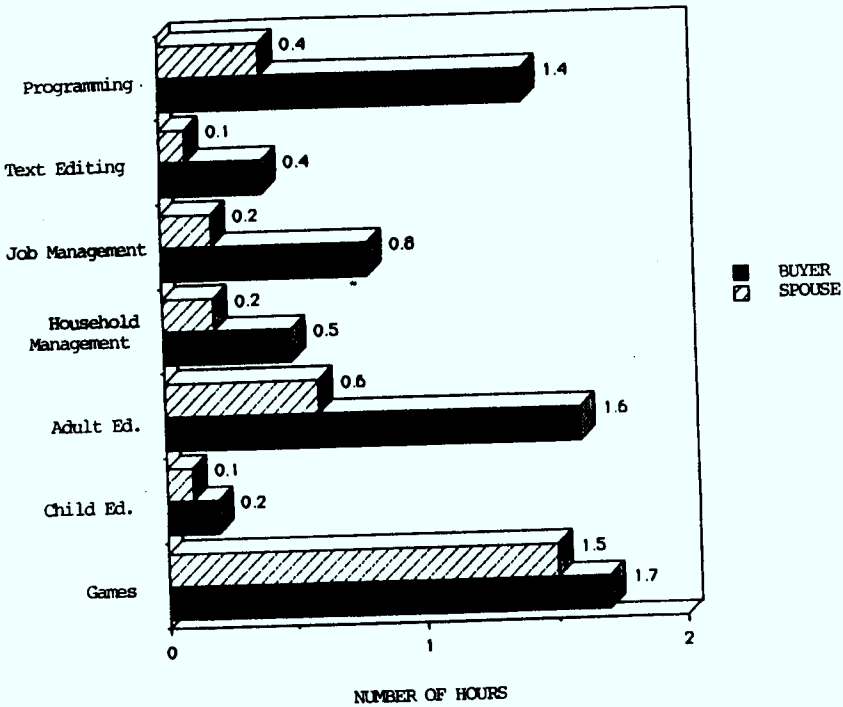
2.3.4 The Purchase Decision

Under what circumstances does the purchase take place? In 35% of the cases, the decision was triggered by a sale; while in 21% of the cases, the computer was bought as a gift. Only 15% mentioned buying the computer for their jobs. The curves of annual sales confirm these responses, because the great majority of purchases were made within the three months before Christmas. The determining factor in the choice of machine is cost (mentioned by 79% of the respondents), followed by the reputation of the manufacturer. The main use foreseen at the time of purchase is undoubtedly learning to program (33% of the buyers). It is important to point out that games are considered of primary importance by only 6% of the respondents. Nevertheless, when we look at the peripherals bought at the time of purchase and later, we find that 82% of the machines bought were equipped with a joystick. In fact, the joystick is by far the most popular peripheral (it is important to remember that it is also one of the least expensive). Thus, there

Figure 3

TYPES OF MICROCOMPUTER APPLICATIONS

BY LATER ADOPTERS



seems to be a relatively large discrepancy between planned and actual use of the microcomputer

2.3.5 Personal Use

The computer is used largely at the beginning or the end of the evening (5l and 30% of the respondents respectively). Generally, it is placed (over 50% of the cases) in a room that is accessible to all the members of the family (living room, recreation room, basement, etc.); however, it may also be installed in a room with more restricted access (workroom 33%, and parents' bedroom 6%).

In describing how much their computer is used, the respondents say that, on the average, they use it about 6.6 hr/wk (Figure 3). Even though our data are a little difficult to interpret in this respect, it seems that the respondent mainly uses the computer for programming and various learning activities, which account for 3 hr/wk. Games come second (l.7 hr/wk) and account for about one third of the utilization time. Job-related functions take up less than l hr/wk. Even though most of the respondents (67%) say that they use their computers with other members of their family (especially for games, and marginally for programming), one third mention that they always use it alone.

The respondents express a high degree of satisfaction with their microcomputers: 64% say that they are quite or very satisfied; while only l5% are quite or very dissatisfied, and 22% have no definite opinion. The main sources of satisfaction seems to be the

possibility of acquiring new skills (41% of the respondents); while dissatisfaction seemed to be related to the complexity of this acquisition (15%), and the cost (14%) of programs and peripherals.

We would also like to emphasize that the respondents in their turn, seem to play a diffusion role within their own interpersonal network: 54% of our owners mention that they are either regularly or occasionally asked for advice about microcomputing.

2.3.6 Interpersonal Environment

When there are at least two adults present, the respondent's spouse uses the microcomputer almost as much as the respondent himself for games (1.5 hr/wk), but much less for other purposes; which accounts for a total time of a little over 3 hr/wk (Figure 3). As far as other people in the home are concerned (almost always the respondent's children, who each use the computer about 4 hr/wk), games are by far their main computer activity; with children's educational programs following quite far behind. They use the machine mainly in the late afternoon (more than 70%).

In fact, when we examine the overall use of the microcomputer by the whole family, games seem to be the most popular activity. For example, in a family of two adults and two children, the microcomputer is used a total of 17.7 hours per person (this figure is obtained by adding the hours of use reported by each person; however, since several people may use the machine together, this figure does not mean that the machine is being used for such a long

period of time). Of these 17.7 hours, 8.4 hours are dedicated to games, 5.0 hours to learning activities (educational programs for adults, programming, etc.), 1.9 hours to educational programs for children, and 2.5 hours to utilitarian functions (family management programs, word processing , for job-related purposes).

2.3.7 Impact of the Introduction of the Microcomputer

All this activity around the microcomputer cannot take place without having certain consequences for the time allocated to other types of recreation. As far as other media activities are concerned (Figure 4), watching television is by far the most heavily affected: 58% of the respondents say that they watch less, for an average decrease of more than four hours per week. This drop cannot be attributed to the fact that the TV monitor is connected to the microcomputer, because, on the average, the respondents own two television sets, and over one third own more than two. Listening to the radio is also affected, but to a lesser extent. Twenty-five percent say that they listen less; though, in 3% of the cases, consumption went up.

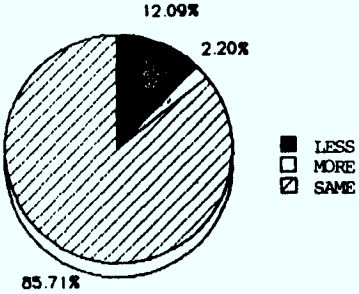
Even though newspaper-reading seems to be little affected, the reading of books and magazines changes in both directions, in most cases, increasing. For example, 73% of the respondents say that they read magazines as much as before, 9% say that they read less, and 18% say that they read more. Even though in certain cases, the use of microcomputer has served as a substitute for this

Figure 4

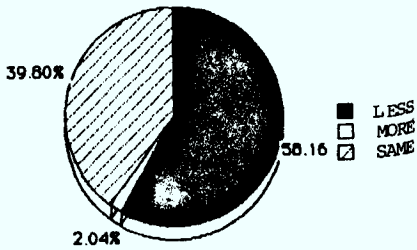
IMPACT OF THE MICROCOMPUTER

ON MASS MEDIA ACTIVITIES AFTER

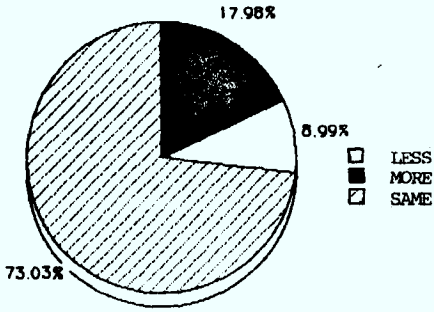
ITS INTRODUCTION INTO THE HOME



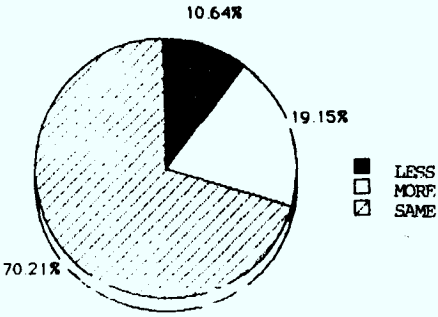
PAPERS



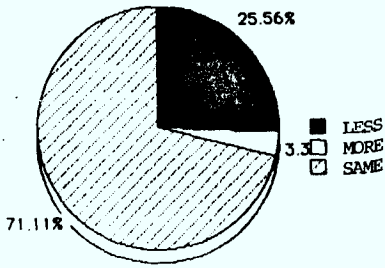
TELEVISION



BOOKS



MAGAZINES



RADIO

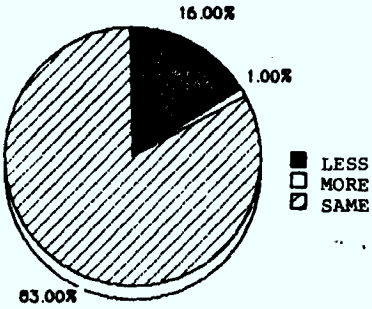
activity, in many cases, it has generated a new consumption of specialized journals. This hypothesis can be confirmed by the finding that 60% of late-adopter respondents mentioned that they read magazines specializing in the microcomputing field, and 23% have even subscribed

As far as other activities are concerned (Figure 5), 48% of the respondents say that they spend less time with their hobbies. Sports and sleeping time seem to be little affected; however, when they are affected, it is usually in a negative sense (this is the case in 15% and 16% of the respondents respectively). In terms of time spent with other members of the family, this may vary in both directions, and in equal proportions. Family relations will increase or decrease depending upon whether the microcomputer is used collectively, or, on the contrary, becomes a source of isolation for the owner (we will see that this is often the case for early adopter owners).

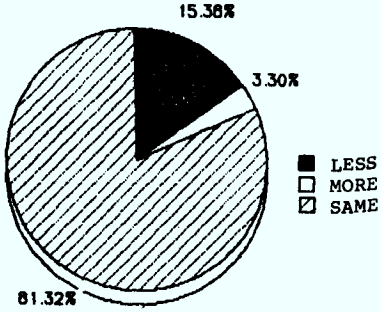
Despite these variations in their time-budget, in general, the respondents consider that the microcomputer has not made any real changes in their lifestyle. When they mention such changes, it is often in the sense of the creation of a new interest in the technology, and the development of a new hobby. However, a majority of families with children mention changes in their behavior. In most of the cases (75%), these changes are perceived as minor and generally positive: a new interest in the technology, new interest in studying, a drop in the number of hours spent watching television. Nevertheless, certain respondents deplore the

Figure 5

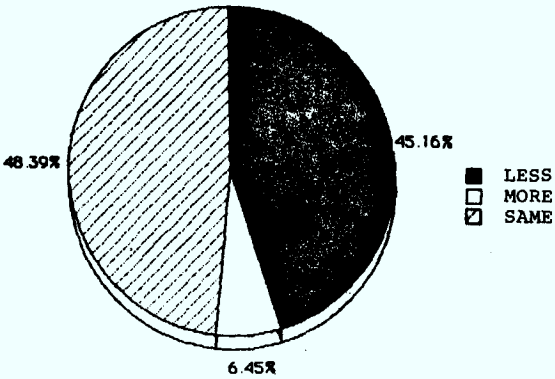
IMPACT OF THE MICROCOMPUTER ON NON-MASS MEDIA ACTIVITIES AFTER ITS INTRODUCTION INTO THE HOME



SLEEPING



SPORTS



HOBBIES

fact that their children spend less time playing outside, or that they "spend too much time with the computer". Finally, it is important to note that 44% of the parents/owners say that they have established certain rules regarding the use of the microcomputer, most often in order to limit its use. The reasons given are concern for the children's health (eyesight, backache), or the danger that schoolwork will be affected. Several also require that a certain balance be established between games and programming or educational activities.

2.3.8 General Attitudes about the Technology

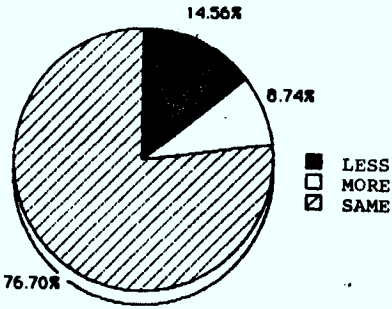
Most of the respondents say that they are relatively or very comfortable with microcomputers. The respondents seem to perceive the presence of computers in society rather favorably. In fact, 95% of them agree with the following statement: "Computers are quite fascinating" and 68% of them associate computers with a better quality of life. Moreover, 82% disagree with the following statement: "With computers, people will no longer count", as well as with "Men are better with microcomputers than women" (72%). Also, the respondents are rather divided when it comes to evaluating whether or not computers are too complicated for the average person.

Figure 5
(Cont.)

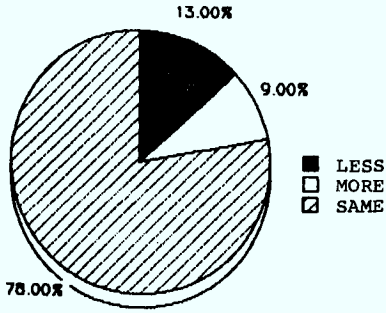
IMPACT OF THE MICROCOMPUTER ON NON-MASS

MEDIA ACTIVITIES AFTER ITS INTRODUCTION

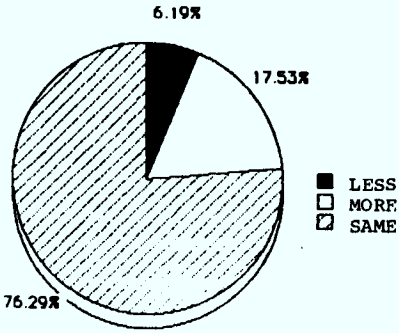
INTO THE HOME



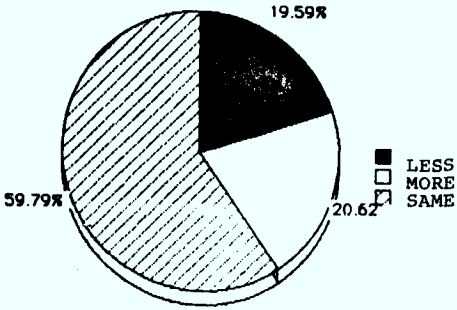
TIME SPENT WITH FRIENDS



TIME SPENT WITH THE FAMILY



STUDY TIME



TIME ALONE

2.4 Analyses According to Gender and 'Home Region' (Later Adopters)

2.4.1 Male and Female Microcomputer Owners

Beyond the initial description of the group as a whole, we have attempted to determine whether male and female microcomputer owners differ in their behaviors and attitudes.

In socio-demographic terms, we find few differences between the sexes, apart from the fact that females are more often teachers and less often professionals or blue-collar workers. As a corollary of this, they are more often employed in the public sector, but have had fewer contacts with technology on the job than their male counterparts. Females also say that they read fewer personal computing magazines, and their interest in this area is more recent. When they specily the sources of their interest, women mention more often the requirements of their family, and less often purely personal interest. For example, they are more likely than men to have bought their microcomputer because their children have asked for it. The same is true for the sources of information, which seem to be more closely linked to interpersonal relations than to their job, than in the case of the males. In fact, it seems that females see the microcomputer as something that the whole family will use since, more than men, they tend to install their machines in locations that are accessible to the whole family.

Even though the differences are not great, males seem to be significantly more satisfied with their microcomputer and have

taken significantly less time to feel comfortable with it. Nevertheless, we find no important differences in terms of the time spent on the various functions of the machine. However, men are more often asked for advice, and have developed a greater number of new relationships around this new hobby.

As far as the impact of the machine on personal activities is concerned, television watching decreases less in females; males say that they spend more time alone and less time with their families, even though the changes were in the same direction. Females are also more likely to set out regulations regarding the use of the microcomputer by their children. Finally, even though the attitudes of both sexes towards computing are very positive, females generally express more reservations than males.

2.4.2 Regional Differences

When we classify microcomputer owners in terms of whether they live in the Montreal region, the Quebec region, or in the rest of the province, we find few significant differences, except that there is a larger proportion of teachers in the rest of Quebec, more white-collar workers in Montreal, and more professionals in Quebec. The most interesting difference is linked to interpersonal network: in fact, people in less urban regions (the rest of Quebec) say that they know more microcomputer owners than people living in Quebec and Montreal, and are more likely to belong to a computing club. Thus, it

seems that residents of less urbanized areas make greater efforts to form links with other people sharing the same interest.

2.5 The 'Early Adopters' Group

If, from the beginning, we have distinguished between people who have owned their machines for less than a year and those who have owned it for a longer period of time, it is because we have been able to isolate several fairly significant differences between these two groups. For example, early and later adopters show similar socio-demographic profiles; but the "early adopters" group includes only 21% females, while the proportion increases to 32% in the "later adopters" group. (see Appendix Tables I and II).

Early adopter owners were from the start more interested in buying the computer, and following this initial interest they carried out the purchase more quickly. In general, they were more influenced by interpersonal sources, and less by the mass media. In choosing what brand to buy, cost played a lesser role than for later adopters, while the variety of software programs and the reputation of the manufacturer were more important factors. Also, they are less likely to attribute the purchase of their machine to a particular circumstance. Thus, our early adopters show behaviors that are more representative of the "innovator" group than later adopters.

In terms of the use of the microcomputer, there seems to be a certain displacement from recreational functions towards more serious uses: we noted that the time spent in job management and

programming is clearly higher in the case of early adopters. Moreover, early adopters use their machine more frequently (7.9 hr/wk versus 6.6 hr/wk in the case of the later adopters).

The impact of the purchase of the microcomputer on recreational time-budget is similar in the two groups. This leads us to believe that the effects of the arrival of a microcomputer in the home persist over time. Also, early adopters include in their interpersonal network a larger number of friends and relatives who also own a microcomputer, they are more frequently affiliated with a computing club, and are more often asked for advice. Finally, their general attitudes about computers are as positive as those of later adopters.

2.6 The Non-Adopter Group

We also looked at the 1157 respondents who did not own a microcomputer at the time of the survey. The objective of this analysis is to compare this sample of interested people (who also registered in the "Octo-puce" course), but who had not yet adopted the technology, with the group who had just made the leap; that is, our later adopters.

Most of the non-adopter group are female (57%) and families are smaller (2.9 people against 3.2 in the case of the adopters). Among other things, we found that there is a lower proportion of couples without children. Their income is only slightly lower than that of the adopters, and that public service employees are there in

great numbers (68% of the people with a job). Over three-quarters of them have already used a computer or seen a demonstration. Thus, they were clearly interested in this technology, but the source of this interest is most often related to their job and less to the family environment. Thus, it seems that job environment plays a significant role in creating an interest in personal computers; however, family pressures, particularly those coming from children, may be more effective in leading to the actual purchase.

Why have the people in this last group not purchased a microcomputer? 56% of the respondents mention cost, the most important other reasons for the hesitation being an absence of real need and a lack of understanding of the computing milieu. Several also mentioned unstable market conditions: changes that are too rapid, incompatibility between brands, etc. Nevertheless, 49% of these non-adopters are more or less certain that they will acquire a microcomputer during the course of the next two years. As in the case of owners, games are not mentioned as the most important foreseen use, but rather learning to program and using programs that would be useful for the household (we know however, that this last application is in fact little used.

Finally, we found that the attitudes of non-adopters towards computing and its consequences were rather positive, but to a significantly lesser extent than in the case of adopters.

2.7 Conclusion

During the first phase of this study, we used as an analytical framework the innovation diffusion model developed by Rogers (1983). In accordance with this model, the microcomputer may be seen as a technological innovation that diffuses through the social fabric, and toward which increasingly important groups of the population are led to take a decision which can be its adoption or rejection. In this context, one of the fundamental questions is to determine at what stage of the diffusion process we had arrived in 1983. Even though some studies had already approached the question from this point of view, our research tends to demonstrate that we are no longer at a stage where microcomputers belong to a minority of "innovators" or "early adopters", but that the "later adopter" group also includes representatives of the "forward majority". Several of our observations converge on this point: later adopters are not only young professionals who buy a microcomputer for their job or to satisfy their taste for programming, but also fathers or mothers who see a utilization potential for their children and buy a microcomputer for the family, especially if they can find a good bargain.

The second concept that we attempted to verify is the integration of the microcomputer into family activities. In this respect, it seems that the use of the machine is no longer the exclusive prerogative of the main adopter, but also of other members of his circle. Moreover, we find that the arrival of the

microcomputer affects the recreational time budget, particularly the time allocated to mass media activities.

At this point, it is important to ask what happens later in this process: will the diffusion of this innovation continue, or will we find that it flattens out, or even that there is a trend reversal of "dis-adoption"? In order to understand the present situation better, it may be useful to compare the microcomputer with the growth pattern of more traditional media. According to Gumpert and Cathcart (1982), we can identify four stages in the spread of mass media: in the first stage, the new medium is perceived as a toy for the exclusive use of the rich and eccentrics:

> First, the new medium is viewed as a toy -- something to be played with or owned by the rich or the eccentric --something that society could get along just as well without. At that stage, the medium is not taken seriously by scholars and researchers ... there are of course those who make "wild" and sometimes accurate predictions.

In the second stage, the new medium gives rise to greater curiosity in terms of its technology and its operation:

> The next stage of interest and involvement is concerned with the techniques of the phenomenon. People want to know how it works, and they marvel at how its effects are achieved.....This in turn produces experts who study and predict the effects of the media.

If the new medium is successful, it progressively reaches the third stage, where it becomes institutionalized and fulfills its more legitimate functions:

> At this point the medium has been institutionalized, has survived its critics, and legitimated its functions.

At the fourth stage, it becomes an integral part of normal activities to the point where the public is no longer aware of its dependence upon it:

> There is a fourth stage in the development of most media and that is the one where the medium has become so much a part of the scheme of things that much of the public is unaware of how dependent it is.

Even though the microcomputer cannot yet be defined as a traditional medium or, at its present stage of diffusion, as a mass medium, we can attempt to determine to what extent its recent evolution seems to follow some of these stages.

According to the data from this study, people buy a microcomputer mainly to become familiar with the technology. This initial contact need could be described as an attempt to "domesticate" computer technology: the later adopters in our sample want to know what it is, how it works, etc., in order to conquer a certain apprehension that is often the legacy of the "myth" of supercomputers designed in the 1950's and 60's (complexity,

colossal size, required expertise, etc.). In this respect, since 1983, advertising in both television and the press seems to have reinforced this initial need by focussing its messages on the necessity to keep up with the changes in the social context, and prepare our children for the "computerized society of tomorrow" (the concept of "computer literacy"). In turn, government institutions, feeling obliged to assume a more active role, legitimize by this very fact this technological phenomenon.

All of these factors lead to a certain "vulgarization" of the domestic use of the personal computer. Thus, a computer is bought because the price is particularly affordable, or because of increasing family or social pressures, without taking into account the real technical capacity of the acquired machine. In fact, this seems to mark a turning point in the diffusion curve of domestic personal computer technology. Data relative to the circumstances surrounding the purchase of the machine, the role played by the respondent's family, his level of satisfaction with his microcomputer, and the use to which the computer is put seem to support this theory. This leads us to believe that the first two stages described by Gumpert and Cathcart have been reached. However, at present, there is a certain readjustment on the part of the home microcomputer industry (some of the manufacturers have chosen to get outof this market) and, at the same time, the introduction on the market of devices of a very different conception (for example, integrated software and user-friendly machines such as the Apple Macintosh). Thus, we may assume that once the initial

familiarization need has been met, it will be necessary to redefine the "general public applications" of the microcomputer, in order to meet "more functional" needs that are more related our daily lives. Certain people define this phase as the reinvention or redefinition of the innovation by and for its users (Rogers, 1983).

In this context, it becomes essential to determine what tendencies are most likely to be confirmed within the next few years. This is the main objective of the second phase of our study: the longitudinal analysis carried out in 1985.

CHAPTER 3

ANALYSIS OF THE RESULTS OF THE SECOND RESEARCH PHASE

(1985 - QUANTITATIVE ANALYSIS)

3.1 Method

3.1.1 Sample

The data we present in this analysis concern 403 respondents who participated in the first phase of the study carried out in 1983 (Caron et al., 1985). It is important to remember that during the first phase of this study, 2307 respondents completed our first questionnaire. Of this number, 880 had bought themselves a microcomputer which they had owned for less than one year. The great majority of them (84%) had agreed to participate in a subsequent phase of our research. Thus, it was those respondents that we contacted, and who represent the basic sample for the present study.

