Results of Our 49-Month Study of Business Attitudes Show Clerical/Support Staff, Managers and Executives Using More Technology at Work and at Home and Becoming More Hesitant Toward New Technology

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A brief summary of of this study's highlights and trends can be found by clicking here.

Executive Summary

Five field studies were performed with 3,129 full-time employees of a cross-section of companies in the urban Southern California area over a period of 49 months. The first study (n=542) was completed in October 1995. A replication was completed with 178 Clerical/Support Staff, Managers and Executives 18 months later in May 1997, another 18 months later in October 1998 (n=717), the fourth 43 months after the first in May 1999 (n=791) and the latest replication in November 1999 (n=901).

Each sample included both Clerical/Support Staff and Managers/Executives who were analyzed separately. This report includes an analysis of changes in the use of technology across the 49 months both at work and at home as well as changes in attitudes toward technology across all five studies.

Attitudinal results of the four-year study indicated that both Managers/Executives and Clerical/Support Staff became more hesitant toward technology with nearly two-thirds of both groups falling among the Hesitant "Prove Its."

Utilization results of the four-year study indicated that Managers/Executives used and understood technology more than Clerical/Support Staff. and that both Clerical/Support Staff and Managers/Executives used technology increasingly more across the 49 months both in the workplace and after standard working hours. Use of more complex technologies was predicted by level of TechnoStress with those less TechnoStressed using using these technologies more often.

SAMPLE DEMOGRAPHICS

Demographic data were collected in each study. The table below indicates, that, for the most part, the cross-sectional field study samples were similar in composition and statistical tests showed no significant differences. Only for ethnic groups, were there statistical differences across samples where the first sample had fewer subject of Spanish/Hispanic Descent and the second sample had fewer Asian subjects. The table below displays these demographics:

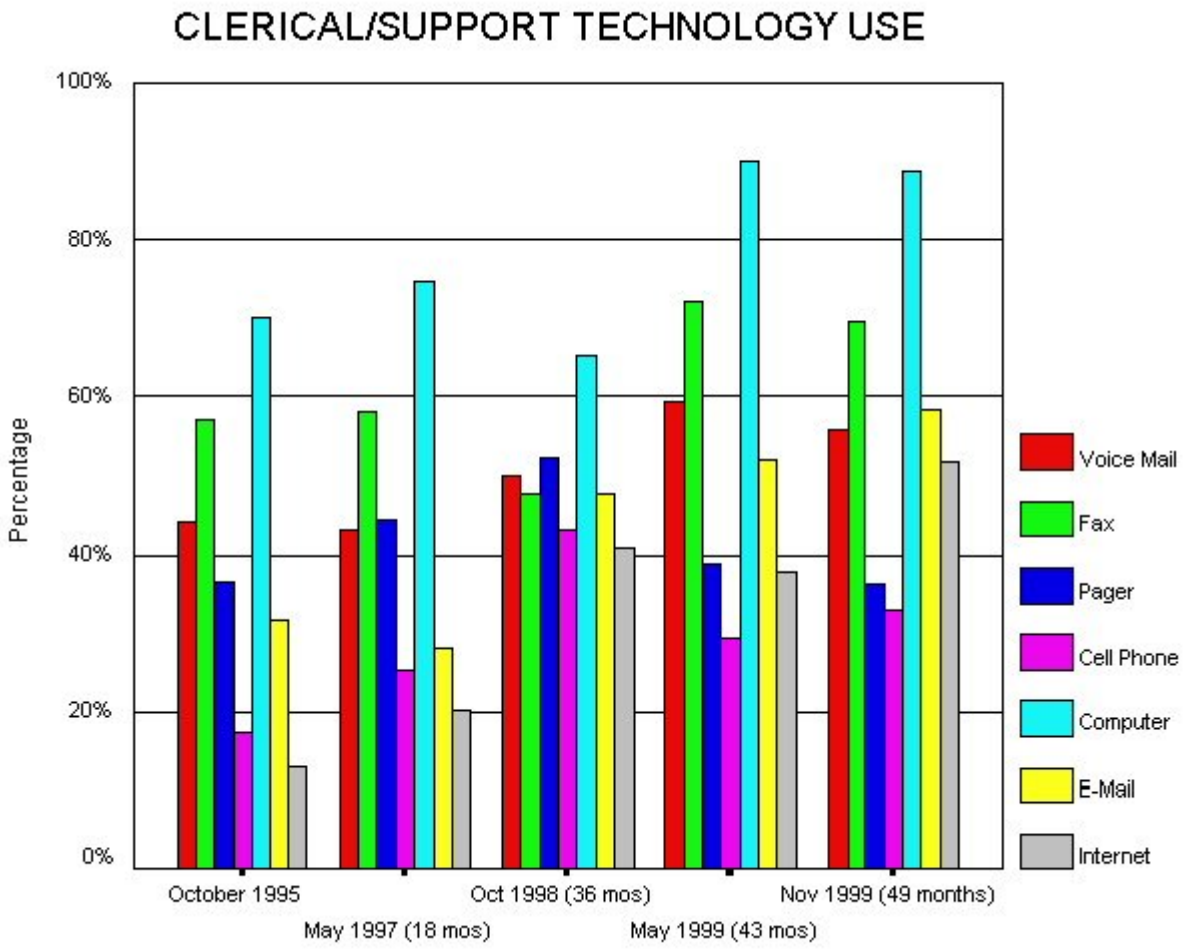
Demographic Characteristic	October 1995	May 1997	October 1998	May 1999	November 1999
GENDER					
Male	46%	45%	47%	44%	49%
Female	54%	55%	53%	56%	51%
AGE					
18-25	22%	24%	26%	21%	26%
26-35	32%	31%	31%	30%	33%
36-50	36%	38%	34%	36%	30%
51 or older	10%	7%	9%	13%	12%
EDUCATION					
No High School Degree	0%	3%	3%	2%	2%
High School Degree	12%	12%	12%	12%	10%
Technical School Degree	4%	2%	3%	4%	5%
Some College	45%	49%	39%	39%	42%
College Degree	30%	21%	32%	32%	30%
Postgraduate Degree	10%	13%	10%	11%	11%
FAMILY STRUCTURE					
Not Married, No Children	38%	45%	45%	40%	42%
Not Married, Children	13%	11%	10%	13%	10%
Married, No Children	16%	15%	15%	15%	18%
Married, Children	33%	30%	30%	32%	30%
ETHNIC BACKGROUND					
Asian/Asian American	13%	5%	12%	12%	12%
Black/African American	26%	24%	19%	22%	21%
Hispanic/Spanish Descent	18%	25%	24%	28%	25%
White/Caucasian	39%	39%	43%	35%	37%
Other - Unspecified	4%	7%	3%	4%	5%