Of the 880 initial respondents, 742 agreed to participate once again. Twenty of them having been set aside for family interviews, (see Chapter 4); 722 questionnaires were mailed during the first week of October 1985. Thirty-seven questionnaires were returned due to address changes. Thus, the sample consisted of a maximum of 685 respondents who received the second questionnaire. Of that number, 416 completed questionnaires were received, which represents a high response rate of 61%. Thirteen of these questionnaires were not included in our analyses because they were received after the data had been entered for processing. Thus, the data discussed in this chapter are based on a total of 403 respondents as well as the others members of their families.

3.1.2 Structure of the Questionnaire

We believe that it is essential to look at these households from different points of view, depending upon whether they no longer use their microcomputer or whether the machine is still more or less the object of attention. Thus, the purpose of the first filter type question was to distinguish between three groups of respondents:

a) **those who no longer own a computer, or households where the computer is no longer being used by any member of the family ("discontinued use" group)**

b) **those whose computer is still being used, but who have not bought a second computer since January 1984, when the initial data were collected ("continued use" group)**

c) **those who have bought a second computer since January 1984 ("second personal computer" group).**

The questionnaire contained the following section:

1) Questions directed exclusively at the "**discontinued use**" group, related to the reasons for their discard, as well as their future purchase intentions.

2) Questions directed exclusively at the "**second personal computer**" group, related to the purchase of the second machine:

sources consulted , motives, plans for use, circumstances surrounding the purchase, model purchased, impact on the utilization of the first machine, etc..

3) Questions directed at the **"continued use"** and **"second personal computer"** groups: weekly microcomputer use timetable.

4) Questions directed at the **"continued use"** and **"second personal microcomputer"** groups regarding the place and impact of the microcomputer(s) in the daily lives of the respondents and their families: peripherals acquired, use of a microcomputer on the job, interpersonal network, lifestyle changes, participation in a computing club, sources of satisfaction or dissatisfaction, impact on mass media and other activities.

5) A final section directed at **all groups** related to their socio-demographic characteristics and general attitudes towards computing and the computerization of society.

3.I.3. Encoding and Analysis

Initially, the data were encoded for processing purposes. We then opened a data file containing for each respondent the total replies to the 1983 (phase 1) and 1985 (phase 2) questionnaires. The analyses were carried out using an SPSS program ("Statistical Package for the Social Sciences"). Several tests of statistical significance were carried out (Chi-squares, T-tests, and analyses of variance, followed by multiple comparisons using the Neuman-Keuls

method). However, only the most important of the significant results obtained will be discussed.

3.2 Description of the Data

As mentioned in the methodological section of this chapter, our first problem was to determine what had happened to the microcomputers in these households between 1983 and 1985. A preliminary analysis produced three respondent group profiles. First, the majority of the respondents (64%) say that their microcomputers are still being used in 1985, but that they are the same machines. Another, 18% say that they have bought a new one (while keeping or disposing of their first); while a comparable number (18%) say that they no longer own or use their personal computers. In order to simplify the presentation of these results, we will, henceforth, define the three groups as **"CONTINUED USE"**, **"SECOND PERSONAL COMPUTER"**, and **"DISCONTINUED USE"** groups.

On the other hand, we must recognize that (in spite of the high response rate for the second questionnaire, and the lack of significant differences between the socio-demographic profiles of our initial sample and the second samples) it is quite possible that there may have been a certain underrepresentation of the "discontinued use" group, since they may have felt less concerned by a questionnaire on microcomputers. However, it would seem that the members of the "continued use" and "second personal computer"

groups represent a very significant proportion of the original sample. This section will deal with three principal factors:

1) the socio-demographic profile of all the respondents, as well as certain characteristics particular to those who have stopped using their personal computers ("discontinued use" group), or who have bought a second machine ("second personal computer" group);

2) Use and impact of the microcomputer in 1985 ("continued use" and "second personal computer" groups);

3) Use of the microcomputer according to job, age, and family situation of the owner-respondent. These analyses will also take into account the longitudinal perspective of the data, changes in the nature of microcomputer use, and its impacts.

3.2.1 Socio-Demographic Profiles

First, we would like to mention that the average age of the respondents did not vary significantly for individuals in the three previously-defined groups. The majority of people interviewed (74%) were between 25 and 45 years of age, with an average age of 38.4 years. On the other hand, there is a significant difference ($p < .05$) in terms of the distribution of the three groups according to the gender of the respondents who own a microcomputer (**see Table 1 and other tables in the Appendix**). Thus, female owners represent 46% of the respondents in the "discontinued use" group; while they represent only 30% of respondents who still use their

computers, and 28% of those who have bought a new one. Although, households where women carried out the purchase seem more likely to discontinue use, nevertheless, our subsequent analyses showed that many other factors also play a role.

3.2.1.1. Household Income

The average family income of the respondents is about $36,700, which means that it is slightly higher than the Quebec average of $34,045 (Statistics Canada, 1984). On the other hand, it is important to point out that this figure does not vary significantly between the three respondent profiles (see Appendix, Table I).

3.2.1.2 Occupation

Even though the type of occupation varies only slightly for respondents in the three groups, the distribution of this population as a whole was quite diversified: 26% have white-collar jobs (secretaries, office clerks, etc.), 23% have blue-collar jobs (skilled or unskilled laborers), 20% are managerial level employees or professionals, and 15% work in the education sector (see Appendix, Table I). We also find that almost half (47%) of these jobs are related mainly to the public or parapublic sectors.

3.2.1.3. Level of Education

Although the average level of education of the respondents does not vary significantly between the three groups, it is nevertheless higher than that of the population of Quebec as a whole (38% of the respondents have at least some university education).

Nonetheless, it is interesting to note that one quarter of our respondents (26%) had completed only primary or secondary school, while 37% had a college-level training.

3.2.1.4 Use of a Microcomputer on the Job

In 1983, only 13% of the respondents said that they regularly used a computer for their work. In this respect, there were no significant differences between the three groups. In 1985, the situation is quite different: 24% of the respondents in the "continued use" group, and 44% of the respondents in the "second personal computer" group say that they use these machines on the job ($p<.05$) (see Appendix, Table IV).

In sum, as was the case in the first phase of the study (1983), our group of respondents are characterized by a level of education and family income that are higher than those of the population of Quebec as a whole. On the other hand, with the exception of the gender variable, factors of a strictly socio-demographic nature do not seem to play a major role in sustaining interest in the microcomputer that has been bought. This leads us to believe that there are other variables that can better explain the differences that characterize computer adoption dynamics in our three groups.

Figure 6

DECISIONS MADE BY THE "DISCONTINUED USE" GROUP REGARDING THEIR MICROCOMPUTERS

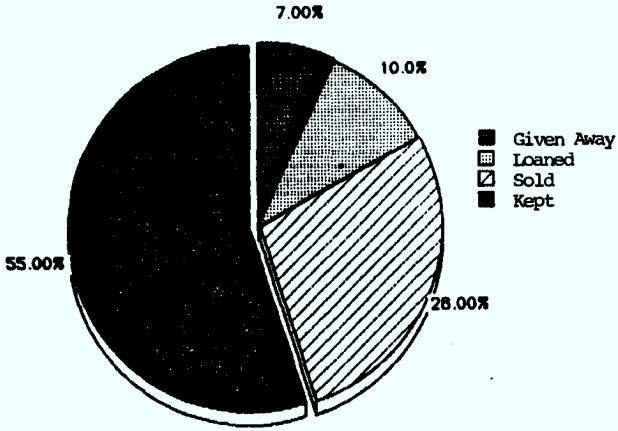
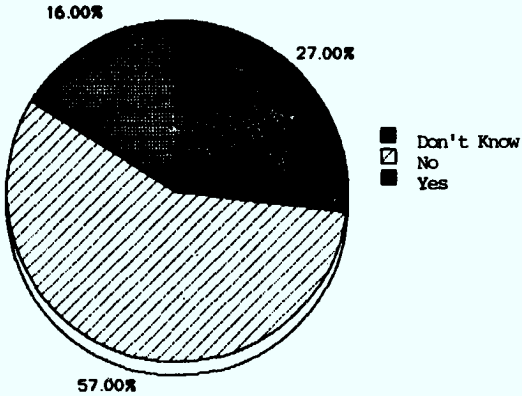


Figure 7

WISH TO PURCHASE A MICROCOMPUTER WITHIN 1 YEAR - "DISCONTINUED USE" GROUP



3.3 Data Specific To Users Who Have Stopped Using Their Microcomputers (The "Discontinued Use" Group)

As we have already mentioned, 18% of the 403 families surveyed have stopped using their microcomputers altogether. Thus, we attempted to understand the reason for this decision, as well as to determine what had happened to their machines.

Even though they no longer use it, most (52%) of the respondents in this group still keep their computer at home; while 28% have sold it. A minority of them have loaned it (10%) or even given it to other people in their family group (7%). Thus, we find that, for the most part, respondents in this group have not "officially" disposed of their microcomputers (Figure 6).

We attempted to understand the causes underlying this behavior by asking respondents an open question about their "discontinued use". Most often, the reason given for discontinuing the use of the microcomputer is lack of interest (mentioned by 27% of the respondents). This general term, "lack of interest", essentially covers themes such as lack of motivation, the inadequacy of the technical potential of the model purchased to meet individual needs, or simply discovering, after the purchase, the uselessness of having such a machine in the house.

Almost one quarter (22%) of the respondents in this group mention disadvantages related to the computer market itself as a major demotivating factor. In this respect, they list defective

equipment, lack of maintenance services, lack of information, or further market instability in the production of models and equipment.

Moreover, a relatively high proportion (18%) mentioned as a disadvantage the necessity for further financial investment after the initial purchase, in order to be able to use the machine in a meaningful way. In other words, it seems that the respondents in this group were not ready to undertake this additional financial burden, despite the fact that they, like the respondents in the other two groups , had the mans to do so. Thus, it was more a question of motivation than purchasing power.

Finally, we asked the people in the "discontinued use" group whether they expected to buy another computer during the course of the next year. Almost 16% of them answered in the affirmative, 27% were undecided, and 57% answered in the negative. Of this last group, the main reason mentioned for not wanting to buy a computer another time was once again lack of interest: they no longer see the utility or necessity of having this type of machine at home. In this sense, discontinuing to use the first computer seems to have a deeper meaning than a simple "accidental decision along the way". As the qualitative indicators will show, some users, particularly those who purchased a lower-price computer have been very seriously disappointed in their personal experience with personal computing (Figure 7).

The figures discussed above indicate some of the reasons for discontinued use. However, they are insufficient to explain the nature of this decision. This is why we will examine this problem in more depth in the qualitative section of this report, below.

3.4 Data Specific to Users Who Have Acquired Another Microcomputer (The "Second Personal Computer" Group)

As we mentioned above, 403 respondents (18%) have bought a second microcomputer; a decision that, in most cases (67%), was made more than a year earlier. Initially, we would like to describe more precisely the type of microcomputer bought by the respondents in this group, before attempting to retrace the process of how and why they arrived at this decision.

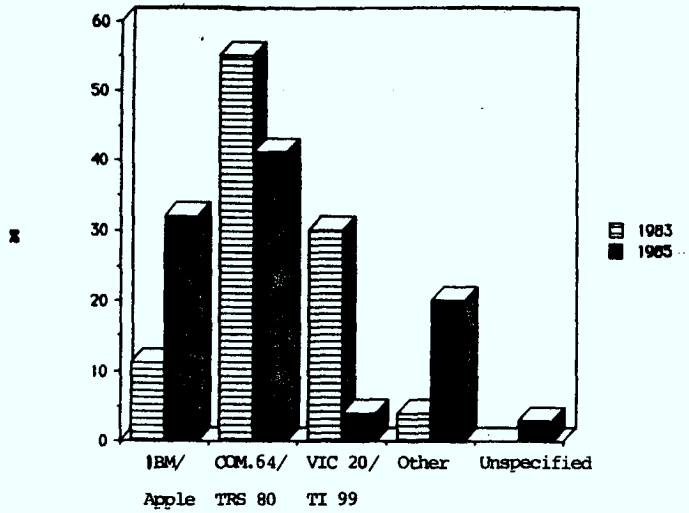
3.4.1. Identification of the Second Microcomputer

In 1985, we can identify over 20 different models among the computers newly acquired by the respondents. Four of them, however, seem to have captured the largest share of the market: Commodore 64 (26%), TRS 80 (15%), IBM PC or PC Junior (14%), and Macintosh (Apple) (13%). In 1983, most of the respondents in the "second personal computer" group had chosen a TRS 80 (33%), 22% purchased a Commodore 64, 16% bought a VIC 20, and 14% a TI-99 made by Texas Instrument. IBM and Apple were scarcely represented.

Figure 8

COMPARISON BETWEEN THE FIRST AND SECOND MODELS -

"SECOND PERSONAL COMPUTER" GROUP



Thus, it seems that between 1983 and 1985 there is a certain evolution in the models chosen by this group, in favor of higher performance computers . (Figure 8).

This interpretation seems to be confirmed by the comparative analysis of the second microcomputer purchase as a function of the first machine owned. Our analyses show that, generally, the second machine is "technically superior" to the first. Thus, we will retrace the stages that led the respondents in the "second microcomputer" group to make this new purchase, in order to see what are the factors that might explain this evolution (see Appendix, Table V).

3.4.2 Circumstances Surrounding the Purchase of the Second Microcomputer

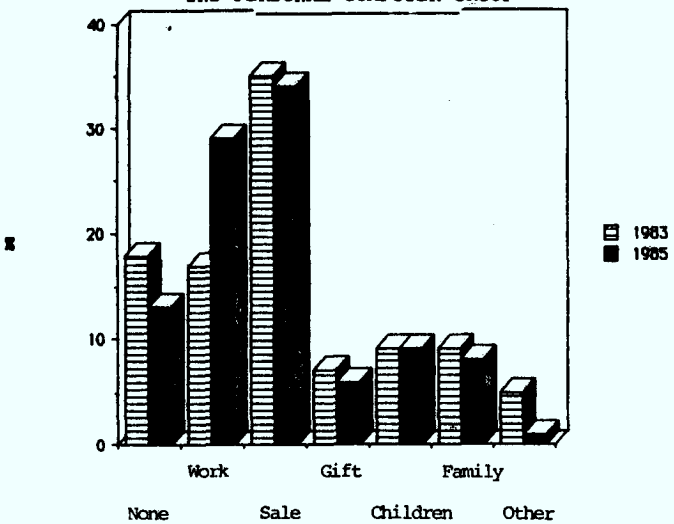
When asked "Under what circumstances did you buy your new microcomputer?", over one-third of the respondents (34%) answered: "because of a particular sale", and 29% mentioned a job-related need. It is interesting to compare this need, which is of a "professional" order, to the 17% of respondents who mentioned essentially a family need (9% mentioned a children's request, and 8% mentioned family needs in general). Finally, in 13% of the cases, the purchase was made without reference to any particular circumstances (Figure 9).

In 1983, to this same question, the percentage of answers expressing family reasons was essentially the same (17% in 1985, 18% in 1983). On the other hand, in 1983, proportionally fewer

Figure 9

COMPARISON BETWEEN THE CIRCUMSTANCES LEADING TO THE MICROCOMPUTER PURCHASE

"2ND PERSONAL COMPUTER GROUP"



respondents mentioned having bought their machine to meet a job-related need (17% in 1983, 29% in 1985). Moreover, in 1983, 22% of all the respondents said that they had bought their first computer as a birthday gift. Thus, we find that the "second microcomputer" group was already different from the others in 1983, since gift-giving was mentioned by only 7% of the respondents in this group. In 1985, this figure dropped to 6%. Thus, it would seem that needs were now oriented more clearly towards the professional context.

3.4.3 Purchase Perspective

The perspective from which the second purchase was carried out provides additional information on the underlying motivations. In this case, we asked the respondents to specify <u>who</u> the new home computer was for. Even though 44% of them said that they had bought the new machine exclusively for their personal use, most respondents (56%) included other members of their family: 31% said that the machine was for the use of the whole family, 13% mentioned their spouses, and 11% their children.

We have already seen that family needs were not often mentioned as a purchase motivation (17%). Establishing a relationship between these figures suggests that, even though several members of the family are included among the future users, each will make his or her own use of the computer. We will come back to this point when we analyse how the machine is used by the various members of the family.

3.4.4 Reasons for the Second Purchase

We attempted to determine why the respondents considered it necessary to purchase a second home computer. The main motivations seemed to be the technical potential of the machine: for 40% of them, it was a question of getting a machine with a greater operating capacity, and for 18% it was a question of a greater choice of software. Moreover, the possibility of doing their office work at home was mentioned by 16% of the respondents. This seems to support the idea that the purchase of the second microcomputer was planned--at least in terms of the main respondent--essentially within the point of view of professional use.

3.4.5. Planned Use at the Time of Purchase

Both in 1983 and in 1985, we asked the respondents to indicate what use they planned to make of their microcomputer at the time of purchase. In this section, we will compare the results obtained in 1983 and 1985.

In 1983, learning to program was the main planned use at the time of purchase for 37% of the respondents in the "second microcomputer" group. Next were mentioned job/word processing (23%), and programming (7%). In 1983, the responses of the two

other groups were similar to those of the "second personal computer" group.

In 1985, we find that there has been a clear evolution in the uses planned by those who have bought a second microcomputer. Thus, 32% of the respondents in this group planned to use the machine for their job/word processing, only 14% in order to learn programming, and 13% for writing programs (Figure 10).

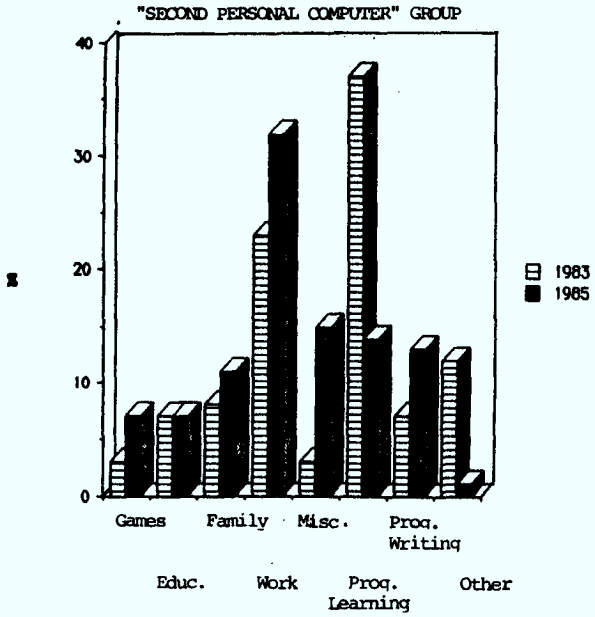
These changes can be explained by the fact that after having bought the first computer, the respondents were able to familiarize themselves with its possible uses, and when they came to buy a second machine, they had more precise ideas regarding planned use. It is important to point out that, in both 1983 and 1985, very few respondents in all groups mentioned playing games as the main planned use (1983: 7% in the "discontinued use" and "continued use" groups, and 3% of the "second personal computer" group; 1985: 7% of the "second microcomputer" group). However, since we know that in total, 83% of the respondents purchased a joystick (a peripheral that is essentially provided for games), we can assume that the buyers greatly underestimated how much their microcomputer would be used for these purposes.

3.4.6 Changes in the Utilization Patterns of the First Microcomputer Bought

Does the arrival of a second microcomputer change the way the first one is used? In the first place, we should note that 23% of the

Figure 10

PLANNED USES OF THE FIRST vs THE SECOND MICROCOMPUTER -



respondents no longer have their first microcomputer, and that 41% say that the fact of having a new machine did not affect the use of the first one in any way. When changes are reported, they consist either of a decrease in the amount of time the first one is used by the principal respondent (16%), or the first model is now used for games or mainly by the children (16%). To conclude this section, we will attempt to obtain a clearer definition of the factors that have influenced the respondent- buyer's choice of a particular model.

3.4.7 Choice of Model

3.4.7.1 Sources of Information for the Choice of Model

We asked the respondents to identify the sources of information that most influenced their choice of a new computer (a maximum of three choices was possible).

Three sources seemed to have played a primary role in the choice of machine purchased: influence of a personal friend (64% of the respondents), reading an article in a magazine (60%), consulting a catalogue in a store (43%), or visiting a store (26%). On the contrary, advertisements seem to have played a lesser role: 7% of the respondents mentioned advertisements in a paper, 4% TV advertising, and only 3% magazine advertising.

Comparisons with the information obtained during the purchase of their first machine were very revealing in terms of changes in their approach. In fact, in 1983, 70% of the same respondents mentioned a visit to a store as the principal source of

information; 22%, consultation of a catalogue; while only 27% of them mentioned the advice of a friend. The effects of advertising also seemed to be much more prevalent in 1983: 16% mentioned newspaper advertising, 11% magazine advertising, and 7% television commercials (see Appendix, Table VI).

In sum, most of the respondents chose their second model on the basis of the advice of a friend or through a personal initiative of their own (consulting catalogues, etc.). This confirms the greater personal attention that they seem to have paid to choosing a second microcomputer, in comparison with the rather impulsive decision that they made in 1983.

The majority of the respondents (58%) say that they tested or a least had a demonstration of their new microcomputer before buying it, while 23% say that they had never had this opportunity. In 1983, the responses were a little different: 45% of the same respondents said that they had at least one demonstration, and 33% said they had not. We would like to emphasize that, at that time, there were no significant differences between the responses of this group and those of the two other groups ("discontinued use" and "continued use").

3.4.7.2 Factors Influencing the Choice of Model

Among the factors affecting the choice of model, the respondents mainly mention cost (23% of total responses), and the variety of available software (21%) as being the most decisive

factors. However, it is important to point out that a relatively high proportion of the respondents also mention the reputation of the manufacturer (14%), compatibility with systems owned by friends or colleagues (13%), the possibility of enlarging the system (12%), and ease of programming (12%). Thus, the quality/price ratio, which in this case means a ratio of investment and operating potential, seems to have been of primary importance to the respondents at the time of the second purchase. Moreover, the attention paid to the reputation of the manufacturer can easily be explained by the instability of the microcomputer market (it is important to remember that this is one of the main demotivating factors emphasized by respondents in the "discontinued use" group).

3.5 Data Specific to Users Who Still Use Their Microcomputers

In the second section of this chapter we will describe the kind of domestic uses made of the personal computer, as well as the impacts associated with it, for respondents in the "continued use" and "second personal computer" groups. The data will be analysed on the basis of a comparison between the behaviors of these two groups, and as a function of the evolution of these relationships during the course of the last two years. More specifically, we will study data concerning (1) the buyer-respondent, (2) other members of the respondent's family, (3) the collective use of the computer, and (4) the interpersonal network of the buyer-respondent.

Before carrying out this analysis, we will describe in detail the computer equipment that respondents in the "continued use" and "second personal computer" groups have available at home. We will compare the behavior of the three groups in 1983, in order to determine whether this could be used as a predictor of a "continued" interest in the personal computer.

3.5.1 . Microcomputer Utilization:

3.5.1.1 Computer Equipment in the Home

We should recall that, generally, respondents in the "second personal computer" group have bought a second machine with a greater capacity than their first. In any case, the three groups in the sample already seemed to have differentiated significantly during the first phase of the study (Caron et al., 1985b), in terms of the type of microcomputer purchased. In fact, it was mainly the "discontinued use" group that seems to be different from the rest of the sample. In 1983, 67% of the "continued use" group, and 55% of the "second personal computer" group had bought either a TRS 80 or a Commodore 64, in contrast to only 34% of the "discontinued use" group. At that time, these two models were classified among the relatively better quality products available in the Quebec microcomputer market.

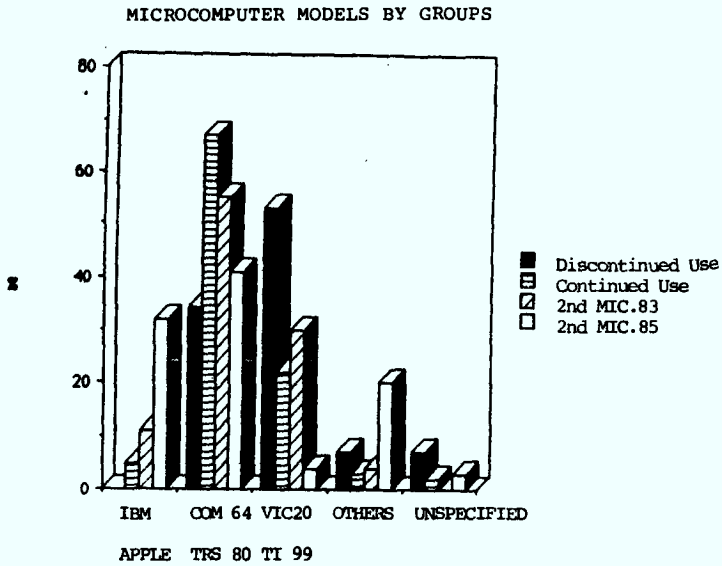
On the other hand, most (53%) of the households in the "discontinued use" group, purchased at TI-99 or a VIC 20, that is, two models that are technically very limited. This was the case for 30%

in the "second personal computer" group and only 22% in the "continued use" group (Figure 11).

This discussion would not be complete without an overview of the types of peripherals bought by the respondents for their microcomputers between 1983 and 1985.

In this respect, we found interesting differences between the respondents in the "continued use" and "second personal computer" groups. In both of these groups, most of the respondents mention having bought routine equipment (necessary for the operation of the machine): monitor (69%), cassettes (61%), disks (60%), and game peripherals, even though this factor was less pronounced for the "second personal computer" group (74% bought a joystick in comparison to 85% of the respondents in the "continued use" group). However, the situation is very different when we consider other types of peripherals, for example those that allow a more elaborate use of the machine. The respondents in the "second personal computer" group are systematically more likely to have purchased this type of equipment, for example a printer (81% vs 44% of the respondents in the "continued use" group), a modem (23% vs 9%), or additional memory (41% vs 16%). An analysis of the peripherals confirms the same trend in the case of respondents in the "second personal computer" group, who are more oriented towards a more professional use for their computer. This can be confirmed by a comparative analysis of the types of actual uses (see Appendix, Table VII).

Figure 11


MICROCOMPUTER MODELS BY GROUPS
80
60
40
20
0
%
Discontinued Use
Continued Use
2nd MIC.83
2nd MIC.85
IBM
APPLE
COM 64
TRS 80
VIC20
TI 99
OTHERS
UNSPECIFIED

3.5.I.2 Time Allotted to the Use of the Microcomputer by the Main Respondent

Before discussing the data relative to this question, it would be appropriate to introduce certain precisions of a methodological order. When the data for Phase I were collected (Caron et al; 1985a), the respondent had to describe his weekly activities in each of the following categories:

- Games,
- Educational activities for children,
- Educational activities for adults,
- Family management (budget, agenda, etc.),
- Job,
- Word processing,
- Other.

At the time, we believed that computer programming would be included under the category entitled "educational activities for adults". However, this does not seem to have been the case for certain respondents, who preferred to include this activity (programming and learning to program) in the category entitled "Other". This could be verified by the fact that these respondents explicitly specified this in their responses.

In order to solve this problem, we added the choice "programming " in the questionnaire used for Phase 2 (1985) of this

study. With this change, we obtained more precision in the process of Phase 2 data encoding, but then found it more difficult to compare these data with those collected during Phase I of the study. The solution here was to regroup the "educational activities for adults" and "other" categories used in Phase I, and the "educational activities for adults", "other", and "programming" categories used in Phase 2 under a single category entitled "learning about the technology". This regrouping necessarily involves a certain loss of precision in the interpretation of the results, but we believe it is the only realistic way to treat 1983 and 1985 data in order to render them comparable. We would also like to emphasize that the "programming" category was not already homogeneous, because the interview data (Chapter 4) revealed that the respondents had given various interpretations to this term, such as program writing, language learning, copying programs, etc. Thus, the loss of precision due to the regrouping is not as large as we may have initially believed.

Total Utilization Time by the Principal Respondent

We found that in 1983 there were already significant differences ($p < .05$) between the three groups in terms of the average time spent per week using their computer(s). At that time, on the average, respondents in the "discontinued use", "continued use", and "second personal computer" groups said that they used their computers 4.8 hours, 6.5 hours, and 10.3 hours per week, respectively. Thus, generally, those who subsequently stopped using

their microcomputers were already using them less than the other adopters.

In 1985, respondents in the "continued use" group used their computers an average of 5.9 hr/wk, and those in the "second personal computer" group an average of 12.2 hr/wk. Thus, respondents in the "continued use" group seem to spend about as much time using their microcomputers as they did two years ago. On the other hand, the "second personal computer" group reported a marked increase (1.9 hr/wk) (Figure 12).

Time Distribution in According to Type of Use

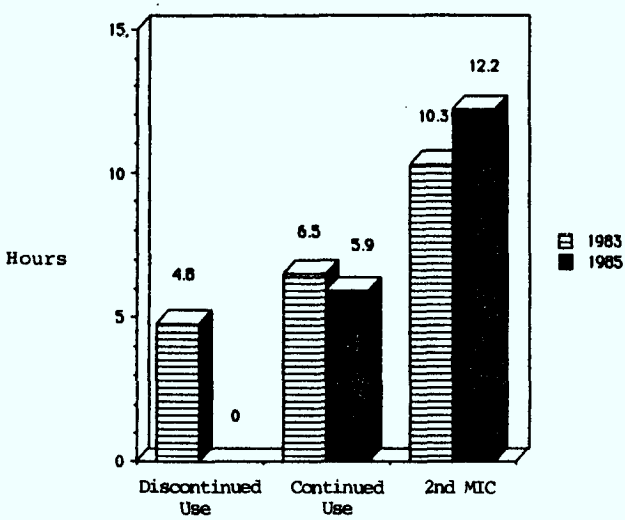
The use averages make it possible to estimate the amount of time spent using the microcomputer. However, the amount of time allocated for each activity as a proportion of total use, provides a better index of the amount of time spent for each type of use. Thus, this makes it possible to obtain a better understanding of the time spent by the buyer using the home computer.

Regardless of the group, in 1983, learning the technology accounted for about half of the total utilization time (48%, 48%, and 50%). Respondents in the "discontinued use" group also spent a significant part of their time playing games (34%); while this was 27% for the "continued use" group, and 18% for the "second personal computer" group.

On the other hand, the "discontinued use" group made relatively little use of their computers for job purposes (6%); while this

Figure 12

UTILIZATION TIME BY GROUPS



represented 14% of the utilization time for the "continued use" group, and 20% for the "second personal computer" group.

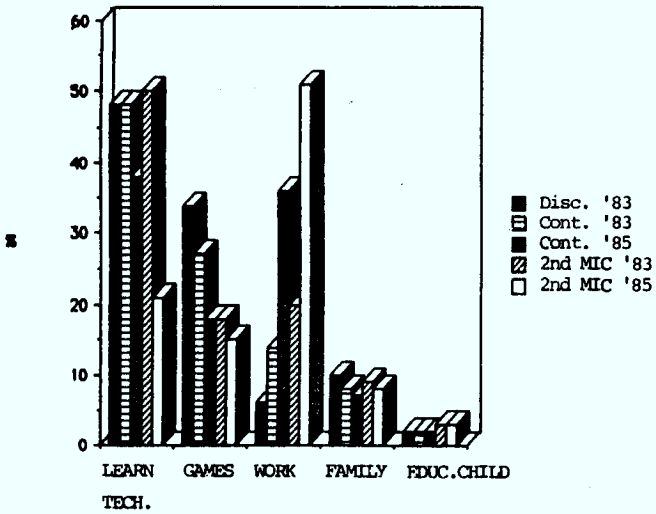
In other words, respondents in the "discontinued use" group generally made little use of their microcomputer in comparison with other groups, and when they did use it, it was mainly to play games. We may assume that once the "novelty effect" had passed, electronic games lost their attractiveness for this group, and the computer itself ceased to be a focus of interest.

At this point, we can ask how the microcomputer is being used by respondents who are still using their machines in 1985. In this respect, our first concern was to verify whether there had been a change in the type of use, and, if so, in what sense. In this respect, we can effectively say that there was a change, for the two groups of respondents we are discussing.

An analysis of the data collected in 1985 is very instructive. If we keep the proportions in mind, we find the same trends in the two groups ("continued use" and "second personal computer" use) in terms of the distribution of activities as a function of total utilization time. **First, we find a significant drop in the time spent learning the technology (in the "continued use" group this dropped from 48% to 38%, and in the "second personal computer" group from 50% to 21%), which is not truly surprising; however, there is also a decrease in the time spent playing electronic games (18% and 15%) (Figure 13).**

Figure 13

TYPE OF USE ACCORDING TO GROUP



On the other hand, utilization for professional purposes seems now to occupy a much more central place, especially for the "second personal computer" group (utilization increased from 14% to 36% for the "continued use" group, and from 20% to 51% for the "second personal computer" group). We would like to point out that, in both 1983 and 1985, the place of family use and educational activities for children is a very small one in relation to time spent on other uses (see Appendix, Table VIII).

Nevertheless, as we saw in the first chapter of this report, we could not reduce the analysis of the adoption dynamics of the home microcomputer to the single dimension of its utilization. This is why we attempted to obtain more information regarding the attitudes expressed by the principal respondents about their microcomputers. These results are discussed in the following pages.

Satisfaction and Dissatisfaction Expressed by The Principal Respondent

We asked the respondents to tell us about their level of satisfaction with their microcomputers. To this end, each respondent was asked to indicate the response on a scale from 1 (not satisfied) to 7 (completely satisfied).

In this respect, we find a significant difference ($p < .01$) between the level of satisfaction expressed by respondents who are still using their first microcomputer ("continued use" group), and that expressed by respondents who have bought a second computer

("second personal computer" group). Thus, 85% of the respondents in the "second personal computer" group are "on the whole" or "completely" satisfied with their microcomputers, while only 55% of the respondents in the "continued use" group express the same degree of satisfaction.

An analysis of the nature itself of the satisfaction/dissatisfaction responses can clarify what these differences in opinion mean. In order to do this, we asked the respondents what were the main satisfaction or dissatisfaction aspects, as a function of their personal experience with home microcomputing.

In the first place, we found that respondents in the "continued use" group are more likely to perceive no advantage (12% vs 6%); while 31% of the respondents in the two groups do not perceive any disadvantage.

For 29% of the respondents, the technical advantages seem to be the most satisfying dimension. Other advantages that are most often mentioned are the pleasure derived from playing games (15%), the variety of possible applications (12%), and programming (11%). On the other hand, the respondents seem to be particularly sensitive to three types of disadvantage: the technical limitations of the machine (20% of the respondents), the complexity of learning (12% of the respondents), and the time required for this learning (10% of the respondents).

In 1983, a comparison between the two groups did not generally reveal any major variations. The only difference was that respondents in the "second personal computer" group were more likely to have perceived no disadvantage(46% vs 36% for the "continued use" group). For the rest, the opinions expressed by the two groups were in the same proportions: relative dissatisfaction with the high cost of the equipment and programs (16% of the respondents), and the complexity of learning (14%). As far as the advantages perceived at that time, they essentially concerned programming (15%), learning new skills (14%), ease of utilization (13%), and technical advantages (12%).

In other words, a comparison of 1983 and 1985 data suggests that, over time, expressed dissatisfaction in respect of costs tends to decrease. Nevertheless, respondents still face difficulties with learning computer technology. Moreover, it seems that, after two years of personal experience with micro computing, the respondents are more sensitive to the technical advantages associated with this technology.

3.5.1.3 Utilization Time-Budget for the Spouse

Total Utilization Time for the Spouse

In 1983, the buyer-respondent's spouse spent less time using the microcomputer than the respondent: for both the "continued use" and "second personal computer" groups, total utilization time for the spouse was less than 4 hr/wk (3.2 hr/wk and 3.5 hr/wk, on the

Figure 14

Type of use by the Spouse

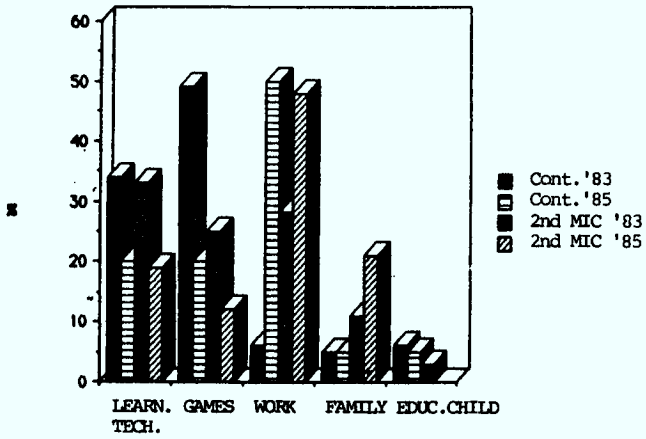
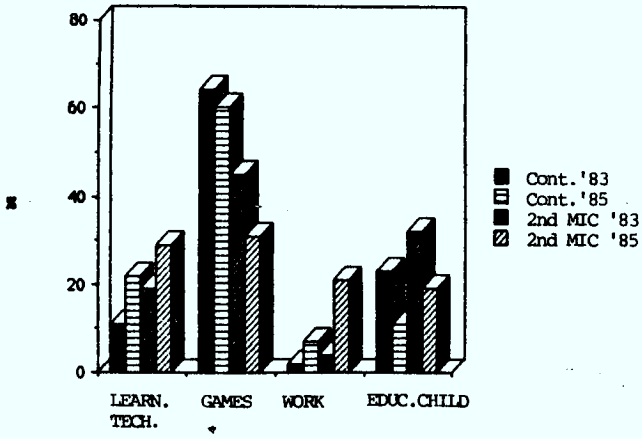


Figure 15

Type of use by the children



average). In 1985, a comparison of total utilization times reveals very different trends between respondents in the two groups: while, on the average, this was 3.9 hr/wk for the "second personal computer" group, it was only 1.7 hr/wk for the "continued use" group. An analysis of the distribution of the time-budget as a function of various activities can be used to explain these behavior differences.

Time-Budget by Type of Activity

As has already been shown in the case of the buyer-respondent, the difference between the two groups can be verified as a function of the time that each of them spends on various activities. In 1983, spouses in the "second personal computer" and "continued use" groups spent approximately the same proportion of their computer utilization time-budget learning the technology (34% and 33%). However, there were differences between spouses at other levels: those in the "continued use" group spent much more time playing electronic games (49% vs 25% for the "second personal computer" group); while in 1983, spouses in the "second personal computer" group spent much more time in job-related activities (28% vs 6% for the "continued use" group).

A comparison of these with 1985 data shows a definite change in the distribution of the time allocated for various computer uses: learning the technology and electronic games occupy less time, and job-related activities have taken over for the two groups of respondents (48% and 50% of total utilization time) (Figure 14).

3.5.1.4 Utilization by First Child

We have also examined the use of the microcomputer by the respondents' children. For technical reasons, we selected only one child per household (the first child listed by each respondent).

In 1983, total computer utilization time for children was higher for those in the "continued use" group (4.4 hr/wk) than for those in the "second personal computer" group (3.1 hr/wk). The way the utilization time was broken down by activity also revealed that the types of use were different: children in the "continued use" group spent 64% of their time-budget playing electronic games (45% of the "second personal computer" group), and 34% of their time learning the technology or in educational activities (51% in the "second personal computer" group).

Thus, in 1985, the children in the "second personal computer" group used the microcomputer more (4.8 hr/wk vs 3.7 hr/wk for those in the "continued use" group). Moreover, an analysis of the way time was broken down by type of use shows that, with the exception of learning the technology, which increased from 11% to 22%, there are hardly any changes for the children in the "continued use" group. On the other hand, in 1985, those in the "second personal computer" group spend less time playing games (31% of total time) and more time learning the technology (29%) and in work-related activities (21%) (Figure 15 and see Appendix, Table X).

3.5.1.5 Family Use of the Microcomputer

Does the family make use of the personal computer together? And if so, by whom, and for what type of activity? In 1983, 47% of the respondents in the "discontinued use" group reported that they had never used their microcomputers collectively, in comparison to only 28% in the case of the "continued use" group, and 27% in the case of the "second personal computer" group. When the microcomputer was used for family activities (either regularly or from time to time), it was mainly for playing games or programming, and this was true for the three groups of respondents.

In 1985, the "continued use" and "second personal computer" groups still use their microcomputer together on certain occasions. However, the proportions seem to be slightly changed in the case of the "continued use" group (38% of these respondents no longer use their computer for family activities), in comparison with respondents in the "second personal computer" group, for whom the figure remains quite stable. Games and programming are still the most popular family activities (Figure 15 and see Appendix, Table XI).

Thus, it seems that the collective use of the machine is organized essentially around the same specific uses (games and programming), even though this tends to decrease over time. In the qualitative section of the analysis, we will deal with the particular socialization dynamics of electronic games, as well as with the supporting or mutual help relationships that may develop around activities involved in learning computer technology.

3.5.1.6 Interpersonal Network

One of the recurrent themes in the literature dealing with the adoption of innovations is the effect of the social environment on the behavior of potential adopters. This is why we attempted to determine precisely what this environment was for the respondents in the two groups under consideration. In the two questionnaires, we asked the respondents to indicate the number of people in their circle (friends, co-workers, neighbors, etc.) who owned a personal computer.

A comparison between the two groups ("continued use" and "second personal computer" groups) within a time perspective provided certain interesting clarifications of this subject. In the first place, the awareness of people in their circle of home microcomputers was extremely similar in 1983. At this time, respondents in the two groups knew, on the average, about three other computer owners among their co-workers (2.6 and 2.5 respectively), and two owners among their personal friends (1.6 and 2.0), but less than one among their family or neighbors. Moreover, the respondents said that, on the average, they had established one new relationship on the basis of their interest in microcomputing.

In 1985, respondents in the two groups under consideration show a similar trend towards having a higher number of computer owners among their acquaintance. However, this is more marked for respondents in the "second personal computer" group. These latter respondents know on the average more than three co-workers who own a personal computer (3.4 vs 2.4 for the "continued use" group),

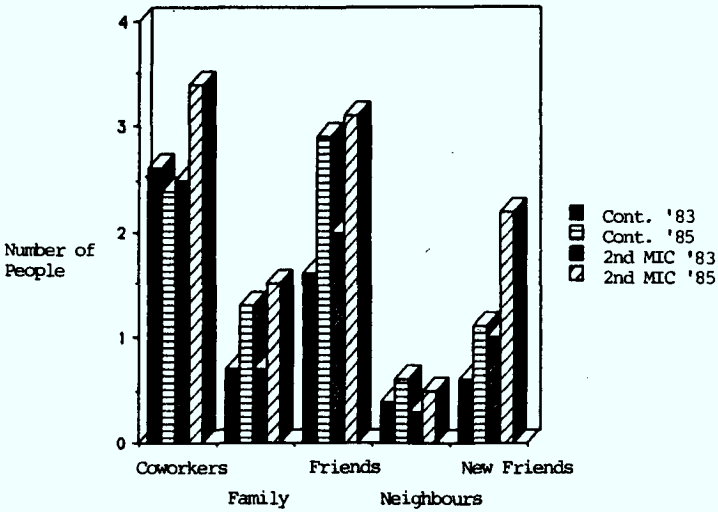
and say that they have established new acquaintances (2.2 vs 1.1) (Figure 16).

We could also ask whether the respondents have sought out external assistance for home computing. Membership in a microcomputing club is a good index of this dimension. In this respect, in 1983, there were no significant differences between respondents in the two groups under consideration: for both groups, membership in a users' club was the behavior of a minority (14%). On the other hand, there seems to have been a change in 1985 for respondents in the "second personal computer" group, since more than one third of them (34%) now belong to a club. In this way, they are significantly ($p<.01$) different from respondents in the "continued use" group (17% members) (see Appendix, Table XII).

Finally, we found that respondents who have bought a microcomputer often seem to play a diffusion role within their own interpersonal network of acquaintances: 86% of the respondents in the "second personal computer" group report that they are either regularly or occasionally asked for advice on microcomputing, in comparison with 62% in the "continued use" group. A similar significant difference was observed in 1983, even though the percentages were not as high; 71% of the respondents in the "second personal computer" group and 50% of the "continued use" group said that they were asked for advice.

Figure 16

NETWORK (FRIENDS, COLLEAGUES, ETC.)



3.5.2 Impact of the Introduction of the Microcomputer into the Home

3.5.2.1 Changes in the Distribution of Time Allotted to Media Activity

It is important to remember that **in 1983, the most noticeable change in the time-budget of the respondents was a drop in the time spent watching television**; this was mentioned by 71% of respondents in the "second personal computer" group, by 60% of those in the "continued use" group, and by only 40% of those in the "discontinued use" group. Thus, there were significant differences between the three profiles of individuals ($p < .05$). In 1983, most of the respondents (over 50%) reported no significant change in relation to other media activities (radio, newspapers, etc.). When changes were mentioned, they essentially consisted of a decrease and here "discontinued use" group differed from the two others: 30% of the "continued use" and "second personal computer" groups spent less time listening to the radio (in comparison with 16% in the "discontinued use" group), and 23% spent less time reading books (in comparison with 15% in the "discontinued use" group). Reading magazines seemed to represent the exception, since 29% of the respondents in the "second personal computer" group, and 14% of those in the "continued use" group ($p < .05$) said that they now spent more time reading magazines.

Thus, we could ask what has happened in terms of these initial indices two years after the microcomputer was bought: have these

changes persisted? Have the respondents become aware of new modifications in their time-budgets?

First, we find that, **in 1985, television-watching is still the activity most affected by the presence of the microcomputer in the home, particularly in the case of respondents in the "second personal computer" group** ($p < .01$): 71% of them mention that they spend less time watching television in comparison to 48% of the respondents in the "continued use" group. Also, respondents in these two groups spend an average of 12 hours watching television per week (which is no different from what we found in 1983, after the microcomputer was brought into the home).

There is also a significant difference ($p < .01$) between the two groups in terms of the time spent reading magazines. Thus, 14% of the respondents in the "continued use" group spend more time reading magazines, while in the "second personal computer" group, the number of respondents who spend more time doing this is 29%. This difference can be explained when we consider that 92% of the respondents in the "second personal computer" group say that they read computer magazines, and that 45% of them are subscribers. For purposes of comparison, these figures represent only 62% and 31% of the respondents in the "continued use" group respectively ($p < .05$). The same differences already existed in 1983, but were not significant in terms of subscriptions.

Also, the time allotted to other media activities does not seem to vary significantly between the two groups after the arrival of the microcomputer in the home: generally, 87% of all respondents spend as much time reading newspapers. On the other hand, 25% say they spend less time reading books, and 30% less time listening to the radio. **In sum, we find that the trends already in 1983 with respect to the distribution of time allocated to various media activities have persisted.**

To conclude this section, we would like to point out that respondents in the "discontinued use" group were those who, in 1983, reported the least changes in the time spent watching television (39% of the respondents in this group, in comparison to 60% and 71% for those in the "continued use" and "second personal microcomputer" groups respectively) (**Figures 17 and 18**).

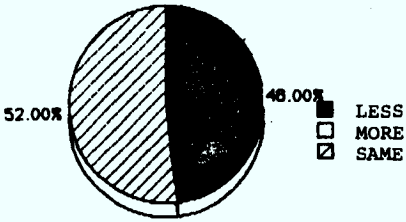
3.5.2.2 Changes in the Distribution of Time Allotted to Non-Mass Media Activities

As we saw in 1983, the time spent on a hobby remains that which is the most affected by the presence of a microcomputer in the home: 37% of respondents in the "continued use" group and 49% of those in the "second personal computer" group spend less time on their hobbies. It is important to point out that two years ago, respondents in the two groups were nevertheless more likely to mention a decrease in this type of activity (52% in the "continued use" group and 59% in the "second personal computer" group). The fact that time spent on a hobby is the most affected, and that this persists over time, is not surprising

Figure 17

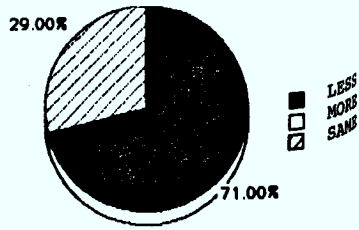
TIME SPENT IN MASS MEDIA
ACTIVITIES BY GROUPS

CONT. USE GROUP

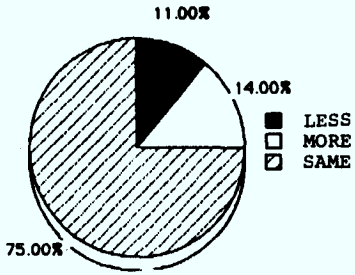


TELEVISION

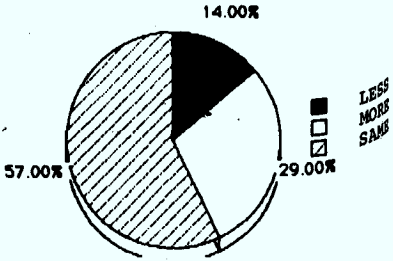
2ND PERSONAL COMPUTER GROUP



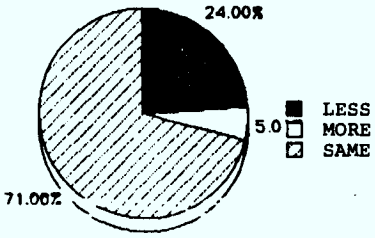
TELEVISION



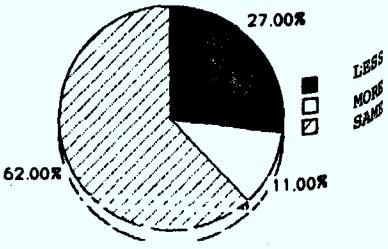
MAGAZINES



MAGAZINES



BOOKS



BOOKS

at all: the term is one that covers a wide range of activities that differ enormously depending upon the individual involved.