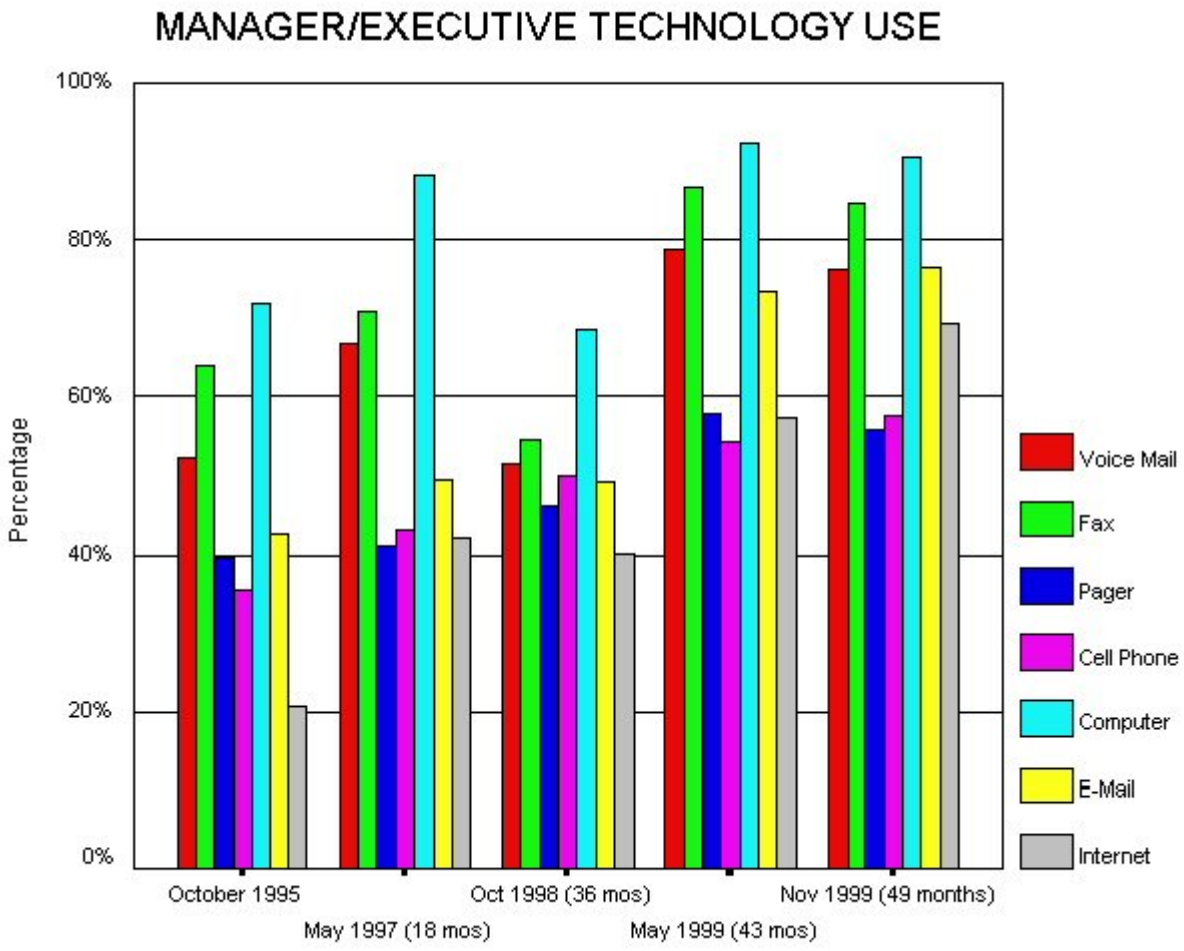
JOB POSITION					
Clerical/Support Staff	39%	46%	42%	49%	49%
Managers/Executives	61%	54%	58%	52%	55%