With the exception of this activity, both in 1985 and in 1983, most respondents (over 50%) do not perceive any significant changes in the organization of their time-budget.

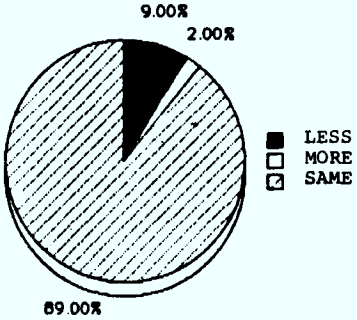
When a change is reported, we find the same trends in the two groups, but in significantly different proportions. Thus, a larger number of respondents in the "second personal computer" group mention that they spend less time ($p < .05$) sleeping, and doing sports than those in the "continued use group". On the other hand, the reverse is true with regard to the time spent studying or working ($p < .01$), since a larger number of respondents who belong to the "second personal computer" group spend more time on these types of activities. It is important to remember that similar differences were obtained in 1983, but that they were not significant.

To a lesser extent, time spent alone, or in the company of other members of the family, also seems to have been affected by the introduction of the microcomputer into the home, but not in the same fashion for all respondents. Thus, 27% of the respondents say that they spend more time alone, while 16% say that they spend less. Moreover, in 1985, 16% of the respondents say that they spend less time with their families, while only 6% say they spend more. Similar results are obtained in terms of time spent in the company of friends, except that in this case the difference between the

Figure 18

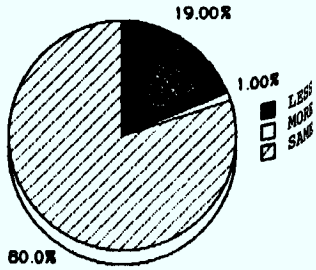
TIME SPENT IN MASS MEDIA
ACTIVITIES BY GROUPS

CONT. USE GROUP

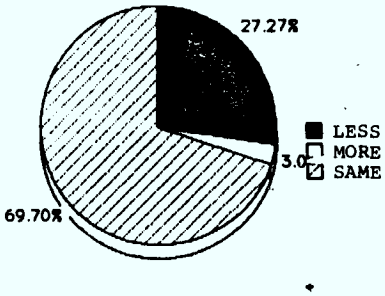


NEWSPAPERS

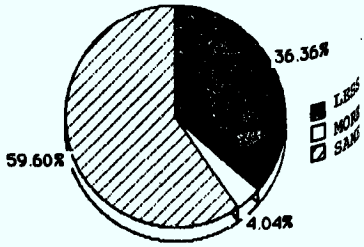
2ND PERSONAL COMPUTER GROUP



NEWSPAPERS



RADIO



RADIO

"continued use" and the "second personal computer" groups was significant ($p < .05$): only 4% of respondents in the "continued use" group say they spend more time with their friends, while this percentage is 11% in the case of respondents in the "second personal computer" group (Figures 19 and 20).

3.5.2.3 Perceived Lifestyle Changes

We used an open question to ask the respondents about the nature of any minor or major changes that they would attribute to the presence of the microcomputer in their homes.

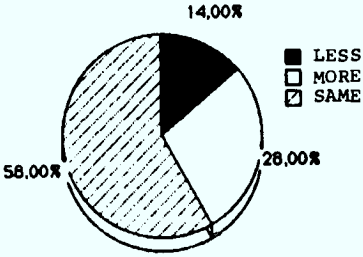
First, we find that respondents in each of the two groups ("continued use" and "second personal computer" groups) are more likely to perceive changes now than they were two years ago, and this is particularly striking in the case of members of the "second personal computer" group: 38% of the respondents in the "continued use" group, but only 17% of those in the " second personal computer" group, report no changes. In 1983, respondents who perceived no changes were much more numerous (68% of respondents in the "discontinued use" group, 52% of those in the "continued use" group, and 34% of those in the "second personal computer" group). This can be explained by the fact that in 1983, the presence of the microcomputer in the home was relatively new, and it was thus more difficult to perceive changes that often take place over time.

Even though most of the changes observed in 1985 are minor (mentioned by 49% of all respondents), nevertheless, we should point

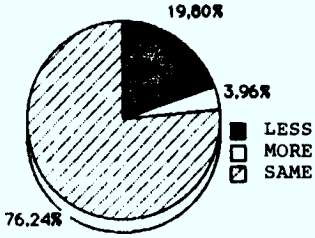
Figure 19

TIME SPENT IN NON-MASS MEDIA
ACTIVITIES BY GROUPS

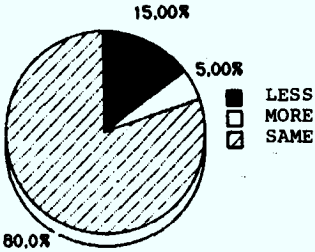
CONT. USE GROUP



ALONE

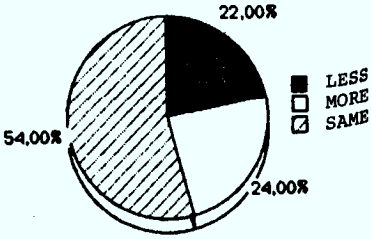


FRIENDS

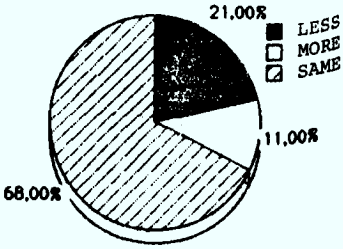


FAMILY

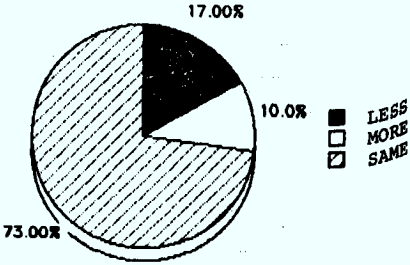
2ND PERSONAL COMPUTER GROUP



ALONE



FRIENDS



FAMILY

out that **respondents are more likely to perceive major changes than in 1983** (particularly those in the "second personal computer" group). Thus, regardless of whether the changes are perceived as minor or major, 12% of the respondents mention the emergence of an interest in computing, 12% mention a new way of structuring their thinking, and 10% the emergence of a new family hobby. It is important to point out that these were already the most commonly mentioned changes in 1983. Thus, it seems that **these modifications persist over time but do not seem to become generalized.**

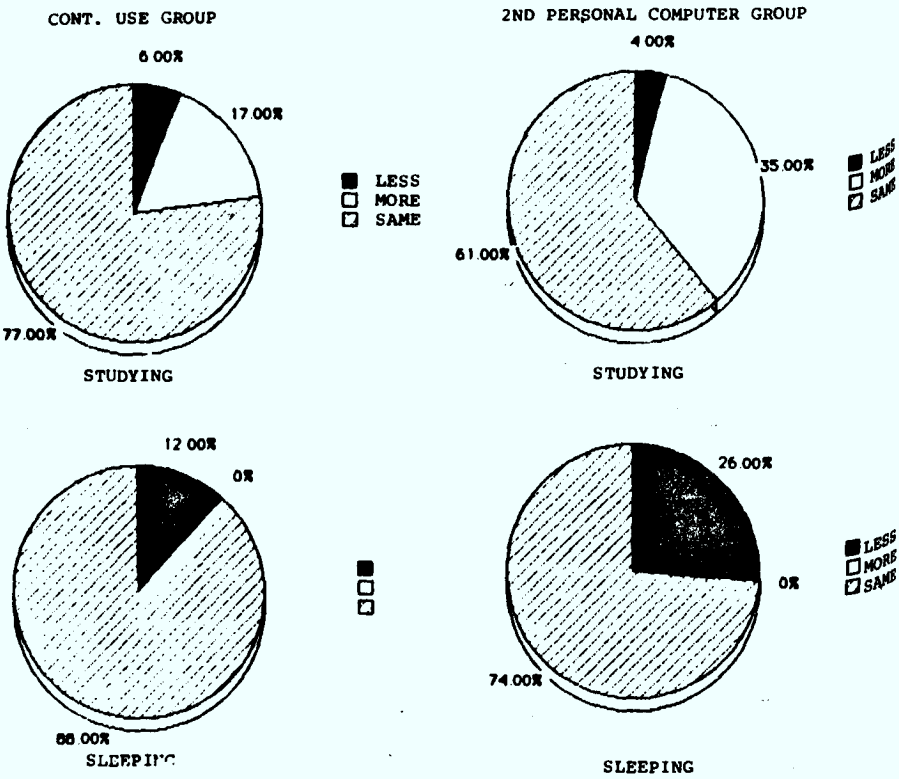
3.5.2.4 Perceived Impact on the Children

Of the respondents who have children, 43% say that at least one of them had already been exposed to computers at school. However, in 1983, only 23% of the respondents mentioned this.

We asked the parents whether they had found certain changes in the behavior of their child (children) since the arrival of the microcomputer in the home. No difference was found between the respondents in the "continued use" and "second personal computer" groups who had children. A certain number of respondents (43%) did not perceive any changes in the behavior of their child (children), while 52% noticed minor changes, and 13% major changes (the total is more than 100% because it was permitted to list minor and major changes at the same time). Regardless of whether they are perceived as minor or major, the changes most frequently mentioned by the parents are for the most part positive and not really different from those reported in 1983. Thus, we also asked

Figure 20

TIME SPENT IN NON-MASS MEDIA
ACTIVITIES BY GROUPS



whether particular rules had been established "in terms of the use of the microcomputer(s) by their child (children)".

Once again, we find no significant difference between the two groups; 64% of the respondents said that they had no rules for this. It is important to note that in 1983, there were fewer parents who had not imposed any rules (55% had no rules). As far as those who have established rules are concerned, the most commonly mentioned rules (both in 1983 and 1985) are: time limit on use, limited consecutive use, mentioned by 13% of the respondents; forbidden to touch the installations (cables, etc.), careful handling (6%), use only in the presence of an adult (5%), and use only once school homework had been completed (5%) (see Appendix, Table XIII).

In the next section, the qualitative analysis will provide an explanation of the fact that fewer rules are imposes two years after purchase. In fact, the novelty of the introduction of the machine often translated into its overuse by children, to which parents reacted by imposing certain rules. Subsequently, the use of the computer by children tends to stabilize, and rules become somewhat unnecessary. Also, we would like to point out that these rules are mainly concerned with restricting the time that the children are allowed to use the computer.

3.5.2.5 General Attitudes Towards Computing (Comparison with Reference to the Three Respondent group Profiles)

As had been the case in our initial data collection, the second questionnaire ended with a series of attitude questions. Of these eleven (II) questions, seven (7) referred exclusively to the personal experience of the respondent with domestic use of the personal computer; while four (4) dealt in more general terms with the impact of computers on contemporary society. Moreover, certain of these questions repeated those already used in 1983. When this was the case, we compared the results in order to determine whether there were certain changes in the attitudes of the respondents. First, it is important to remember that the respondents had to express their agreement or disagreement on the basis of a five-point scale. In the following results, we have grouped on one hand the "very positive" and "positive" attitudes, and on the other, the "very negative" and "negative" attitudes. We have excluded the central point on this scale representing respondents who had "no opinion".

Comparison of Statements Referring Specifically to Microcomputers by Respondent Group

It is interesting to note that, regardless of their profile and in spite of everything, the respondents seem to have a generally positive attitude towards home computing. Their enthusiasm seems greater when respondents have integrated their computer into their own activities in a significant way. In fact, positive statements systematically reveal significant variations ($p < .05$) between the

three groups. Thus, respondents in the "second personal computer" group are unanimous in expressing the personal satisfaction that they get from using their microcomputers (98% in comparison to 86% in the "continued use" group). The great majority of respondents in the "second personal computer" group also say that they are at ease with microcomputers (94% vs 73% for the "continued use" group, and 48% for the "discontinued use" group), think that the computer allows them to increase their skills (94% vs 83% and 62% respectively), that it provides amusement (92% vs 81% and 63% respectively), and that it complements their work (84% vs 73% and 57% respectively).

Moreover, 46% of the respondents in the "second personal computer" group think that their microcomputing skills helps them to a better understanding of the world around them, while this was the case only for 22% of respondents in the "discontinued use" group ($p < .05$).

In this respect, we would like to emphasize that in 1983, respondents in the "second personal computer" and "continued use" groups were already significantly more likely ($p < .05$) to feel at ease with microcomputers and derive personal satisfaction from this activity ($p < .05$). In both cases, a comparison of the sample distribution seems to show that respondents in the "discontinued use" group are less positive, while those in the "continued use" group, and especially those in the "second personal computer" group, tend to be more positive

Attitudes about Computers in Society in General

It is important to point out that a comparison by response distribution for the three groups was not significant for 1985. Nevertheless, there is agreement among those individuals that computers will improve their standard of living (66%), and that they will have an impact on their personal lives in the future (56%).

METHODOLOGICAL NOTE

(ACQUISITION OF PERIPHERALS)

In the previous chapter, we compared the "continued use" and "second personal computer" groups while assuming that adopters in the latter group had made a significant move in buying a second machine. Nevertheless, it is important to question the homogeneity of the "continued use" group. In fact, the purchase of a second machine is not the only way to make further investments in home computing; it is also possible to increase the capacity of the original device. In order to ensure the adequacy of our grouping, we decided to study the responses of the "continued use" group in more detail. Thus, we examined the purchase of additional equipment by members of this group.

We divided the group into two subgroups which we called "continued use -" and "continued use +", adopting the following criterion: respondents who had not bought any additional memory, modems, or printers between 1983 and 1985 were classified into the "continued use - " subgroup; while those who had bought one or another of these devices were considered to have made significant further investments into their computers ("continued use +" subgroup). We then statistically compared the microcomputer use by the "continued use + " and "continued use - " subgroups and

the "second personal computer" group, in order to determine whether the purchase of additional equipment had as great an effect as the purchase of a second machine. Of the original "continued use" group, 67% (n = 146) were classified as "continued use - " , and 37% (n=87) as "continued use +" .

In terms of total microcomputer activities, it seems that the purchase of additional equipment has a significant effect: in fact, members of this sub- group fall almost midway between the "continued use -" and the "second personal computer" groups. However, when we examine each of the activities, it seems that the trend is only clear for word processing, where the "continued use +" subgroup nearly attains the level of the "second personal computer" group. For all other activities, we observe a slight increase in the "continued use +" subgroup, but they do not differ significantly from the "continued use -" group. Moreover, as far as the activities of the other members of the family are concerned, there are no significant differences as a function of the purchase of additional equipment.

Thus, we recognize that the purchase of a modem or printer may have an effect on the use made of the microcomputer, but that the effect seems to be limited uniquely to the buyer. This means that we cannot consider this group to be comparable to the "second personal computer" group in terms of the total family uses of the equipment.

3.6 Microcomputer Use by Occupation, Age, and Family Status of the Owner-respondent

Up to this point, we have limited ourselves to comparing the "discontinued use" , "continued use" , and "second personal computer" groups, and following the changes in the time allotted to using their computers. Nevertheless, there are other variables that may also be linked to the extent the microcomputer is integrated into the daily lives of our respondents. Thus, during the first phase of this study (Caron et al., 1985a), we did not have opportunity to examine certain variables in depth. This is why we carried out three series of additional analyses concerned with occupation, age, and family situation of the respondent. Since the variables to be compared are quite numerous and sometimes complex, in the following pages, we will only discuss those relationships that were found to be statistically significant, as well as cases where the absence of a significant correlation in itself represents a significant phenomenon.

3.6.1 Occupation

Table XIV in the Appendix shows the distribution of respondents as a function of their occupation in 1983. It is important to point out that we distinguished between teachers and other professionals and managers, because the former were represented in large numbers in our sample and may show particular motivations and behaviors regarding their microcomputers. In the

following analyses, we will take into account only the first four groups; that is, teachers, managers and other professionals, white collar workers, and blue collar workers, since the other categories represented only a small percentage of the respondents.

3.6.1.1 The Situation in 1983

First, we should point out that, in our sample, respondents in professional jobs (categories one and two) are generally older than respondents in the white-collar and blue-collar groups. While teachers and other professionals include almost 25% of the respondents between 25 and 35 years old, and 55% of those between 36 and 45 years old, the proportions are practically reversed in the other two groups: 50% of white- and blue-collar workers who own a computer are between 25 and 35 years old, and 30% are between 36 and 45 years old. On the other hand, 46% of the teachers and 30% of the white-collar workers, but only 9% of the managerial and 8% of the blue-collar workers are female. **Even though this distribution partly reflects gender distribution in the general job structure, it seems that there is a certain interaction between the job and gender of the respondent in terms of his/her interest in microcomputers**

If there does not seem to be any relationship between the occupation of the respondent and the date of acquisition of the microcomputer, the **decision** is taken under circumstances that are a little different. For example, the two groups of professionals most often mention reading an article in a magazine as a source of

information before the purchase, whereas blue-collar workers mention most often the influence of a member of the family, and much less often a co-worker. Moreover, teachers are more likely to have had one or more **demonstrations of their machine** before purchase: 82% against 70% in the other job groups. Finally, the **circumstances surrounding the purchase** vary from one group to the other: while 21% of the teachers mention a job-related need (against less than 15% in the other groups), a sale opportunity seems to be a determinant factor in the less educated groups: a sale is mentioned by 27% of the teachers and 30% of the managers , but by 38% of the white-collar workers and 48% of the blue-collar workers.

We also find a relationship between occupation and the principal planned use of the microcomputer: Table XV in the Appendix illustrates this relationship.

In all groups, almost one-third of the respondents mention learning to program as a primary planned use; however, the teachers also frequently mention job-related functions and word processing; while games and programs that would be useful to the family are almost absent. The reverse is true for blue-collar workers, who envisage job-related uses less frequently.

These differences also have an effect on the **type of microcomputer** bought: while among blue-collar workers, 43% of the respondents own one of the two most popular lower-priced machines (TI-99 or VIC 20), this proportion was only 20% in the

case of teachers, 27% for managers and 23% for white-collar workers.

Rather surprisingly, in 1983, we found no significant difference in terms of the use made of the microcomputer by the owner as a function of his occupation, either in quantitative terms (number of hours per week), or in the type of use to which it is put. None of the microcomputer functions is particularly valued by one or the other of the groups, even though the teachers seem to spend a little more time in job-related activities and word processing (2.2 hr/wk vs one hour or less for the other groups). Nevertheless, this difference did not reach the significance threshold ($p > .05$).

However, it seems that in general, professionals are better **equipped**, since we found that a printer is owned by 51% of the teachers and 43% of the managerial workers and other professionals, while only 32% of the white- collar workers and 26% of the blue-collar workers own this type of peripheral. A possible explanation for the lack of a statistical correlation is the wide variance within each of the groups: use goes from zero to more than 20 hr/wk. Thus, it seems that at this time, occupation is not a preponderant factor in how much the microcomputer is used by its owner. We will come back to this question when we deal more specifically with changes in microcomputer utilization with time.

3.6.1.2 The Situation in 1985.

What had happened to the microcomputers bought by the families surveyed in 1983, two years later? Table XVI in the

Appendix shows the distribution of respondents by occupational category into the "discontinued use", "continued use", and "second personal computer" groups.

As we can see, occupation is not related to discontinued use or increased integration of the microcomputer: even though blue-collar workers show a slightly higher proportion of use discontinuity, this relationship is not significant.

As far as the use of the microcomputer is concerned, we found only a slight correlation with occupation. All groups use the microcomputer equally and for similar functions. In 1985, the only noticeable difference was the use of the microcomputer for job-related activities, and word processing: while teachers, managers, and white-collar workers use their microcomputers for these purposes about three hours per week, this type of use accounts for only two hours per week in the case of blue-collar workers. However, this difference is not statistically significant.

Nevertheless, we could ask whether changes took place differently as a function of the respondent's job between 1983 and 1985 (**See Appendix, Table XVIII**). As we have already emphasized, differences between groups were at no point significant ($p > .05$). As far as changes over time are concerned, the groups seem to follow the same trends: a more or less considerable decrease in game activities, and activities related in learning the technology, and a clear increase in job-related activities and word processing. Moreover, the four groups are comparable in terms of

the acquisition of a printer: at present, this peripheral has been bought by 51% of the teachers and 54% of the managerial workers, but also by 55% of the white-collar workers, and 45% of the blue-collar workers.

In fact, rather curiously, it is not at the level of effective utilization, but rather at the level of **motivations** and interpersonal network that occupational groups can be more readily distinguished. For example, of respondents who have bought a second microcomputer, teachers and other professionals generally mention their job as the motivation for the purchase, while in the case of blue-collar workers, the purchase seems to have been impulsive and related to economic imperatives: again, it is a sale opportunity that stimulates the purchase. In the case of professionals, the main planned use for the second microcomputer is related to their jobs; in the case of blue-collar workers, learning to program remains the primary motivation, and this corresponds once again to their respective utilization profiles.

Also, respondents who belong to professional groups can count on a greater amount of support within their interpersonal network. Professionals, particularly teachers, have a significantly higher number of friends and co-workers who own microcomputers than do white- and blue-collar workers. Teachers seem also to be differ from the other groups in terms of their interest in the microcomputer in their homes. They are more likely to observe changes in the behavior of their children, and are especially more inclined to establish rules with respect to the use of their

microcomputers: 51% of the teachers mention that they control microcomputer use, while this proportion barely reaches 35% in the case of the other job categories.

3.6.2. Respondent's Age

Table XVIII in the Appendix shows that the great majority of our respondents were between 25 and 45 years old. For the purposes of this analysis, we will only examine adults between 18 and 55 years old.

3.6.2.1 The situation in 1983

We find very few differences between the various age groups in terms of their experience with computing and sources of information consulted. Nevertheless, older people (36 years and more) mention that they have a considerably wider interpersonal network (more neighbors and co-workers who also own microcomputers) than the other groups.

The planned uses of the microcomputer vary slightly according to age; however, we are not able to determine any clear trends: the younger respondents (18 to 25 years old) mention more often their wish to learn to program than the older group (44% vs 33%); while the latter mention job-related activities a little more frequently (20% vs 13% in the younger group).

At the level of equipment purchases, age seems to play a more important role. In the 18 to 24 year group, 56% of the respondents had one of the two most popular lower-priced machines (TI-99' or

VIC 20), but this proportion drops to 29% in the 25 to 45 years group, and to 14% in the 46 to 55 years group. The same is true for peripherals. Clearly, the quality of the equipment varies directly with the age of the respondent. While younger respondents own mostly cassette drives, the older groups are more likely to have purchased disk drives, which are faster but more costly. The same is true for printers and additional memory, a difference that is even greater when memory is added to an already more sophisticated device. As we will see in the following sections, it is possible that the lower quality of the equipment owned by the younger group has had an impact on the subsequent integration of the microcomputer (See Appendix, Table XIX).

3.6.2.2 The Situation in 1985

Table XX in the Appendix illustrates how respondents were distributed among the "discontinued use", "continued use", and "second personal computer" groups.

It seems quite clear that once introduced into the home, the probability of discontinued use decreases with age. Even though we cannot be completely certain, we believe that this relationship is linked to the quality of the machine bought, rather than to the motivation of those who have bought it. In fact, the difference is between the "discontinued use" and "continued use" groups, because the proportion of respondents who subsequently made further investments ("second personal computer" group) is the same in all groups.

Given that the number of respondents is this cell was small, we were unable to study microcomputer use as a function of age.

3.6.3 The Family Situation

We were also interested in the family situation of the respondents as a factor capable of affecting the use of their microcomputers. Thus, we defined five standard family profiles: single owners living alone, couples without children, single parent families (a single adult), couples with only one child (that is, under 18 years of age), and couples with two children or more. Thus, we set aside households that did not meet the conditions of these profiles (several adults sharing accommodation, households where a couple live with a parent, etc.). The classification was made on the basis of 1983 data. Table XXII in the Appendix shows the frequency of the profiles retained for analytical purposes. As we have already mentioned, in more than half of the households in our sample there were one or more children.

3.6.3.1 The Situation in 1983

The presence of children in the home seems to be a determinant factor in the acquisition of a new microcomputer. In households with children, the microcomputer was often bought in response to a request on their part (about 15% of the cases), or as a gift (18% of the cases). In these homes, the respondents say that they know more neighbors who own a microcomputer: it seems as though children are often a source of contact between neighbors, and

that this contributes to the creation of a network between microcomputer owners.

Moreover, even though the uses planned for the microcomputer before the purchase are similar in the various groups, we note that learning to program or writing programs are more often mentioned by respondents who have no children (44% vs 31% in the case of households with one child or more). Nevertheless, family composition seems not to play a role in the type of machine bought, except in the case of single parent families, where there is a larger proportion of low cost machines (TI-99 and VIC 20). However, there are certain differences in the peripherals bought: in 1983, 84% of the households with one or more children own a joystick, against only 62% of households without children. The singles group was different from the others in terms of whether or not they own a printer (28% against almost 17% in other households).

3.6.3.2 The Situation in 1985

Table XXIII in the Appendix shows the distribution of families in the "discontinued use", "continued use" , and "second personal computer" groups.

As we can see, families without children were more likely to discontinue using their microcomputer (28%). Nevertheless, it is difficult to interpret this difference with certainty: it may be due to the influence of the children (in terms of games, for example), but it may also be due to a normal statistical correlation between the probability of using a machine and the number of people living in a

house. At the same time, family composition seems to play a role in microcomputer use, which is evident when we examine Table XXIV in the Appendix, which also contains 1983 data for purposes of comparison. In 1983, respondents without children were not too different from the other groups regarding games and activities related to learning the technology, but spent more time in job-related activities and word processing (with the exception of the single parent group). Nevertheless, these respondents reported a significantly higher total amount of activity ($p<.05$) than respondents who had children. In 1985, the various groups are more clearly differentiated from each other, but the pattern is more complex: surprisingly enough, on first sight, we notice that adults with children use their computer significantly less for games than the others (with the exception of single parent families). On the other hand, single respondents use their microcomputers the most: they are significantly more likely to use it for job-related activities, do more programming, and in total, spend more hours per week using the computer than the other groups. This phenomenon is quite understandable because, in their case the microcomputer was necessarily bought for their personal use alone. Thus, we may assume that they were more motivated. Nevertheless, we should point out that this discrepancy was not as clear in 1983: thus, the microcomputer would seem to have a greater long-term impact for people living alone.

CHAPTER 4

ANALYSIS OF THE RESULTS OF THE SECOND RESEARCH PHASE

1985

(QUALITATIVE ANALYSIS)

In the section, we will discuss the main results obtained from the qualitative study carried out in the fall of 1985 at the same time we carried out our second quantitative data collection. It is important to remember that it is based on the analysis of interviews with all members of eighteen (18) francophone families in the Montreal region. Before discussing the results of this analysis, we will briefly review the methodology used.

4.1 Methodology

4.1.1 Selection of the Sample

The families interviewed were chosen on the basis of a sample of "later adopters" (n=880) who participated in the first phase of this study (Caron et al., 1985a). first, we retained those who met the two following criteria: **they had purchased their microcomputers between September and December of 1983, and were residing in the Montreal region.**

It is important to remember that the qualitative approach is essentially concerned with determining the various factors of the home microcomputer adoption dynamics. Thus, it is important that interviews to be carried out with families allow them to express various behaviors and attitudes about their personal experience. To this end, and referring to the existing literature, we set out certain

major dimensions that play an effective role in the adoption dynamics:

- **Socio-demographic characteristics:** presence or absence of children, gender and age of the children, occupation of the adults, etc.

- **Characteristics of computer equipment available:** brand and model of the microcomputer, etc.

Second, we "stratified" the potential sample (n= 100) along the dimensions chosen, in order to obtain a representation of a minimum of four to five families for each profile. **In this sense, the final sample does not claim to be representative of the population of Quebec as a whole, but rather represents certain dimensions that play a role in the adoption dynamics.**

We used two complementary methods to collect our information:"(1) a utilization record in which all the members of the family were to enter the time spent and the nature of their activities using the microcomputer; and (2) semi-directive interviews. The families retained were contacted by telephone and, with their agreement, were sent a "utilization record" where they were to enter each day, for a period of fifteen days, information about how the microcomputer was used.

4.1.2 Structure and Carrying out of the Interviews

All the interviews were carried out in the home of the respondents between November and December 1985. In families with children, the children were interviewed separately from their parents. These semi-directive interviews touched upon three main areas:

- Retrospective chronology of the two years during which they had personal experience with home microcomputing;

- A discussion of the points raised during the first part of the interview (change in utilization patterns, etc.);

- Evaluation of their experience, and a "potential scenario exercise".

The interviews were recorded, subsequently transcribed and organized thematically in terms of a pre-established analytical matrix.

4.2 Description of the Sample

4.2.1 Socio-Demographic Characteristics

4.2.1.1 Family Profiles

The 18 households interviewed are rather uniformly distributed according to profile. **In the first place, there are comparable proportions of families without children (n=5), with young children (n=6), and with adolescents or young adults (n=7).** Secondly, of the households with children, three have only girls,

five only boys, and five others have children of both sexes. Third, the sample included four single parent families (in three of these cases, the adult at home was the father).

Thus, the total sample of persons interviewed consists of thirty-two (32) adults and twenty-eight (28) children or adolescents whose individual characteristics will be described below.

4.2.1.2 Individual Characteristics

Adults

The family income of the respondents is $43,000 per year, which, at first sight, would seem to be clearly higher than that of the population of Quebec as a whole ($34,500 per year for 1985). Nevertheless, it is important to remember that we have excluded single people, and that in eleven of these households, both adults work. Thus, in most cases, the family income includes two salaries, which considerably increases the average family income of the sample.

The 29 employed adults hold a variety of jobs, such as: postman, information officer, electrician, teacher, or engineer. Thus, the distribution according to occupation is as follows: white-collar workers (n=11), blue-collar workers (n=7), upper management or professional workers (n=6), and teachers (n=4).

As far as education is concerned, we have as many respondents who had completed high school (n=12) as those who had university education (n=12), while eight of them had a college degree.

Finally, the 32 adults seemed to have had a relatively superficial knowledge of computers at the time they acquired their machines. Even though several had already used a computer in their job, or had seen one demonstrated by their friends, except in one case, none of them worked directly in the computer sector.

Children and Adolescents

Of the 28 young people interviewed, there was a relatively balanced distribution of girls (n=12) and boys (n=16). At he time the computer was bought, they were mostly between six and twelve years of age (n=8), or between thirteen and eighteen years of age (n=14), only three of them were less than six, and three more than eighteen. Most of them had no real knowledge of computers, although many had seen demonstrations, and a few adolescents had had a general introductory course at school.

4.3 Personal Computer Equipment for the home

Even though the common characteristic of all the households chosen was the ownership of a home microcomputer, we believe that it is necessary to obtain precise information about the model and type of additional equipment (peripherals and programs) purchased by the respondents.

4.3.1 Microcomputer Purchased

Most of the respondents have invested in what we could call a middle-range microcomputer buying either a Commodore 64 (n=6), or a TRS 80 Color Computer 2 (n=5). On the other hand, five households have purchased a "top quality" computer: Apple II (n=3), Apple Macintosh (n=1), and IBM PC (n=1); while five have very limited computers: TI-99 made by Texas Instrument (n=2), TS 1000 and ZX81 made by Timex Sinclair (n=2), and Commodore VIC 20 (n=1). We would furthermore like to emphasize that there are three of the households with two computers. In these three cases, everything else being equal, the second computer purchased is technically superior to the first.

4.3.2.Peripheral Equipment

We will not focus upon the proportion of respondents who have acquired routine equipment; that is equipment necessary to the operation of the device (cassettes, disks, etc.). On the contrary, it is of interest that **nine (9) families presently own a printer, and five (5) own a telecommunications modem**.

Moreover, we asked interviewees, to draw up an approximate list of the software that they own. This task was not always easy, because the number of programs purchased varied from less than ten to several hundreds. Inevitably, this included much game software of all kinds (sport competitions, arcade or adventure games), but also word processing, graphics, music, skill training, data base, telecommunications, or electronic spreadsheet software.

PRESENT SITUATION AND REVIEW OF OBJECTIVES

Thus, we see that behind the simple fact of owning a home computer, there are many variations regarding the actual computing equipment used by the respondents. **Thus, it is not surprising to find that, two years after the original purchase, there is a behavioral continuum ranging from totally discontinuing to use the machine to intensive use (to the extent of more than 30 hours per week in certain households).**

In fact, of the 18 households, four no longer use their microcomputers (they had purchased a TI-99, TRS 80 Coco2, or a TS 1000), and three of the families use their microcomputers only irregularly or "sporadically". Most of the time this is for playing games, or is confined to the children. Nine other households use their computers regularly, for an average total varying between 6 and 20 hours of use per week. Finally, in two of the families interviewed, average use by all members is more than 20 hours per week. The reasons for this interest in the microcomputer are nevertheless quite varied:work, homework, belonging to an "electronics club" , etc.

The purpose of this qualitative analysis is precisely to elucidate the factors that can explain such differences. This is why we will discuss the analysis of these interviews by retracing the integration dynamics and emphasizing evident differences at each stage using the following framework: (1) the origins of the purchase, (2) the discovery ritual, (3) the versatility of interest in the

microcomputer, (4) the evolution of usage patterns, and (5) the present place of the microcomputer.

4.4. Origins of the Purchase

In this first section, we will delineate the origins of the purchase of the microcomputer: why buy a personal computer? What are the motivations and needs that lead to the purchase?

4.4.1 Motivations and Needs: Achieving One's Technological Break Through

More than any other motivation, it is important to emphasize the concern of all the people interviewed to achieve their own "technological breakthrough". This statement is based on the use of certain terms by the respondents when asked to explain their reasons for acquiring a personal computer:

"to join the ranks of computer people"
"to be up to date", "to be fashionable"
"Because the technological revolution is coming!"
"To know what it feels like!"
"Because the computer represents the future, both at work and at home"

When we asked them about planned uses, the need to become familiar with the computer figured prominently in all future practical applications. In other words, at the time of purchase, the great majority of the adults interviewed did not plan to use their personal computers

for any particular purpose. The answer provided by one of our respondents can serve as a good illustration of this general sentiment:

> It was mainly the desire to find out about and have a machine in the house; something to play with ... We didn't have any precise ideas about learning to program or store anything, it was mostly a toy, a hobby.

Nevertheless, it is possible to be more explicit about the attitudes of the people interviewed toward the technological context. **For most of them, expressed more fatalistically than enthusiastically, to become familiar with computing is more of an obligation than a true personal interest: a necessary concession in order to keep up with a society in the process of change.** To purchase one's own microcomputer is to make an "official and socially recognized" gesture.

If the rest of the people interviewed mention the coming technological revolution, they adopt a more detached attitude, and formalize their purchase by speaking more of an "intellectual curiosity" about the computer. Remarkably but not surprisingly, this second type of attitude is systematically found in the better-educated people in the sample. We can say that, in the short term, they feel less directly threatened by computers than other groups.

4.4.2 Circumstantial Motivations

Independent of these emotional dimensions, for some of the respondents, the popularity of personal computers corresponds to a passing infatuation which has now been satisfied. These people justify their purchase by speaking of the particular context of the times; for example, as one father said:

> It was the fashion .... at that time! Everybody had one.... Computer were everywhere, you had to "computerize" everything, every house had to have its own microcomputer!

Thus, rather than being innovative and distinctive, these individuals adopted home computers in order to be "like the others", following a logic of social imitation

It is also important to emphasize another much more clearly cited variant of this reply, that places the technological fact into a future perspective: the buyers like to see themselves as the enlightened forerunners of a phenomenon that will fundamentally change the structures of their society: the technological revolution. Thus, this father of three adolescents explained that:

> Computers are ... like when the wheel was invented: everybody was asking what it was going to be good for. Today the wheel is completely indispensable. It's the same thing with computers ... young people

> who ignore computers are already out of date (the purchase) was made to make them conscious of that fact : they have no choice, they have to get on the bandwagon.

This second point of view is expressed mostly by fathers and mothers: the computer is bought in order to give their children access to the newest technology. Thus, the parents speak of the penalty that their children will have to pay if they are not familiar with computers, or the head start that they will enjoy, strictly from an academic point of view, by having a computer at home. For example, the mother of an ll-year-old boy explains:

> We thought that it would help him a lot to be able to get into that; just the fact of being able to program from the point of view of typing, vocabulary, everything was great! In the twinkle of an eye . . . the children could quickly learn to read and write properly, it was the same thing from the point of view fo a visual skills

It is tempting to establish a parallel between the words of the people interviewed and the advertising messages of the time (l983). In fact, we cannot fail to mention the overriding effect of the mass media on people's expression of their motivations for the purchase. Most people who mentioned feeling strong pressures in terms of the technological context, also referred to this directly during the course of the interview. We should also emphasize that this influence of media messages seems to have been particularly "effective" in the less-educated environments, and in the case of those who were less sensitized to the computer sector.

4.4.3 Rationalization and Identification of Functions

Even though, for a considerable proportion of the respondents "to join the technological revolution" --or permit their families to join--represents a need sufficient unto itself, most of them expressed at the same time other more personal motivations. More than concrete and precise needs, most--who did not have a great deal of experience with computers--foresee certain fields of application where they could eventually use their experience with home computing: jobs, their children's schools, or domestic uses:

> Even without having clear uses in mind, we thought that maybe for your work (addressing her husband), for my courses ... we could find little uses that could justify the purchase;... it may be that the computer can contribute something.

Finally, a limited number of interviewees identified a particular and personal use as the catalyst of their purchase. In this particular case, it was a need directly related to the work environment: a surgeon who had as his personal objective to make computer files of all his patients; or sometimes related to studies (word processing in order to write a Master's thesis, for example).

4.4.4 The People Involved in the Purchase

The interviews clearly reveal that the purchase of a personal computer is only rarely the result of a single individual decision (that is, a decision taken individually by a single member of the family). Nevertheless, this does not mean that all the people involved approved of the purchase without expressing reservations.

In fact, the acquisition of a home computer seems to be the result of a form of family consensus facilitated by the importance accorded computers in general.

However, interviewees (both adults and children) do not seem to have participated in the decision in the same way: There seems to have been a kind of "roleplaying" that separated the active players (active roles) who were more directly involved in the purchase itself, and those who had only a supporting role.

4.4.5 Roleplaying

Regardless of the family characteristics, the people in our sample systematically identified one person (or more rarely, two) as the principal instigator of the purchase. The father or the husband is systematically included in this category, either because he was himself the initiator of the purchase, or because he actively supported those who wanted it (in this case, children and adolescents). On the other hand, even though it may be overstating the case to say that women were largely absent from the decision-making process, they were generally less directly involved than their husbands. The very ironic evaluation made by one of the adolescents interviewees regarding his mother's attitude illustrates this tendency rather well:

> She has never touched a computer, she's afraid of it , she thinks it will bite her ... Even though at the beginning she had the idea that she could put in her recipes, .. she was mainly in favour of the purchase... because of the others!

In fact, behavior differences seem to be largely associated with different family situations.

4.4.6 The Case of Couples Without Children

A first situation characteristic of the couples without children interviewed during the survey, tended to be an individual-type decision, it is generally the husband who has introduced the idea of buying a personal computer. He talks to his wife, and finds very little resistance. This excerpt from a dialogue between husband and wife is a good illustration:

> Husband: "She was a little more reticent than I to buy it (microcomputer), but I was really interested, so that one day I decided to get it" .
>
> Wife: "I was not sure about the investment ... just for me it wouldn't have been worthwhile, I don't use it, but for him ... because he uses it so much, I finally realized that it was worthwhile .

In fact, this lack of interest seems to have two different origins. A minority of the women interviewed use computers in their jobs and do not want to use this tool outside their office hours. For the others, who were much more numerous, indifference was only an appearance, and in fact denoted strong reservations about technology in general.

4.4.7 Families with Children or Adolescents

During the interviews, children have more often identified their father as the principal force behind the purchase, and seem to

agree on the fact that they were consulted during the decision-making process. This consultation, even if only on principle, seems to have produced enthusiastic reactions in spite of the fact that they had only a very vague idea of what a computer could be. In fact, their enthusiasm seems to be attributable to the only thing they knew for sure about computers at that time: to have a microcomputer in the house meant daily access to electronic games.

On the other hand, in some families, the idea of a home microcomputer was received with a more skepticism, particularly on the part of the adolescent girls. One of them, proudly displaying her own indifference in contrast to the interest expressed by her brother (who requested the purchase), put it this way:

> I didn't want it [the computer], I thought that it was a waste of money and that I wouldn't use it ... and any way it is not good for much ... I don't need it.

As far as the interest shown by mothers is concerned, it is essentially with reference to the other people in the home, particularly their children. As one of them said:

> Ac far as I'm concerned, let's say that I made the decision for the children. I can't say that I was interested more than that ... it was mainly for the children ... thinking that in high school they will have to use them [computers].

These women also expressed more fears than their husbands regarding possible computer "abuses" by their children, especially in terms of what we could call the "computer game syndrome": the machine would be used for games to the detriment of finer purposes purposes (schoolwork, etc.). The following mother of two girls, expresses this fear quite well:

> Before we got it, I wanted to be sure that it would be really useful for the children ... If it was only a question of games, the children would not have had one and that's definitel

or, this other interviewee:

> If we buy it, it must not be just for games, because for that, we could just get an Atari. It has to have some other purpose.

4.5 Making the Purchase

The idea of buying a computer having been established, we are then interested in how the people in the sample under consideration translated this idea into action.

4.5.I The Influence of Interpersonal Networks

One of the first constants emerging from the analysis of this dimension is the importance of interpersonal networks in the choice of model acquired. This can be explained by the fact that most interviewees mention their own lack

of knowledge of this area, but also that they do not really trust the people selling computers in specialized stores. In other words, whenever they have had the opportunity, the respondents asked the advice of a resource person in their circle.

We think it interesting to distinguish between two profiles of resource persons as described by the people interviewed. A few respondents effectively have had access to true computer "experts" (people working in the field, etc.). These "experts" have assumed their role as "guides" by giving precise advice to the interviewees regarding their financial investment as a function of planned use, etc.

However, most of the respondents had recourse to other people in their circle, themselves owners of a microcomputer, with a certain degree of competence in the area. In this particular case, the model acquired by the respondent is almost always identical to that owned by the "resource persons"; and this is often done without parallel verification, as in the following example of a woman questioned about her choice of model (TRS 80):

> Almost everyone in the office bought one; for most of them it was a TRS 80, so that's the one that I went to see. I saw others, a Commodore, but I wasn't interested in it ... because everyone else had bought a TRS 80 ... I had more confidence in it: because they all preferred to buy this one for their homes.

4.5.2 Choice Criteria

4.5.2.1 The Price in Itself

For a significant minority, price is the one and only choice criterion in determining the model purchased: they do not take into account technical factors, and buy less expensive range products, or those which had been on sale at the time (TI-99, TS 1000, ZX 81). We are speaking here of people who had no one to guide them in their approach, and who mention that they have very little knowledge of computers.

4.5.2.2 The Quality/Price Ratio

A second group of respondents (the majority) give the "quality/price ratio" as the decisive choice factor. Some of them have opted for "less expensive" machines identical to those chosen by respondents who bought only as a function of price, but they have done it from a totally different perspective. In fact, they were fully conscious of the technical limitations, and it seems that there is a certain strategy behind their approach: you buy things one sale because you are not totally convinced of the real usefulness of home computers. One of the people interviewed put it this way:

> We bought whatever was cheapest, to start learning how to use it; then we become more competent with it, we will be able to make a better choice.

In other words, some of the respondents thought of the purchase of their first machine in terms of a simple step in the process of learning about computers. This step

may possibly precede the acquisition of a better computer. Most of the people mentioning the quality/price ratio have chosen middle-range machines (Commodore 64, TRS 80, etc.) allowing them to make subsequent financial investments if they want to increase the capacity of their machines. One of them puts it this way (purchaser of a TRS 80 which can be upgraded):

> We wanted to start slowly: if we liked it, we would continue, and if not we could stop .... It is less expensive this way, and if things didn't work we would be able to pay either way. ... There are many people who have put their computers in a closet, people who are no longer using them after paying $2000 to $3000 for an Apple or an IBM!

4.5.2.3 Manufacturers' Reputation

Finally, a minority of respondents mention better product stability, upgrading possibilities, the user friendliness of the system as other choice criteria. However, we find that this was essentially the case in the better-educated groups of respondents; those who report higher incomes, or who have computer "experts" in their personal network (a guarantee that they could ask their advice after the purchase, and thus undertake a calculated financial risk). But, this was especially the case for respondents who had in mind certain precise applications before the purchase that would justify such an investment.

4.5.3 Conclusions: Naive and Sophisticated Buyers

Thus, it seems respondents can be divided between two buyer profiles or groups. There are, first, the **naive buyers**, who show a certain number of common characteristics: they have no particular application in mind, apart from "the family uses" mentioned in the ads; they have had no previous experience with computers or the computer market, and have no resource persons available to advise them at the time of purchase. Because of this, they start out with very high expectations (encouraged by the media) and do not have a chance to "readjust" them. The microcomputer arrives at their homes with a heavy symbolic load, **and in this they are quite different from second, the group of more sophisticated buyers whose purchase decision seems to be the result of mature consideration.** They may have bought a less expensive machine, but they are aware of its technical limitations, and this, as we mentioned above, seems to be the result of a long-term learning strategy. Whatever the case, the more experienced buyers are more likely to buy middle to top quality machines, with a view to specific uses.

4.6 The Ritual of Discovery

We have isolated the period following the purchase of the microcomputer from the rest of the dynamics involved, because the respondents themselves spontaneously identified it as being exceptional; that is, characterized by

"abnormal" behaviors and situations. Moreover, this period seems to be important for this analysis, because it represents a privileged moment when the expectations expressed by the individuals before the purchase are confronted with the reality of using the microcomputer; a reality that most of the respondents discover through a sort of "ritual":

> At the beginning, it was mainly a question of demystifying the mechanics of computers, to get through the mystery: to understand how they worked, and to see how they could be used ... it was fascinating!

Thus, first, we will discuss the types of behaviors that are characteristic of this period, and then second, we will analyse how this period is understood by the two previously identified types of buyers ("naive" and "sophisticated").

4.6.I Post-Purchase Period: An Exceptional Time

4.6.I.I The Enthusiasm of Discovery

This period may vary from three weeks to several months, depending upon the families in the sample; however, it is characterized by certain constants: all the people interviewed recall with a certain amusement their sometimes excessive, enthusiastic individual or family behavior, towards the computer, which had temporarily become the center of attraction at home. According to the great majority, these behaviors are no longer present. Thus, a

father describes the arrival of the computer at his home in the following words:

> It was so new, so beautiful! We really made fools of ourselves! We couldn't wait to use it! ...[before ending, he said:] But then, the moment came when I was disillusioned, when I got home after work I was no longer tempted to do a bit of programming or read the manuals... It was almost like a children's game: so great, such fun, you played with it endlessly; then, after, it joined the rest of the toys!

or this other:

> At the beginning, I would do just about anything! I tried everything! But now, it's much more rational, more mature, I try to decide how I'm going to use a certain program, etc.... Now it's no longer like a duty, to say once or twice a week, "I'd better go and do it" ... I use it when I feel like it.

Thus, the period immediately after the arrival of the computer seems to remain essentially a direct consequence of the "novelty effect": the object is appreciated because of its novelty and its potential.