BUSINESS TECHNOLOGY USED IN THE OFFICE

The next two figures indicate the percentage of the Clerical/Support Staff (first graph) and Managers/Executives (second graph) who used specific types of technology in the workplace. Strikingly, use of all forms of technology increased across the 49 months except pagers for Clerical/Support Staff. The following table shows the percentage increase in use for each group from the initial sample (October 1995) to the latest sample (November 1999) which indicates that usage increased substantially more for Managers/Executives than Clerical/Support Staff for fax machines, pagers, e-mail and the Internet. Computer use increased 19% for both groups and the figures show that nearly all business people use computers in the workplace.

WORK TECHNOLOGY	Clerical/Support Staff	Managers/Executives
Voice Mail	+12%	+14%
Fax	+12%	+21%
Pager	+0%	+16%
Cell Phone	+16%	+22%
Computer	+19%	+19%
E-Mail	+17%	+34%
Internet	+39%	+49%


CLERICAL/SUPPORT TECHNOLOGY USE
100%
80%
60%
40%
20%
0%
Percentage
October 1995
May 1997 (18 mos)
Oct 1998 (36 mos)
May 1999 (43 mos)
Nov 1999 (49 months)
Voice Mail
Fax
Pager
Cell Phone
Computer
E-Mail
Internet



BEST PREDICTORS OF TECHNOLOGY USE

Discriminant Function Analyses were used to determine, for the entire sample, what factors best predicted whether someone would or would not use a particular form of technology in the workplace. Potential discriminator variables included job position, company size, supervisory role, age, gender, marital status, children living at home, income, education, ethnic background and a composite measure that assessed TechnoStress. This latter measure was formed through factor analytic techniques from questionnaire items reflecting anxiety, attitudes and cognitions toward technology.

The forms of technology are arranged in order from least technologically complex (cellular phone) to most technologically complex (Internet use). [NOTE: A Factor Analysis indicated that cellular phones and pagers formed a single category of less complex technology while voice mail email, fax machines, computers, e-mail and the Internet formed a separate category of more complex technology.]

For each technology, the significant discriminators are listed with their beta weights reflecting the relative weights of each with the top discriminators (within .10 of highest one) highlighted in blue. As is evident from the table, a variety of variables discriminate between users and nonusers. Interestingly, as the technology gets more complex, general psychological TechnoStress plays an increasingly important role. For familiar (less complex) technology such as cellular phones, pagers, voice mail, TechnoStress is not the most important predictors of their use. For more complex technologies (computers, e-mail,

Internet) TechnoStress is the best discriminator.