Thus, for almost all the people interviewed, the exploration of the machine goes through two main types of use: electronic games, and learning the technology itself, which is often integrated into mastering programming. While the technology itself is learned both individually and collectively, there are well-defined socializing dynamics that occur around the electronic games (that is, the

collective use of the machine). This is the only aspect that involves all or almost all the individuals in the household, whether or not they are interested in the technology. It often goes beyond the family unit, and is never a solitary undertaking (one always plays in order to measure one's performance against that of others). More particularly, in households with children or adolescents, it represents one of the rare cases where the mother actively participates in the family's infatuation with computers while, for the children, it represents a special chance to compete against parents. Thus, a temporary complicity shared by all the members of the family is created with regard to home computers.

4.6.I.2 The Children: Prestige Outside the Family

First, it is important to remember that it is the certainty of having daily access to electronic games that makes children fervent defenders of the purchase of a personal computer. Under these circumstances, this turns out to be the main use that children make of the machine during the initial period following the purchase. Apart from the already discussed internal family dynamics, there develops an attitude of valorization in regard to their friends; in other words, the desire to gain a certain "social prestige" in their eyes: friends become the privileged witnesses to the new acquisition, which children often take over, at least verbally, as illustrated by this child's statement:

> The first day I had it I invited everyone [imitating the envious tone of his friends:] "You have a computer!" ... they could hardly play, they all wanted to play at the same time. We were always

> haggling about who was going to play against whom. It was such fun! They didn't believe me! ... I had to bring them into the house to show them, so that they could see that I really had one.

In households where there are several children, we find the same type of attitude, but it is compounded by visible competition between brothers and sisters.

4.6.1.3 Temporary Tensions and Time Limit

Thus, whatever the family characteristics, the initial enthusiasm goes hand in hand with an overuse of the machine in terms of time. It is precisely this aspect of the dynamics that is associated with most of the tensions mentioned during the course of the interviews. This seems to be particularly true in households without children, as we can see from the statement made by this young woman concerning the initial attitude of her husband:

> At the beginning it was almost like a mania, he was always at it. At one point it really became a bore, because it was the only thing to do ... It was just like a new toy or hockey, ... at one point every evening I was sitting in front of the TV, and he was in the family room programming and whatever ... but, at one point, he was finished, and slowly he started to let go. Let's say that we arrived at an arrangement, ... with a lot of patience!

Nevertheless, this excerpt from an interview emphasizes the temporary nature of the tensions that may be associated with the presence of the microcomputer in the home, and can be mainly attributable to a disruption of the household schedule.

Finally, we thought it would be interesting to determine the reactions of parents towards the use of the computer by their children mainly for playing games. In retrospect, the general attitude is one of resignation towards what they consider as a necessary stage in the child/computer interaction, and which they themselves qualify as an **"inevitable game crisis"**. Some parents even explained that this was an integral part of a strategy that could be summarized as follows: you buy a microcomputer, you let the children develop a certain form of dependence through the games, following which you orient them towards a more "constructive" use of the machine (schoolwork, etc.); then, most of the time, this leads to the implementation of certain rules that are essentially concerned with limiting the utilization time by children:

> It was not long before we had to establish some rules. Not before 8 in the morning ... because at 7 o'clock they were already at it! We were hardly up, when the children were already playing with the computer! But we quickly limited use to around one half-hour or three-quarters of an hour at most.

4.6.I.4 Learning the Technology: From Computer Myth to Reality

The general expression characterizing this period seems to be **"the exploration of the technological object"**. However, it goes without saying that **this ritual of discovery is neither seen nor interpreted identically by all the people in the population under consideration:** depending upon their

expectations regarding the actual potential of the machine purchased, this will in fact take on very different meanings.

4.6.2 The Disillusionment of Naive Buyers

As could be predicted, for the first respondent profile, **the period of exploration is followed by rapid disillusionment.** In the first place, they come to realize that ownership of a microcomputer does not automatically lead to a personal mastery of the computer and its secrets:

> The computer doesn't do anything by itself, you must tell it exactly what you want it to do, otherwise it doesn't do it. You have to think carefully about what you're doing,... without this, it doesn't work, I thought that it would be easier.

In other words, they realize that in order to take full advantage of the computer, it is necessary to invest a certain amount of time and energy, something that they apparently had not expected.

In the second place, during process of learning to use the machine, they come face to face with a computer reality that has nothing in common with the image that they had formed: printing errors in the manuals, lack of software and documentation in French, defective equipment, etc. These factors become a source of demotivation that is greater in the case of respondents who do not have resource persons in their network, and who have little or no

understanding of computers, as is the case for this couple who bought a TI-99:

> Wife: We had good intentions. We wanted to, but it just didn't grab us . Now, when you finally get there, there wasn't regally much, you know, all the hoopla about it ... it's discouraging how you let yourself be influenced by all the advertising. There's nothing to it! You come with all the equipment and then you can't do anything because you have nothing personally ... you know nothing from the point of view of computers

> Husband: When you go into a store, you buy it and two weeks later they tell you: "I'm sorry, but we don't have it any more, it has been discontinued" ... When you want the guy to explain how your machine works, it's the same thing. Try to find a place where they sold TI's, and you can't find one any more, this is why we gave up ... We were had when we bought it, we're not about to buy another!

Finally, they come up against the real technical potential of their own machine. We will recall that some naive buyers have chosen a computer only because of the sale price (less expensive), while others have chosen more powerful or middle range models. These choices seem to have generated two types of attitudes that are directly related to their experience with the microcomputer market and consumer services.

For the first (less expensive) the deception seems so great that it leads only to a great feeling of frustration: they have been

taken in by advertising and the media, who sold them impossible applications, by dealers who failed to warn them against the subsequent financial investments that they could expect, etc. This disillusionment is rather typically translated into the impression of having bought a "fake computer", a subproduct of home computing:

> I am not saying that I wouldn't want to have a good one ... a real one ... but I would never pay the price that would take! Because you don't get enough out of it, considering what it costs ... I don't mean to say that it is not useful, but we were screwed. And then we were stuck with it: if we had really known what you could do with a computer, and how, we may not even have bought it.

For this type of respondent, interest in the microcomputer seems simply not to have gone beyond the stage of exploration: the computer has taken on a temporary significance which has not withstood the "confrontation with reality", because of the enormous discrepancy between the owner's expectations and the real potential of the machine.

However, not all the naive owners react in the same extreme manner, losing interest in their acquisition within the six months following the purchase. Among them, the "middle of the range" users can in fact try to "readjust their expectations": they choose to invest more time, seek help, take courses, etc. In other words, they develop "compensating strategies", in particular, creating for themselves a stimulating environment to support their motivation.

4.6.3 Questioning the More Sophisticated Buyers

Even though the exploration of the machine also goes through a stage of learning the technology, it stays directly encouraged by a need to master a particular application (clearly associated with the concrete objective that motivated the purchase). The following respondent, asked about what happened within the first few weeks following the purchase of his microcomputer, spontaneously oriented his response towards a rational process of learning how to use the machine:

> IBM (brand bought) has several books that you can use when you start working with it, then we went through all the initiation phases, and after, we bought the usual commercial programs, like Lotus I 2 3, DBase, Wordstar.

This attitude seems to illustrate a point of view that is totally different from that of the naive buyers. It effectively denotes a fundamentally instrumental vision--in contrast to the mythical perception -- of computers: the words "working with the computer" are used as a synonym for "using", or even "playing", which are the terms generally used by the other respondents.

Nevertheless, we should emphasize that, among individuals who have invested in more sophisticated equipment, learning is not always "painless". Some of them too had underestimated the learning effort required. In the words of an Apple II owner.

> I had a lot of books to read, and documentation to read, and this was a little discouraging ... Apart from that, the software that we bought was also a problem ... because we may have bought things impulsively thinking that such-and-such a program was quite good, without checking whether or not it was really good. This can be very frustrating.

Thus, even for well-motivated purchasers, the exploration may lead them to question their initial evaluation of computers. However, contrary to the naive buyers, this does not tend to lead to the total and immediate rejection of the computer purchased.

In the following sections, we will discuss the dynamics of respondents who persevered in their efforts (that is, fourteen families, since we did not take into account those that no longer used their computers after the discovery period).

4.7 Versatility of Interest in the Microcomputer

For most people, a fundamental distinction is made between the period immediately after the purchase of the computer and the dynamics that are established later: respondents who go beyond the "ritual of discovery" express for the most part a relatively unstable interest in computers. In this section, we have attempted to summarize the factors associated with these "fluctuations" in interest.

4.7.1 Circumstantial Interest

4.7.1.1 The Acquisition of Computer Culture

During the course of the interviews, a good number of the adults expressed the need to acquire enough "computer culture" to be able to demonstrate a certain amount of competence when this subject is discussed at work or in other social situations. This attitude is based on the logic of the expressed need to take part in the technological revolution. We can speak of this need for social competence as a circumstantial objective to be achieved. It is interesting to point out that social competence is mostly verbalized by men (whether they are fathers or not).

> Husband: For myself, it was mostly a question of knowing what it was good for, I mean, you hear talk about it and you don't know what it means ... but now, when somebody talks to me about a computer, a printer, or Basic, I know what they mean.
>
> Wife: For him, it was very important to know.

Nevertheless, the respondents referring to this "social competence" aspect do not necessarily lose interest in their computers when they feel they have attained a sufficient level of proficiency in "computer language". Their relationship with the computer changes: the amount of time they use the computer stabilizes, or evolves into forms of utilization other than exploration. Thus, a father has subsequently developed a tutoring

relationship with his children, and hardly uses the computer any longer for himself.

4.7.2 Seasonal Interest

Among respondents who make regular use of their computers, it is not uncommon to find that "seasonal factors" play a regulatory role in the use of the machine: the computer is used more in the winter than in the summer. This can be verified for both adults and children.

As far as children are concerned, we find two trends related to the effect of the school year: some parents say that their children use the computer less during the school year, while for others it is just the opposite. Moreover, it is important to emphasize that some parents, while praising the pedagogical aspects of the computer for their children, also mention the fact of going to school to explain a drop in utilization.

4.7.3 The role of External Supporting Structures

4.7.3.I The Importance of a Stimulating Environment

Interest is directly correlated with the possibility of being able to benefit from outside sources to learn how to use the machine. By outside sources we refer to enrollment in an introductory course, or a personal computer club. For example, one of the respondents became interested in his computer during the "Octo-puce" series, but then abandoned it until the "Octogiciel"

television series was announced. During that period of a year, he lent his computer to his sister's children.

This lack of supporting structures is also expressed, looking back, as a significant demotivation factor. This is illustrated by the statement made by another respondent (young couple without children) who is no longer using his computer:

> It would have been interesting to be part of a club because there were people who had been members for a long time. It makes it easier to obtain information; but I didn't think it was serious [the club], I thought it was just for games.

4.7.3.2 Indifference Within the Family

The lack of interest in the home is rather typical for couples without children (it is important to recall that the purchase was often an individual decision made by the husband and meeting with indifference on the part of the wife). This seems to contribute in large part to the demotivation of the principal user of the machine. This is clearly illustrated by the following explanation given by one of the women interviewed:

> As far as I'm concerned, I was not too interested [in computers], maybe if I had been more interested, he [husband] would have spent more time with it ... One of my brothers is a wizard at computers. He lives for computers and makes others do the same. When he comes here, he [husband] uses it with him, because the atmosphere is more conducive. It requires a more supporting environment.

Thus, it is not necessarily within the family circle that the person involved will be able to share his interest in computers. Some of the respondents tell us that they had to combat this indifference by engaging in their computer activities in a process that took place totally outside the family. This is the case for one of our respondents who from the start bought a computer identical to that of his co-workers, because he could see the possibility of being able to exchange software and share his interests in this area.

4.7.3.3 Lack of Knowledge About Computers and Willingness to Learn

Seeking for an environment conducive to learning may correspond, although much more rarely, to an interest on the part of the adults to make progress in their attempts to master computers. An example of this situation is the case where parents want to increase their understanding of computers but do not themselves have any more than the most rudimentary knowledge of the area. Thus, they experience learning difficulties, and the enrollment in a course or computing club becomes a strategy designed to overcome these difficulties and succeed in their attempts to master computers:

> As far as I'm concerned, it offers a lot [enrollment in a club]. When you join the club, you find workshops on graphics, text editing, etc. We created a working group on text editing using the TRS 80, and then they asked me to help with the journal.

4.7.4 Cost Considerations

These informal environments are nevertheless as important for families where there is already a certain internal dynamic, but the expressed motivation does not have anything to do with any particular need for socialization or academic support : **it is rather a practical and easy way to obtain access, in a less expensive way, to new software or other equipment**. This is clearly illustrated by the statement made by this respondent (family where the microcomputer is still widely used by many members):

> It was a simpler way of getting certain software. If you register in a course ... they sell the programs for $4 or $5: if you want a copy of the manual, that costs $25 ... this means $30 for a program that can cost as much as $200.

4.7.5 Extension of the Novelty Effect

Finally, we would like to mention certain examples of a reawakening of interest that become "temporary novelty effects": purchase of intriguing new software (flight simulation program, for example), new games, or the visit of friends who have not yet seen the computer. This does, however, not seem to have any other significance than constituting a kind of episodic extension of the discovery ritual.

In order to conclude this section on "the fluctuations" in the interest shown in home computers, we will return to a previously

mentioned case, that of the person who loaned his computer for a period of one year. This is how his wife described the return of the machine to their house:

> When the computer came back we had some game cassettes ... that we didn't have at the beginning, ... so that was interesting, but he wasn't interested in data processing, he was interested in the games!

Thus, interest towards the machine is not uniquely dependent upon contextual factors, such as the existence of a supporting environment, or enrollment in a course. What remains fundamental in order to understand the place occupied by the computer over time, is the discovery of applications that correspond to real needs in the daily lives of the people interviewed (whether this dimension consisted of games or anything else). Thus, it is this particular dimension that we shall discuss in the following section.

4.8 Changes in Use Patterns: The Search for Applications

As we have already said, the exploration of the technical object goes through, for the most part, a period of playing electronic games and learning to program, followed, by a period of questioning. We have seen that for four of the families in the sample, this led to a concrete and definite rejection of home computing.

For the other households, this questioning led to a more reasoned type of behavior: now that we know what a computer is,

how can we profit from it in more concrete terms? **In other words, the individuals consulted seemed to have established a more rational relationship with the computer: they now ask themselves about practical applications that could be really useful in their daily lives:**

> We arrived at a certain stage when we either had to make progress or stagnate: this is a question of interest. We were interested in going on ... but there are some people who arrive at this stage and stop, because the computer is not useful to them. They have already learned what they wanted ... they just wanted the pleasure of knowing about it.

This is precisely what we call "searching for significant uses". That is, uses that represent a real contribution to the daily lives of the individuals.

4.8.1 The Search for Significant Uses

To many people, this "search for applications" leads to the so-called "**domestic" uses** of the machine (family budget, cooking recipes, etc.). This is not surprising, because initially, the concept of home computing itself as advertised by the promoters at the time (end of 1983), emphasized largely this type of use.

We must recognize the scepticism expressed by the respondents about this type of exploitation, as a result of their personal experience. Some even use the term "false uses". This may even be more striking, because the feeling seems to be widely shared, regardless of the family profile, social-demographic

characteristics, or the technical sophistication of the microcomputer acquired. In sum, one of the people interviewed expressed this general sentiment rather well by saying that using microcomputers for things like that: "was like driving a Cadillac to the corner store".

Moreover, most of the people interviewed, both adults and children, were interested, during the course of their discovery, in computer applications that had an **"artistic dimension"** (graphics, music, etc.).

However, for most adults, this remains at the level of "intellectual curiosity" only: they find it amusing, surprising, or unexpected, but do not see that it would lead to any concrete useful applications. On the other hand, in general, children are particularly sensitive to the creative potential of the computer. The views expressed in an interview held along with their parents, illustrate these interests well:

> Father: Anne-Marie [daughter, 5 years old] has never shown a lot of interest.
>
> Mother: That is, she was interested at times, when she was playing games; this is a child who is very interested in drawing, she was interested in the little colored squares,.... the graphics.
>
> Father: It is the same thing for the Macintosh ... the children use the drawing program a lot.

Even though children find that an "artistic exploitation" of the computer is an end in itself, adults tend to search for more

"serious" uses, particularly word processing. From that moment on, those who have not yet invested in peripherals become aware that they must do so order to be able to take full advantage of their computers. In the words of this Commodore 64 owner:

> At the beginning, we had to learn about things, but then at a given moment we realized that we had to specialize. We had to buy a word processing program that we didn't have, we had to buy a printer, and once we had the printer, then we developed many things.

This excerpt from an interview emphasizes the rather general sentiment among present users that: **the acquisition of a printer is an important turning point in the evolution of use patterns, because it allows a user to proceed from familiarization to realizing some returns on the original investment**. More generally, we can say that, at a given point, all respondents were faced with a "financial investment dilemma" that had to be solved in order to purchase additional equipment.

4.8.2 The "Financial Investment Dilemma"

Even though, all those who originally purchased a middle-range machine are sooner or later confronted with this choice, they do not all decide to make further investments in home computing. Certainly, this investment is above all a question of motivation, but it also seems to be based on the perceived usefulness of the machine, in itself intimately related to the fact that the respondents not only have a practical application in mind, but can

also perceive the usefulness of the computer in a particular area (work, etc.).

This conclusion is based on the analysis of statements made by respondents who have decided to make no further investments in additional equipment. They mention especially the financial aspects, even though they are not necessarily from households at the lower socio-economic levels. In fact, they realize that even if the particular application is interesting in the abstract, they do not feel a personal need, or have other ways of accomplishing the same tasks, especially in their workplaces. Thus, the personal investment became superfluous.

Respondents who choose to make the investment do it from a point of view of making the computer "pay". As we will see in the next section, it is not surprising that the computer is now largely used for "serious purposes" related to their professional lives. Also, for the two of the three families who have acquired a second microcomputer, this move responds to the same logic (having initially invested in a technically very limited machine, it was difficult to upgrade it). One of the families interviewed, planning to purchase a new computer within the next few months, summarizes this rather well by saying:

> The investment has to be justified ... we had a computer that was not too expensive [Commodore VIC 20], but we have practically not used it for a year, and we are concerned about investing $2000 in something that we will no longer use in six months... this represents a collective investment!

Thus, contrary to some theories that see the purchase as a way of solving problems of competition between individuals for access to a single computer, the purchase of a second machine visibly represents an extension of the process of computerizing the home.

To judge on the basis of the way the computer is at present used, those who pass through this stage and acquire additional equipment (additional memory, printer, modem, etc.) behave like those who initially invested in peripherals or better machines. **Thus, the investment in peripheral equipment can be used to distinguish between households where the computer seems to be used regularly and for more "serious" purposes, and those where the computer is now used sporadically and mostly for games.** In the next section, we will return to this distinction to show that it leads to a different type of exploitation, and especially to a different perception of home computing.

4.9 The Microcomputer Now

In this section, we will examine, in turn, how adults, adolescents, and children use the computer at present.

4.9.1 Adults

Let us recall the distinction already made as a function of financial investment: the attitudes and behaviors of respondents who now own a high performance

machine (n=10) are very clearly different from those of the other respondents (n=8).

Those who have not made the additional investment use their machines less intensively than the other people in the sample (less than 5 hr\wk for all members of the family together). Moreover, this type of use seems to be limited to three types of activities: electronic games, recopying programs from computer magazines (essentially game programs), and learning to program (mainly BASIC). Thus, these are the same types of activities that they carried out at the beginning. **Over a period of two years, there has been no notable evolution in the way they use their computers.**

Thus, it is not surprising that the first category of respondents do not see any real impact related to the introduction of the microcomputer. Surprised at this, some recall the short term changes that took place just after the arrival of the microcomputer at their homes: they remember the enthusiasm of discovery, and a decrease in the time spent watching television.

Therefore, we can see that, for most of them, the computer now represents more of a luxury than a real necessity:

> At the beginning it may have changed a few things, but that is no longer the case ... it's mostly a little toy: at the beginning it was quite important; but finally, it didn't change my life, it's nothing but a gadget.

Even though respondents who now own a better machine still spend **a significant proportion of their time playing electronic games, it is the whole range of new functions that seem to be regularly used**. Here, it is mainly a question of functions that are useful in their professional lives (word processing, electronic spreadsheets, etc.), and learning new programs. We would like to emphasize that **the possession of a telecommunications modem seems to play a significant role** in the five households where one was purchased, since a good part of the time spent with the computer is directly related to its telecommunication possibilities (either in relation to school, professional purposes, or an interest group, such as a club).

Moreover, when asked about the changes and transformations associated with the presence of the microcomputer, these respondents unanimously have mentioned a decrease in the time spent watching television, and to a lesser extent, the time saved for the organization of their professional life. In fact, even though the computer is not necessarily perceived as being indispensable, it is at least granted the status of a utilitarian objects

> It has found its place, it's more than a gadget even if our focal point is not the microcomputer: it has become a normal activity among many others. But if we didn't have it, we would miss it.

4.9.2 Adolescents

It is important to underline above all, the differences in behavior and attitude between girls and boys. If we judge on the basis of the time spent on this type of activity, **adolescent boys** seem to be more motivated by microcomputing (utilization time is double in the case of boys vs. girls). But mainly, the way they use it is radically different, which may provide a possible explanation for these interest differences.

For adolescent boys, the game dimension is very important and seems to take two main forms: so-called electronic games , as well as the modification of game programs in order to include competition between friends (and thus external to the family). In this sense, for them, the computer seems to represent a new effective means of gaining prestige. It is important to point out that they nevertheless carry out some word processing for school purposes.

When asked about the reasons behind their reduced interest in computers, **adolescents girls** tend to remain curiously evasive:

> I don't use it enough for changes to occur. I'm not really into it. It seems that, at my age, a microcomputer ... I'm really interested in other things: I don't need it, maybe later.

Nevertheless, they still use the computer from time to time for games, and in the case, below, always when asked to play by other members of the family. In fact, the only application that

seems to be really interesting in their eyes, is the use of graphics software. A father, commenting on the manual, explain this in the following terms:

> Take "drawing" for example, who uses it Ah, yes, Michelle [daughter], she draws now with the computer. [addressing his wife] have you seen her drawings, her latest drawings? She has drawn hibiscus flowers. She even made my wine labels. She does it on her own. She seems to like all that a lot.

4.9.3 Children

Even though the role of games in stimulating the children's interest in computers is undeniable, the existence of a helpful, active parent-child relationship represents a decisive factor in the integration of micro-computing into their daily lives. This perception is based on a comparative analysis of households where there are supportive structures for learning, as opposed to those where parents limit themselves to verbal encouragement.

When the helpful relationship does not exist, the child makes independent (or outside the family) attempts to learn (TV, schoolbooks), or receives parental verbal encouragement. He attempts to move to other uses for the machine by himself, but this remains very occasional: he runs up against learning difficulties, and he quickly returns to use the machine for games. In the words of one of our young interviewees:

> I made programs from time to time but no more than that, because I made errors and that was discouraging.

During the course of the interview, he acknowledged that:

> I only touch the keys for fun. We rarely talk about it [microcomputer], it has not changed much.

For another child, asked what the personal computer represented for him, he very spontaneously answered that it was "something to play with", before concluding that he preferred the computer to television, because it had more games; or for another child, a microcomputer "was like a typewriter that you can put cassettes in to play...". We could mention many more examples of this type.

The principal meaning that seems to persist over time seems to be the increased prestige in the eyes of their friends, that the fact of having a computer at home represents. Nevertheless, even though the use of electronic games is particularly high in the period immediately after the purchase, we have to admit that this is not simply due to the novelty effect: it persists over time on a more or less regular basis.

4.10 Various Scenarios on the Computerization of Society

We ended the interviews conducted with adults and adolescents with a kind of projective exercise based on the

"scenarios method". The purpose of this exercise was to attempt to clarify the perception of the interviewees regarding the role played by computers and their importance in the future.

Three short written texts offering a particular subjective vision of the computerized society were shown to the respondent. The first two scenarios assumed that computers will fundamentally change the present organization of society. Nevertheless, the first (I) offers a very negative vision of these changes, and the emphasis is essentially placed on the dangers of a computerized society. In this respect, it is diametrically opposed to the second (2), which emphasizes the benefits of computers and offers a strongly optimistic vision of the future. The last scenario (3) questions the importance of the electronic revolution: without denying the presence of computers, it questions the extent of the impact of computers on society.

Thus we asked the various people present to read each of the three versions and to express their views regarding these scenarios. They first had to choose the one that they thought was most plausible, and then explain the reasons for their choice. In this section, we will discuss a summary of the reactions observed during this exercise.

Most of the people interviewed agreed with scenarios I or 2; that is, those that describe technology as an active factor in social evolution. This is not really surprising, if we remember their

previously expressed feelings about the technological revolution, which was seen as one of the reasons behind the purchase of their own computers. Nevertheless, their views about the nature of the impact that can be attributed to the use use of computers in society were far from being unanimous: the opinions expressed were as often negative as positive.

4.10.1 "The Optimists"

Most people who chose Scenario 2 were conscious of certain risks associated with computers--particularly an increase in unemployment. For them, this represents essentially a painful transition phase; but, in the long term, "the game is worth the candle". As one of them said:

> We may lose some jobs, but this will create others. This will hasten the arrival of the leisure society: we have gone from the industrial era where one worked 80hr/wk, and today we only have to work 35 hr/wk. Then, after [the introduction of computers], you will see that this will drop to 30 or 25 hr/wk, but we will still be getting the same salaries!

In the words of this adolescent, who himself spends more than 40 hr/wk using his computer:

> Everyone will be able to use a microcomputer, poor people from Ethiopia just as well as rich people.

One of the most attractive aspects of the computerized society, in their eyes, seems to be the opportunities offered by telebanking, teleshopping, etc., a precursor of which is already available in the electronic banking card, to which they often referred. Most people who adopt this point of view have become adept at handling the computer, and use their machines assiduously (more than 20 hours per week).

However, this apparently unreserved optimism hides a certain fatalism. This is illustrated by the following comment:

> Computers are often beneficial, but the world has to understand them better. In any can, we don't have any choice. The Japanese have done it, the Americans have done it.

The following comment was made by another adolescent:

> In Japan, plants are completely computerized, and this means that if we don't do the same thing, in the end, we will have no more jobs in Canada, we have no choice.

As far as the risks of access to private information are concerned, they may be mentioned, but are often perceived as being already present and independent of the introduction of computers.

This second type of qualified statement, even though basically positive, was made by respondents who are significantly different from those in the first profile: people who do not use it much but have come out of their experience with a "serene and constructive

attitude" toward computers. Moreover, they are mostly individuals who belong to the category that we called "sophisticated buyers" and have invested in less expensive machines with the idea of becoming more familiar with the technology. In these homes, there is frequently a wish to buy a more sophisticated second computer in order to meet future needs. Also, all the people in these homes have college or university degrees, which may explain that they have fever reservations about the idea of a computerized society (since they are less directly threatened). Moreover, in this group there are as many women as men, and the great majority of adolescents interviewed also fall into this category.

4.10.2 "The Pessimists"

The principal reservations expressed by people who have chosen the first scenario concern the job market (increase in unemployment, lack of recycling, lack of preparedness, etc.). In the case of women, this initial worry is increased by concerns regarding abuses that may be carried out in terms of access to private information, and the dehumanization of human relationships. The comment of one of the women is a good illustration of this point:

> With all the technology that we have, I have the impression that we will all soon be just pretty little numbers. We will no longer have a private life, and there will be a lot more unemployment.

Evidently, this group includes some respondents who have come out of their personal experience with computers somewhat

disappointed and embittered (regardless of whether they are men or women). However, this type of very negative reaction is also found among members of families where the computer is generally well integrated. In this case, it is systematically the woman (whether a mother or not) who told us, during the interview, that they do not feel "attracted" to computers. Carried to an extreme, their reactions, as expressed by their choice of the pessimistic scenario category, are closer to technophobia than to a real lack of interest in computers: it is often the women who say that knowing about computers is essential for their children, but who let their husbands look after teaching, or who say that they will only learn to use the computer when they have to.

4.10.3 "The Undecided Group"

We used this term to describe people who were unable to decide in favour of Scenario 1 or 2. They felt that some elements of both were important: for example, the dangers of a police state, unwarranted access to confidential records, and the risk of unemployment were mentioned on the minus side. On the other hand, on the plus side, they mentioned the advantages of all aspects related to "teleshopping" (remote transactions, etc.), and possibly an improvement in the quality of life. On balance, these people have a single conviction: computers will change the structures of present society; however, they cannot or even refuse to say what will be the nature of this impact. In fact, this is a question that, in their eyes, it is useless to ask, because computerization is inevitable anyway. This is expressed rather well by the following comment:

> I don't have to decide whether they [computers] represent an advantage or a disadvantage, because this is the way we are going anyway.

4.10.4 "The Sceptics"

Nevertheless, a minority of the adults interviewed chose the third scenario. In this respect, we found no significant correlation with socio-demographic profile (family, occupation, or gender), but rather with their personal experience with computers. In this sense, a very homogeneous group among the people interviewed totally support the third scenario: those coming from households where the computer was rapidly rejected after the initial period of discovery, or where it did not take on any significant meaning over time, unless it was for game purposes. Thus, it is these people who have the impression of having been victimized or penalized by advertising, and who seem to reject the presence of computers in their daily lives. This summarized by the following comment:

> They [computers] can't invade our daily lives, because after all, you should decide yourself what to do with your life.

It is important to emphasize that another group of respondents chose the third scenario mainly because it takes the drama out of the process of the computerization of society (the respondents found pertinent elements in the two others, but found exception with their excessive character). In fact, this was exclusively the case in families where the computer was integrated as a working tool (not

necessarily those where the computer is used more, but those where it is used regularly for serious purposes). These people justify their choice in the following terms.

> At the beginning it was a tool, that is why scenario 3 is more realistic. There is no cause and effect relationship between the fact of using computers and the fact of a solution to the economic crisis.

or

> Scenarios 1 and 2 overestimate the upheaval: the computer is just a working tool in the same way as a pen, there is always a human being behind it.

CHAPTER 5

THE DIFFUSION OF HOME COMPUTERS IN CANADA

In this chapter, we will discuss the results of the survey carried out by the Centre de recherche de l'opinion publique (CROP) on our behalf (CROP Omnibus, 1985). The purpose of integrating this survey into our own study was to obtain an overview of the national home computer market. This step seemed particularly pertinent at this stage of our work, because the third phase of this study will have a national scope.

Before discussing the results of this survey, we will briefly review the methodological background. Most of the data in this study were collected from information provided by 2040 adults (18 years or older) in November 1985. The probabilistic sample was obtained by stratification of the Canadian population in accordance with its socio-economic characteristics. Thus, it is representative of the Canadian population, with the exception of the Yukon and North-West Territories. We will also provide several statistical indices collected in a way comparable to the process described above, but this time within the framework of CROP Omnibus surveys for 1982, 1983, and 1984.

First, we will discuss the socio-demographic data related to ownership of a home computer in 1985. Secondly, we will provide a detailed analysis of these data as a function of the actual technical potential of the computer acquired. Third, we will discuss the evolution of the adoption rate in Quebec and in the rest of Canada.

5.1 Socio-Economic Data Related to Ownership of a Home Microcomputer in 1985

The first finding of this analysis is that, in November 1985, 13% of the Canadian population owned at least one home microcomputer, and 10% of the microcomputer owners had two. Nevertheless, as we will see below, the rate of penetration of the Canadian home market varies considerably in accordance with certain socio-demographic criteria.

First, the rate of penetration varies as a function of the **age of the population:** most owners are either between 30 and 44 years of age (18% of them have purchased a microcomputer), or between 18 and 29 years of age (15%); while only 11% of people between 45 and 55 years of age, and 3% of those 60 years or older have a microcomputer. Moreover, owners of this type of machine are more likely to be male (14%) than female (11%). On the other hand, there are no differences between single people and couples (with or without children).

The **level of education** seems to play a primary role. In fact, even though only 3% of the respondents who have completed primary school have purchased a personal computer, this is the case in 10% of those who have a secondary diploma, and 22% of those who have a post-secondary diploma (college or university). An identical trend is found as a function of annual family income, since the proportion of owners goes from 2% in the case of respondents who report an income of less than $15,000 per year, to 22% of those who

report an income of $35,000 per year or more ($15,000-$25,000 = 8%; $25,000-$35,000 = 13%). The same is true in relation to the owner's occupation: almost one third (29%) of professionals or upper managers have their own microcomputers, while the figure is only 17% in the case of various white-collar professions; and 7% in the case of specialized or non-specialized blue-collar workers.

Finally, home computing seems to be more popular among anglophones: 14% of them own their own computers, against 9% in the case of francophones. This brings us to a discussion of the considerable variations revealed by a regional analysis of the Canadian market. In fact, the two provinces where the rate of penetration of home computers is the highest are Alberta (19%) and British Columbia (17%); while only 13% of the people in Ontario, 12% in Quebec, and 8% in the Atlantic provinces own a personal computer (see Appendix, Table XXV).

Even though these figures provide an initial indicator of computer equipment in Canadian homes, they are nevertheless rather general. This is why we wanted to carry out a more detailed analysis by obtaining more information regarding the actual technical capacity of the machines acquired. To this end, we asked respondents who owned a microcomputer to specify the brand and model.

5.2 Analysis of the Canadian Market as a Function of the Type of Microcomputer Acquired

In general terms, three models share practically half (45%) of the Canadian market: Commodore VIC 20 (18%), Commodore 64 (17%), and Coleco/Atari (10%). All the other brands and models captureless than 10% of the market each. It seemed appropriate to regroup the models mentioned into three generic categories, as a function of their actual technical capacity. In order to simplify the analysis, we have called these three computer families: the "less expensive", "middle range", and "more expensive" groups respectively (these criteria are established from the point of view of the domestic market, and it is unlikely that they correspond to the requirements for computers acquired for job-related purposes).

If we use our regrouping, we obtain a global distribution of the Canadian market where "less expensive" computers are predominant (39% of the total); while "middle range" machines represent 21% of the total and "more expensive" computers represent 17%. It is important to note that 16% of the respondents could not specify the model, and 7% had no reply. This said, we can again attempt to emphasize significant variations as a function of socio-demographic criteria.

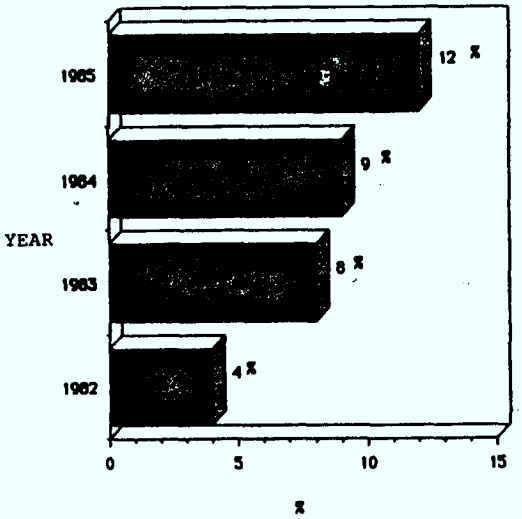
As could be expected, the technical sophistication of the computer acquired increases in accordance with the annual family income of the owners: even though more than three-quarters (77%) of the respondents who reported an income of $15,000 or less own an

inexpensive computer, this was the case in only 26% of those who reported an income of $35,000 or more. On the other hand, this proportion is reversed when we look at the profile of those who have invested in a "more expensive" computer: 15% of those earning $15,000 or less; and more than one-quarter (26%) of those earning $35,000 or more. Nevertheless, we would like to point out that the group earning $15,000 or less has invested more often in a "more expensive" computer than those in the salary categories immediately above ($15,000-$25,000, 2%; and $25,000-$35,000, 10%). This could be explained by the presence of students in this category of respondents. Moreover, an analysis based on the educational level of the owners seems to confirm this interpretation: the technical capacity of the machine acquired increases proportionally with the level of education.

Finally, we would like to point out that a larger proportion of anglophones invest in "middle range" or "more expensive" machines than francophones (45% for anglophones vs 30% for francophones). Nevertheless, an analysis along the regional dimension clarifies this a priori cultural differentiation. In fact, the regional analysis reveals that the two provinces where investment in "more expensive" machines is higher are Quebec (24%) followed by British Columbia (22%); while in the other provinces this figure is systematically under 20% (see Appendix, Table XXVI).

Figure 21

EVOLUTION IN THE ADOPTION RATE IN QUEBEC



5.3 Changes in the Adoption Rate

Figure 21 shows that the adoption rate increased significantly in Quebec between 1982 (4%) and 1985 (12%).

Even though this is a less "elitist" profile than that of a few years ago, home microcomputers owners seem to be characterized by certain particular traits: 21% of the families whose annual income is over $35,000 own such a machine. This is also the case in 21% of individuals who have completed fourteen years of school or more, and 26% of professionals (the rate of penetration of the home microcomputer in homes where the head of the family has a service sector job--specialized or semi-specialized--fluctuates between 10 and 14%).

The language spoken in the family also seems to be an important factor, since 23% of anglophone Quebec homes own a microcomputer against only 10% of francophone families. In this respect, it is highly probable that the fact that resource materials (particularly software), which have been essentially designed in the United States, are published in English, represents a significant cultural handicap for a number of francophone families.

Finally, an analysis of the rate of penetration of the home microcomputer in accordance with area of residence reveals that this is 13% in communities of one million inhabitants or more, 18% in regions where the population concentration varies between 100,000 and one million, 10% where population varies between 5,000 and

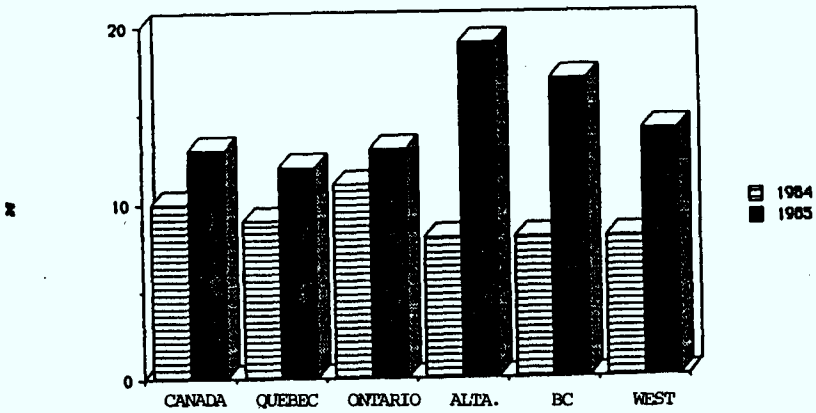
100,000, and 6% in areas where there are fewer than 5,000 inhabitants.

In Canada as a whole, a similar evolution seems to have taken place: in 1982, only 4% of the homes owned a microcomputer; while this figure is 13% in 1985. Moreover, in 1985, more than one-third (37%) of the buyers use their microcomputers for amusement purposes, one-quarter (26%) for job-related purposes, and 19% for educational purposes.

The few comparative data available at the national level also indicate that these changes vary considerably depending on the region. Thus, as we have already mentioned, according to the latest statistics obtained by CROP, the rate of penetration of the microcomputer in certain regions of western Canada, particularly Alberta and British Columbia, has more than doubled. Even though, given the size of the sample, we have to take into account the margin of error at this level of analysis, it is nevertheless true that the rate of penetration in these regions seems to have increased considerably (Figure 22).

Figure 22

MICROCOMPUTER ADOPTION RATE IN CANADA



CHAPTER 6

DISCUSSION AND CONCLUSIONS

6.1 Discussion

At the end of the second phase of our study, we believe that we have obtained rather unique data about what we have termed "the home computer phenomenon".

The first phase of our study, which was carried out in 1983, made it possible to clarify the conditions of adoption of the home microcomputer, its uses, and its impact on the daily lives of the respondents who had owned one for less than one year. In Chapter 2 of this report, we summarized the main results of the first research phase. Moreover, the results of this initial data collection have already been distributed and published in various reports (Caron et al., 1985a), and articles (Caron et al., 1985b).

The second phase of our study was carried out in 1985, and its primary objective was to analyze the potential reappropriation of the microcomputer by its owner and the members of the owner's family in the years following the initial adoption. In order to do this, we used a double methodology: questionnaire data made it possible to compare, with a certain amount of precision, changes in the use patterns of the microcomputer and its long-term impact on the daily life of the households that had adopted it; however, aware of the limitations of the written questionnaire, we also used in-depth interviews with all the members of approximately twenty

households, in order to determine more clearly the roles and respective perceptions of the various family members in relation to this new technological object.

Before discussing in more detail the results of this double data collection and the study as a whole, it will be useful to review briefly the main results obtained.

6.1.1 The Home Microcomputer: 1983-1985

What had become of the microcomputer and its place in the home two years later? Three adoption profiles were obtained: the microcomputer was no longer used by approximately one out of every five people in our sample (18%). Some had disposed of their microcomputers, while others had simply set them aside. For a comparable number of respondents (18%), the computer was sufficiently important to lead to subsequent financial investments that took the form of purchasing a second microcomputer of better quality. For most respondents (64%), the microcomputer was still being used more or less assiduously, but in this case, it was still the first machine bought, which may have been upgraded with various peripheral devices.

In the "discontinued use" group, more than half of the respondents had kept their microcomputers, while the others disposed of them. Moreover, this attitude seems to be rather firm: the lack of interest mentioned by the great majority of these respondents means that most of them are not planning to buy another

microcomputer in the future. The interviews conducted with families who no longer used their microcomputers indicate that, on the whole, they stopped using their computers once the "novelty effect" had worn off, and after they had explored how the machines worked (especially in terms of playing games). For these people, it was the home computing phenomenon as a whole that had lost its meaning.

In the "second personal computer" group, the reasons mentioned for the new purchase were not the same as in 1983: rather than family reasons, job-related motives were mentioned the most. The second microcomputer is almost never bought as a gift; however, from a more precise utilization point of view, 81% of the respondents now own a printer. Learning to program has lost its importance as a purchase motivation. In general, the purchase of the second machine affects the utilization of the first: 23% of the respondents have disposed of their first machine, while 32% use them less, or the machine is used mainly by children for games.

This time, the decision to make the purchase seems to be more mature, and the sources of information have changed: the advice of personal friends is of primary importance, and the buyer chooses more carefully: a majority of them said that they had consulted catalogues in a store. At this point, mass media sources are no longer relevant, except for magazine articles, which were consulted by 60% of our respondents in this group. As far as the new machine is concerned, in almost all cases, it is of better quality than the

first. The less expensive machine is still Commodore 64 (26% of the respondents), but 32% purchased an IBM PC, Apple II, or Macintosh.

Moreover, the qualitative analysis emphasized that the purchase of the second microcomputer clearly represents an extension of the computerization process in the home; contrary to some theories that see it as a way to solve problems of competition between individuals for access to a single computer.

6.I.2 Comparison of Adoption Profiles

How do we explain the fact the respondents fit into one or other of these three profiles? In what ways are their behaviors and attitudes different The **socio-demographic data** alone do not make it possible to predict that an individual will belong to one of the three groups. In fact, there are few differences, even though there is a larger proportion of "discontinued use" in homes where the owner respondent was a woman, and the "second personal computer" group includes fewer blue-collar workers and more people in upper management and professors than the two other groups. In the following sections, we will see that it is mainly in terms of the equipment initially or subsequently bought, the planned and effective uses of the device, and the support offered by the respondent's personal and professional circle that the differences appear.

Thus, the **equipment** bought initially seems to be a rather good index for predicting the type of appropriation that will take

place. Already in 1983, the "discontinued use" group was less well equipped: they owned more "less expensive" machines (TI-99 ans VIC-20) and fewer "middle range" or "more expensive" machines (Commodore 64, TRS 80) than the two other groups. Nevertheless, it is important to point out that many respondents in the "second personal computer" group also had "less expensive" machines: thus, although it is true that the fact of owning a less powerful device may have discouraged some, it may also have pushed others to re-equip themselves. An analysis of the interviews carried out with families who had bought a second microcomputer clearly shows that purchasing a "less expensive" machine first was seen as a simple stage in the process of learning about computers, and thus seems to fit within a certain strategy: one buys something on sale because one is not too sure of the real usefulness of home computing:

> We bought whatever was more economical, so that we could learn about it, and at the same time, by becoming more competent, we could then make a better choice.

The **peripheral equipment** can also be used to emphasize these differences: respondents in the "discontinued use" group were less likely to have a video monitor or diskreader, and almost never (6%) owned a printer. It is clear that the printer seems to be a determinant, even in terms of predicting the behavior of respondents in the "continued use" and "second personal computer" groups. In 1983, 17% of the respondents in the "continued use" group owned one, while this proportion was already 43% in the "second personal

computer". Moreover, this tendency for the "second personal computer group" to upgrade its equipment will increase in 1985. The members of this group are more likely to own a printer (81% of the second computer group vs. 44% for the continued use group), as well as a disk drive (84% vs. 54%) or additional memory capacity (41% vs. 16%). Several households in the "second personal computer" group also have a modem (23%).

The interview data also underline the fact that it is above all the investment in peripherals that seems at the present time to separate the households where the computer is used on a regular basis and for "more serious" purposes, from those where the use of the machine is only occasional and largely for game-playing.

Certain other factors seem to be linked to the extent or appropriation of the personal computer. The discontinued use group in 1983 made less **collective or family use** of the home computer than did the other two groups. In all cases, this use was essentially one of game-playing, and to a lesser extent, of learning computer programming.

Mutual support also seems to play a role: in 1983, the members of the "discontinued use" group reported having fewer friends who had a home computer than the respondents in the two other groups. Furthermore, in 1983, there was no difference between the three groups of respondents regarding **membership in a computer club** (we must remember that they had only recently obtained their machines at that time), whereas in 1985, 34% of the

respondents in the "second personal computer" group are enrolled in such a club, versus 17% of the respondents in the "continued use" group.

The interview data provide a wider range of information on the motivations behind joining a personal computer club. For some respondents (those identified as belonging to the "continued use" group in the quantitative section) it was to compensate for lack of interest in their families (socialization need) or to make up for their own lack of knowledge in this field. For the latter group, enrollment is motivated by a desire to master programming (need to fit into an educational framework). A third motivation, which was especially evident in those respondents who had invested most heavily in programming (present in the "continued use" and "second personal computer" groups) is economic: enrollment in a personal computer club is an easy and less expensive way to gain access to new programs and equipment.

Even though the above mentioned data are good indicators of our three adoption profiles, it is undoubtedly the **time that is spend and the use** made of the home computer by the sample that will allow us to understand these groups better. In 1983, it was already possible to differentiate clearly between the three groups of respondents, on the basis of their total utilization time. Even though the respondents as a whole spent a good part of their utilization time learning the technology, respondents in the "discontinued use" group played more games and carried out fewer job related and word processing activities. The same was true for

the "continued use" group in relation to the "second personal computer group". In 1985, the differences between the "continued use" and "second personal computer" groups are also accentuated. In both cases, games and programming have decreased in importance while job related activities have increased, the respondents in the "second personal computer" group being clearly more oriented toward job-related activities than those in the "continued use" group. As far as total utilization time is concerned, the "second personal computer" group spend almost twice as many hours using the computer as those in the "continued use" group. Moreover, the time spent is significant, having reached 13.1 hr/wk in the "second personal computer" group and 6.2 hr/wk in the "continued use" group.

Moreover, the analysis of the interviews revealed that, in 1985 (two years after the initial purchase), once the initial period of familiarization has passed, microcomputer use is the result of a process of investigating microcomputer functions. For the respondents to integrate these applications in a meaningful way, it is undoubtedly necessary that they be able to perceive their utility and pertinence to a particular field. In general, it is in relation to professional life (job or educational activities) that an application seems most clearly pertinent.

The spouses of the respondents showed rather similar utilization profiles from one group to the other; however, the evolution over time seems to differ: in the "continued use" group, utilization by the spouse clearly decreased from 1983 to 1985, whereas it increased in the case of spouses in the "second personal

computer" group. In both groups, games and learning activities lost ground in 1985 in relation to job-related activities. Here again, total activity nevertheless reached 4 hr/wk in the case of spouses in the "second personal computer" group, and 2 hr/wk in the case of those in the "continued use" group. Also, we would like to emphasize that, in 1985, the respondents in the "second microcomputer" group were significantly ($p < .05$) more likely to have regular access to data processing in their work place. However, there were no differences between the two groups in 1983.

As far as children are concerned, the analyses showed an evolution rather similar to spouses': decrease of total utilization time in the "continued use" group, and increase in the "second personal computer" group. In both groups, interest in games remained constant, but there was a decrease in the use of educational programs, and a certain increase in programming activities. In both groups, the total time spent at the activity by children reached 4 hr/wk.

As far as mass media activities are concerned, the perceived impact of the microcomputer seems quite clear: since 1983, all groups said that they spent less time watching television. The "discontinued use" group was the least affected, however. Similarly, the "discontinued use" group also show the least effect in terms of the time spent listening to the radio and reading. Thus, right from the first few months, those respondents who were more likely to stop using their computers, had already assigned a less important place for this activity in their time-budgets. In general,

in 1985, this perceived impact continued, but it was stronger in the case of the "second personal computer" group than in that of the "continued use" group. In the two groups that still use their microcomputers, the machine was perceived by most as having introduced changes in the behavior of their children. In general, these changes were perceived as positive: the children had acquired new interests.

In 1983, our respondents had very positive views about the development of data processing in society. However, the respondents in the "discontinued use" group were again different from the two others. In 1985, the opinions of the respondents in all groups remained rather optimistic.

6.2 Conclusions

In order to avoid any unfounded generalizations, it is important that we from the outset recognize the limitations of our study. First, most of the data was collected from people who had bought their microcomputers in 1983 (even though some of them bought a second microcomputer later). In the last two years, however, new models have become available on the Canadian microcomputer market. Thus, we cannot state with any certainty that buyers of two years ago displayed behaviors and attitudes that are totally similar to those of present buyers **On the other hand, the first phase of the study showed that these respondents could easily be identified with those adopter profiles that**

Rogers (1983) termed the "forward majority" that is, individuals whose socio-demographic characteristics are different from those of the average population (better educated, higher incomes, etc.), but who are not fundamentally different in terms of behaviors and attitudes. The respondents in our study, including those who bought their microcomputers two years ago, do not seem to be marginal in relation to the rest of the population.

Secondly, since our data were obtained from a sample of only French-speaking Quebecers, we are unable to generalize from these results to the Canadian population as a whole. Although the results of the CROP poll support the finding that the penetration rate for the home computer in the total Quebec domestic market is the same as the national average (12% for Quebec and 13% for Canada), the rate appears to be less pronounced for the Quebec French-speaking population (10% versus 23% in the English-speaking population of Quebec). This being said, the studies that have been carried out in English-language countries, for example, the United States and Great Britain, do not reveal behaviors that differed fundamentally from our own respondents'. Furthermore, there seems little reason to believe that Quebecers would differ drastically from the rest of the Canadian population with respect to certain aspects of the impact of the personal computer such as on media behavior

or the re-invention of its functions. It would, however, be advisable to verify this statement in future years.

Finally, our study has been limited to what we have defined as the domestic or household context (despite certain data that go beyond those bounds, such as the use of the personal computer on the job, etc.) When we refer to the potential uses of the microcomputer, it must be kept in mind that the home is one area among others where this "reappropriation" may occur.

Despite the fact that a significant number of Canadian households now have access to a personal computer (the penetration rate for home computers has risen from 4% to 12% in Quebec in four years and is at 13% for Canada as a whole), certain myths about computers and their users continue to circulate. One of the most common is "the personal computer in the closet", according to which the computer is purchased solely as a result of the power of advertising and then put aside after a few trials. Another persistent cliche is to see the personal computer as the exclusive toy of a small, anti-social elite, who become totally oblivious to the outside world once they acquire it. There is also the "myth of the electronic cottage" (a particularly popular one at the beginning of the 80's) according to which the home would rapidly become THE nerve centre of the information society.

Nonetheless, these cliches have some basis in a more serious question to which no one seems to have an answer: why and how do the silent majority of microcomputer buyers use their machines? In

light of this, at the beginning of the 1980's the home computer industry attempted to impose its own ideas and conceptions about the personal computer: the computer, it said, would be called upon to become the cement of family relations, the catalyst of a new set of parent/child bonding, in addition to being a household management aid. The industry endeavoured to turn the computer into a tool for the household in the functional sense of the term.

It was precisely at this point in time (1983) that the respondents in our study acquired their personal computers. Our findings clearly demonstrate, however, that it was not household management and family software that generally constitute the main use of the microcomputer two years after this purchase by our respondents. There has been, therefore, a reappropriation of the innovation. This was not the case for everyone, however: the "discontinued use" group displays a loss of interest in home microcomputing. The study results reveal that this first group invested primarily in "low end" machines (TI 99, etc.) whose technical limitations restricted their use to electronic games (which is what in fact they were used for). In addition, our interview data are an eloquent testimony to the fact the respondents in this first group were "naive consumers" for the most part; particularly susceptible to the advertising message of 1983, they had inordinately high expectations for their "personal computer". These uninitiated consumers had none or little knowledge of the computer field, and no one among their acquaintances to turn to for information. Having to rely on the formal sales structure, it was the

question of cost, the essential factor in choice of model, that led them to purchase low performance models. Once confronted by the reality of the low end computer they had the feeling they had been tricked by the ads that had sold them impossible applications and by the salespeople who had failed to warn them about subsequent costs. Their lack of interest and total rejection of the home computer seem to stem from this. In other words, this first group of adopters had in a sense "been held prisoners" of the image of the personal computer that others had suggested. The quantitative data show furthermore that this is a firm rejection (very few of those respondents had any intention to buy another computer during the coming year). Thus, while there reappropriation, there was also no acceptance of the industry's image either.

The two other groups of users defined in this study, ("continued use" and "second personal computer" groups) seem, on the other hand, to have effectively initiated a process of reappropriation of home microcomputing. This tendency seems more pronounced in the "second personal computer" group. Both the quantitative and qualitative data speak for themselves in this regard: respondents who invest in additional equipment, or buy a new, more powerful model, are of course those who use their machine most regularly. But above all, they use it differently: a large majority adopt it for their professional life and use it decreasingly for games or for learning about computer technology (including programming).

In short, the phenomenon of microcomputing is a persistent fact: the individuals who continue to make use of it (the majority of our sample) have integrated it into their activities for essentially utilitarian purposes. But this bears no relation to the machines that were discounted by the manufacturers and advertisers at the beginning of the 1980's. The home personal computer, as users have adapted it during their experience is no longer a tool for the home in the functional sense: the home must instead be understood here in its geographical sense, that is as a location, (within the home).

In conclusion, we emphasize the state of the microcomputer market as the factor which probably most seriously hampers the expansion of home computing. The majority of respondents expressed numerous complaints about this: incompatibility between brands and software, defective equipment, lack of information and documentation, poor service and lack of software in French were among the day-to-day stumbling blocks encountered by users. Moreover, the respondents who have invested the most in this area (the "second personal computer group") have increasingly abandoned the "formal structure" of the microcomputer market. Our data show that a substantial proportion of them have joined clubs in order to gain easy and direct access to software and therefore to the applications which interest them (having said this, we do not wish to pass judgment here on the pirating and illegal copying of software...).

Whatever the case may be, the longitudinal study of our sample over a two-year period has clearly demonstrated the dynamism of

the process of adoption of an innovation. This has taken various forms over time: for a minority of respondents (18%) adoption has ultimately ended in the rejection of home computing. For the two other groups of users ("continued use" and "second personal computer") adoption has initiated a more or less rapid process of reappropriation of home microcomputing in connection with their professional lives.

There is therefore every reason to believe that home microcomputing as redefined in terms of professional activities can no longer be seen as just another fad. Nor should we ignore over the long term the contributions of such external influences as computerization of the school and work environments which will certainly stimulate individual demand by increasing the visibility of microcomputing (notably among children). It is of course highly unlikely that home microcomputing - in its current form - will ever be diffused throughout the entire population; rather than being a mass medium, the personal computer remains a tool which fulfills specific individual needs and cannot therefore meet the expectations of an entire population. Whatever the exact percentage of the population that adopts the personal computer, its adoption will cease to be considered a marginal phenomenon and will ultimately be recognized for what it is: a social fact.

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Appendix

Table I

Socio-Demographic Profile

Comparison of Non-adopters, Later adopters, Early adopters

	Gender of respondent %		Average age of respondents	Average income	Occupation of respondents %				
	Male	Female			Professionals Senior managers	Blue collar	White collar	Teachers	Other
Non Adopters	43%	57%	34	33,600	16%	9%	25%	25%	25%
Later Adopters	68%	32%	35	34,500	21%	17%	17%	18%	18%
Early Adopters	79%	21%	34	35,000	18%	21%	17%	18%	26%

Table II

Family Structure
Comparison of Non-adopters/Later adopters/Early adopters

	- Couples Number of children					Single parents	Single
	0	1	2	3	4		
Non adopters	38%	18%	21%	8%	2%	3%	19%
Later adopters	24%	16%	27%	11%	2%	7%	13%
Early adopters	24%	15%	32%	5%	3%	8%	13%

Table III

Comparison of respondent-purchasers in the "Discontinued Use", "Continued Use" and "Second personal Computer" Groups, according to gender, occupation and Family income

Purchaser	GENDER		OCCUPATION					FAMILY INCOME				
	Male %	Female %	Prof. Sen. man. %	Teachers %	White Collar %	Blue Collar %	Other (Student home-maker, etc.) %	20000 and less %	20001 to 30000 %	30001 to 40000 %	40001 to 50000 %	50001 and over %
Discontinued Use N = 71 18%	54	46	16	14	25	29	17	15	17	27	20	21
Continued Use N = 255 64%	70	30	19	15	27	25	14	17	20	22	21	22
Second personal computer N = 73 18%	73	28	26	19	23	14	19	11	11	27	20	30
N = 399	$p < .05$	32%	20%	15%	26%	23%	16%		$\bar{x}$ = 36 700$			

Table IV

Comparison of the 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to their job-related use of the personal computer
Respondent-purchasers for 1983-1985

Job-related use of the personal computer / Group of respondents	Discontinued Use		Continued Use		Second Personal	
Date of comparison	1983 %	1985 %	1983 %	1985 %	1983 %	1985 %
Yes (from time to time)	11	*	17	24	14	16
Yes (regularly)	7	*	14	24	15	44
No	82	*	69	52	71	40

* not applicable

Table V

"Second personal computer" Group
Comparison between First and Second Models

Personal computer model	First Personal Computer (1983) %	Second Personal Computer (1985) %
IMB PC	3	14
APPLE II	8	6
APPLE MACINTOSH	0	13
COMMODORE 64	22	26
COMMODORE VIC 20	16	1
TRS 80	33	15
TI 99	14	3
PANAMA XT	0	4
ADAM	0	4
Model not specified	0	3
Other	4	11
Total	100	100

Table VI

"Second personal computer" Group
Sources of information concerning the choice
of purchased model
Comparison between 1983 and 1985*

	First Personal Computer (1983) %	Second Personal Computer (1985) %
Television programm	6	17
Television advertising	7	4
Newspaper article	11	6
Newspaper ad	16	7
Magazine article	40	60
Magazine ad	11	3
Computer book	21	6
Store catalogue	21	43
Store visit	70	26
Acquaintance	27	64
Colleague at work	21	8
Family	22	1
Work place	1	11
Other/do not recall	4	1

* As up to three choices could be listed, the percentage totals may exceed 100%.

Table VII

Comparison of the 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to the peripherals purchased in 1983 and in 1985
(The figures are given percentage of
respondents in each group)

Group of respondents	Discontinued Use		Continued Use		Second Personal Computer	
Peripherals purchased / Date of comparison	1983	1985	1983	1985	1983	1985
Monitor	14	*	39	67	39	74
Cassette drive	81	"	66	63	75	56
Disk Drive	14	"	42	54	35	84
Printer	6	"	17	44	43	81
Modem	1	"	4	9	6	23
Additional memory	11	"	17	16	35	41
Joy Stick	64	"	81	85	68	74
Electrical Appliances Control	0	"	3	4	3	4
Graphics board	1	"	2	4	1	19
Synthesizer	0	"	3	5	7	3
Mouse	*	"	*	4	*	21
Other	19	"	11	2	24	10

* Not applicable
As more than one peripheral
could be mentioned, the percentage
totals may exceed 100%

Table VIII

Comparison of 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to use of the microcomputer by principal respondent
for 1983 and 1985 (average number of hours per week)

Group of respondents	Discontinued Use		Continued Use		Second Personal Computer	
Type of use / Date of comparison	1983 hr/wk	1985 hr/wk	1983 hr/wk	1985 hr/wk	1983 hr/wk	1985 hr/wk
Learning about the technology	2.4	*	3.2	2.0	5.1	3.5
Games	1.7	*	1.7	1.1	1.9	1.7
Job-related	0.2	*	0.8	2.3	2.2	5.6
Family-related	0.5	*	0.5	0.4	0.9	1.1
Children's educational	0.1	*	0.2	0.1	0.3	0.3
Total	4.9		6.4	5.9	10.4	12.2

* Not applicable

Table IX

Comparison of 2 groups:
"Continued Use" and "Second personal computer"
according to spouse's use of the computer

	Continued Use		Second Personal Computer	
	1983 hr/wk	1985 hr/wk	1983 hr/wk	1985 hr/wk
Learning about the technology	1.2	0.4	1.2	1.1
Games	1.7	0.4	0.9	0.5
Job-related	0.2	0.7	.6	1.4
Family-related	0.2	0.1	0.4	0.9
Childen's educational	0.2	0.1	0.1	0
Totals	3.5	1.7	3.2	3.9

Table X

Comparison of 2 groups:
"Continued Use" and "Second personal computer"
according to children's use
(average number of hours per week)

	Continued Use		Second Personal Computer	
	1983 hr/wk	1985 hr/wk	1983 hr/wk	1985 hr/wk
Learning about the technology	0.5	0.8	0.6	1.4
Games	2.8	2.2	1.4	1.5
Job-related	0.1	0.3	0.1	1.0
Family-related	0	0	0	0
Childen's educational	1.0	0.4	1.0	0.9
Totals	4.4	3.7	3.1	4.8

Table XI

Comparison of the 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to the amount of family use of the computer
in 1983 and in 1985

Group of respondents	Discontinued Use		Continued Use		Second Personal Computer	
Type of family use / Date of comparison	1983 %	1985 %	1983 %	1985 %	1983 %	1985 %
No	47	*	28	38	27	25
Yes (unspecified)	10	*	14	7	8	11
Games	28	"	45	44	44	43
Educational	3	"	10	8	12	11
Household (family management)	0	"	1	2	3	6
Programming	14	"	14	19	30	22
Word processing	1	"	0	3	3	10
Learning about the machine	7	"	7	1	7	3
Other	1	"	0	1	0	5
		*				

*: Not applicable
As more than one type of use could be mentioned, the total percentages can exceed 100%

Table XII

Comparison of 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to enrollment in a Computer Club
in 1983 and 1985

Group of respondents		Discontinued Use		Continued Use		Second Personal Computer	
Enrollment in a Computer Club	Dates of comparison	1983 %	1985 %	1983 %	1985 %	1983 %	1985 %
	Yes	11	*	15	17	15	34
	No	89	*	85	84	85	66

* Not applicable

Table XIII

Comparison of 3 groups:
"Discontinued Use", "Continued Use", "Second personal computer"
according to the rules for children's use
of the microcomputer in 1983 and 1985

Group of respondents	Discontinued Use		Continued Use		Second Personal Computer	
Established rules / Date of comparison	1983 %	1985 %	1983 %	1985 %	1983 %	1985 %
None	63	*	54	65	55	61
Fixed hours for use	6	*	6	2	9	5
Time limit on use	9	*	22	17	20	17
Save time for other leisure activities	9	*	12	5	18	10
Care of the equipement	20	*	9	6	7	7
In the presence of an adult only	9	*	7	5	2	5
Regulation of the types of use	0	*	5	3	5	0
Other	0	*	0	3	0	2

* Not applicable
As more than one rule could be mentioned the total percentages can exceed 100%

Tableau XIV

Distribution of respondents by occupation
(1983 findings)

	(N)	(%)
Teachers	56	15.1
Managers and other professionals	89	24.4
White collar, Sales	92	24.9
Blue collar	63	17.0
Students	20	5.4
Retired	6	1.6
Homemakers	20	7.6
Unemployed	16	4.3
Total	372	100.3

Table XV

Main use of the personal computer by respondent's occupation (1983 findings). The figures show the percentage of respondents in each group who mentioned the activity as their principal use

	Teachers	Managers and other profes-sionals	White Collar	Blue Collar
Games	2%	6%	10%	8%
Family use programs	5%	8%	15%	14%
Work and word processing	32%	24%	16%	13%
Learning to program	30%	32%	30%	35%

Table XVI

Distribution of the "Discontinued Use", "Continued Use" and "Second Personal Computer" groups according to occupational category

	Teachers	Managers and other professionals	White Collar	Blue Collar
Discontinued use	16.9%	16.0%	18.2%	23.3%
Continued use	61.0%	60.0%	65.7%	65.6%
Second personal computer	22.0%	24.0%	16.2%	11.1%
Total	100%	100%	100%	100%

Table XVII

Respondents' utilization of the home computer (hr/wk) by occupational category 1983-1985

	Teachers	Managers and other professionals	White Collar	Blue Collar
1983				
Children's Educational Games	1.35	.98	2.08	1.63
Work and word processing	2.32	1.10	.87	.84
Learning about the technology	2.62	2.22	2.98	4.45
Other	6.7	.44	1.27	.59
Total	6.96	4.74	7.20	7.51
1985				
Children's educational Games	.65	.80	1.97	.80
Work and word processing	3.55	2.91	3.95	2.07
Learning about the technology	1.95	1.39	2.95	3.71
Other	.64	.65	.83	.69
Total	6.79	5.75	9.70	7.27

Table XVIII

Distribution of respondents by age group

	(N)	(%)
7 to 12 years	1	.3%
13 to 18 years	15	4.2%
19 to 24 years	16	4.5%
25 to 35 years	131	37.1%
36 to 45 years	132	37.4%
46 to 55 years	44	12.5%
56 to 65 years	14	4.0%
	(N= 353)	100%

Table XIX

Major peripherals owned by respondents by age
(The figures show the percentage of respondents in each age group who had the peripheral at the end of 1983)

	18-24	25-35	36-45	46-55
Monitor	19%	23%	41%	54%
Cassette drive	100%	78%	66%	54%
Disk drive	13%	30%	40%	51%
Printer	13%	14%	18%	40%
Additional memory	13%	16%	23%	23%
Joy stick	75%	73%	82%	63%

Table XX

Distribution of Respondents in the "Discontinued Use" "Continued Use", and "Second Personal Computer" Groups (in %)

	18-24 years	25-35 years	36-45 years	46-55 years
Discontinued Use	37.5%	24.4%	12.9%	9.1%
Continued Use	43.8%	57.3%	68.2%	72.7%
Second personal Computer	18.8%	18.3%	18.9%	18.2%

Table XXI

Use of the Microcomputer by the Respondent as a Function of his Age Category. Changes between 1983 and 1985 (average hours/week)

1983	18-24 years	25-35 years	36-45 years	46-55 years
Games	3.73	1.90	1.14	1.80
Work and word processing	.06	1.28	.78	2.19
Learning about the technology	4.76	4.09	2.77	2.95
Other	1.49	0.97	0.50	0.16
Total	10.04	8.24	5.19	7.10
1985				
Games	4.55	1.34	.68	1.12
Work and word processing	1.04	3.36	2.64	3.38
Learning about the technology	3.57	3.29	1.46	3.95
Other	.70	.81	.45	.46
Total	9.86	8.80	5.23	8.91

Table XXII

Distribution of Respondents as a Function of Their Family Situation

	(N)	(%)
Single	49	15.8
Couple without children	69	22.3
Single parent family	19	6.1
Couple with 1 child	43	13.9
Couple with 2 children or more	130	41.9
	310	100

Table XXIII

Distribution of Respondents in the "Discontinued Use", "Continued Use" and "Second Personal Computer" Groups As a Function of Family Structure

	Singles	Couples without children	Single parent families	Couple with 1 child	Couple with 2 children or more
Discontinued Use	22%	28%	21%	14%	10%
Continued Use	51%	64%	63%	70%	72%
Second Personal Computer	27%	9%	16%	16%	19%

Table XXIV

Use of the Microcomputer by the Respondent as a Function of his Family Situation (in hours/week)

1983	Singles	Couples without children	Single parent families	Couple with 1 child	Couple with 2 children or more
Games	1.57	2.40	1.26	1.4	1.25
Work and word processing	1.54	1.40	2.10	.70	.73
Learning about the technology	4.65	3.84	2.50	2.80	2.71
Other	.55	1.03	.30	.89	.66
Total	8.31	8.67	6.16	5.79	5.35
1985					
Games	1.64	1.87	2.96	.59	.64
Work and word processing	4.91	2.30	3.25	3.60	1.90
Learning about the technology	4.59	3.46	2.96	1.64	1.96
Other	.86	1.03	.37	.66	.45
Total	12.00	8.66	9.54	6.49	4.95

Table XXV

Rate of Penetration of the Home Microcomputer in Accordance with Some Socio-Demographic Variables

	GENDER			Age				CIVIL STATUS		LANGUAGE		HOUSEHOLD INCOME				OCCUPATION				
	Total	M	F	18 to 29 yrs	30 to 44 yrs	45 to 59 yrs	60 yrs +	Single	Married	E	F	Under $15,000	$15-25,000	$25-35,000	$35,000 Or more	Prof Adm. PE	Tech PS EP	Office Sales Serv	SW SSW	UW
Sample	2040	982	1058	602	571	437	431	384	1412	1387	564	447	425	515	640	178	206	532	224	19
Yes	13	14	11	15	18	11	3	14	14	14	9	2	8	13	22	29	20	15	7	6
No	87	86	89	85	82	88	97	86	86	86	91	97	91	86	78	71	80	85	93	94

	SCHOOLING				REGION				SUB-REGION				
Sample	Total	0-8	9-13	14 +	Atlantic	Quebec	Ontario	Western Provinces	Toronto	Montreal	Man/Sask.	Alberta	B.C.
Sample	2040	343	1115	580	177	547	728	589	264	247	166	187	236
Yes		3	10	22	8	12	13	14	14	13	6	19	17
No		97	89	77	92	88	87	85	85	87	92	81	83

Table XXVI

Type of Home Microcomputer in Accordance With Some Socio-Demographic Profiles for All of Canada

Technical Potential	Totaux	INCOME				EDUCATION			SEX		Language		REGIONS					
		$5,000 or more	$15 - - 25,000	$25 - - 35,000	$35,000 and more	Pri-mary (0-8)	Second-ary	Comp-leted Sec.	M	F	F	E	Atlan-tic	Quebec	Ontario	Total West	Alber-ta	B.C.
Less Expensive Vic 20, coleco/Atari TI 99,RS 100/200	39%	77%	50%	52%	26%	56%	52%	25%	41	36	37	42	66	35	36	41	50	26
Middle Range Com. 64, TR80, COLOR Comp.2 RS1000, 2000	21%	0%	21%	20%	24%	26%	19%	23%	19	25	25	18	25	15	28	20	11	22
More Expensive Apple II, TI 4, Tc, IBM PC, Junior, McIntosh	17 %	15%	2%	10%	26%	0%	12%	23%	18	15	20	12	19	24	13	18	16	22
Unspecified (model)	16%																	

Don't know 7%

CARON, ANDRE H.
--Adapting to the caallenge of technology ; the case of the home computer

DATE DUE

FOREWORD

This report describes the results of a study undertaken in 1983 by the Department of Communications at the Université de Montréal. The purpose of this research was to analyze the **dynamics of integration of home microcomputers.**

Within the framework of the **first phase of the study carried out in the fall of 1983** for Communications Canada, we analyzed, on the basis of the information provided by more than 2000 respondents, **the process of diffusion of the microcomputer** in Quebec homes.

In order to do this, data was collected on people displaying various behaviors towards home computers: some who had recently acquired a personal microcomputer (n = 880); others who had taken this step more than a year before (n = 120); and finally, those who did not have a home computer (n = 1157); but who were interested in this technology.

This led to an initial review of the conditions determining the adoption or non-adoption of a home microcomputer. In addition, we were interested in the **use** that the buyer and his family made of their microcomputers, as well as the **impact** of the computer on the life-styles of the users.

The second phase was carried out **in the fall of 1985** also for Communications Canada. Its purpose was to determine, on the basis of answers provided by 400 families who owned a home computer (the same families who had taken part in the first phase of the study), **any changes in their views, attitudes, and behaviors towards their machines.** To this end, we collected two types of data using questionnaires and semi-directive interviews, which necessitated two complementary types of analysis: statistical and thematic content analyses.

This longitudinal form of survey and analysis--it is one of the few that have approached the problem in this way--made it possible to obtain a better grasp of the human dimension of the technological innovation represented by the home microcomputer.