BEST PREDICTORS OF TECHNOLOGY USE		
Workplace Technology	**Discriminator Variables**	**Beta Weight**
Cellular Phone	Supervisory Role	.53
	Company Size	.31
	Education	.30
	TechnoStress	.23
	Gender	.22
	Job Position	.21
	Marital Status	.20
	Ethnic Background	.17
Pager	Supervisory Role	.67
	Gender	.41
	Ethnic Background	.41
	Company Size	.40
	TechnoStress	.28
Fax Machine	**TechnoStress**	.50
	Company Size	.41
	Age	.36
	Education	.36
	Marital Status	.20
	Ethnic Background	.19
	Gender	.15
Voice-Mail System	Education	.57
	Company Size	.38
	TechnoStress	.39
	Age	.36
Computer	**TechnoStress**	.73
	Company Size	.37
	Education	.35
	Gender	.30
	Age	.22

	Job Position	.15
Electronic Mail	**TechnoStress**	.59
	Education	.47
	Company Size	.33
	Age	.22
	Ethnic Background	.18
	Supervisory Role	.12
Internet	**TechnoStress**	.68
	Education	.63
	Ethnic Background	.13

TechnoStress

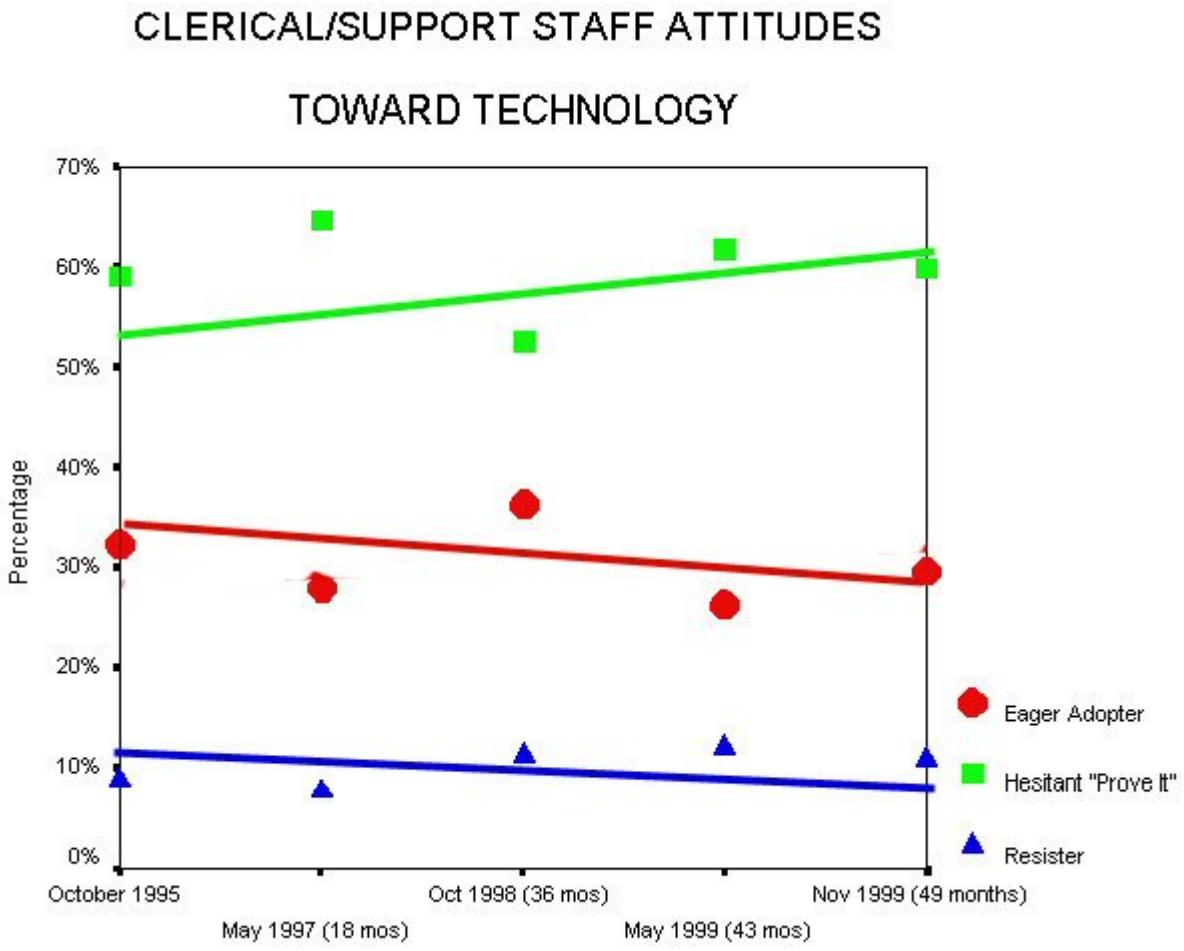
Research by our lab and others (MCI, consumer research) has shown that people react to technology in a characteristic fashion. Some are Eager Adopters who embrace technology as soon as it is released. The Eager Adopters enjoy technology, expect it to have problems and find solving the problems stimulating and fun. MCI's 1994 study of business executives found 12% to be Eager Adopters.

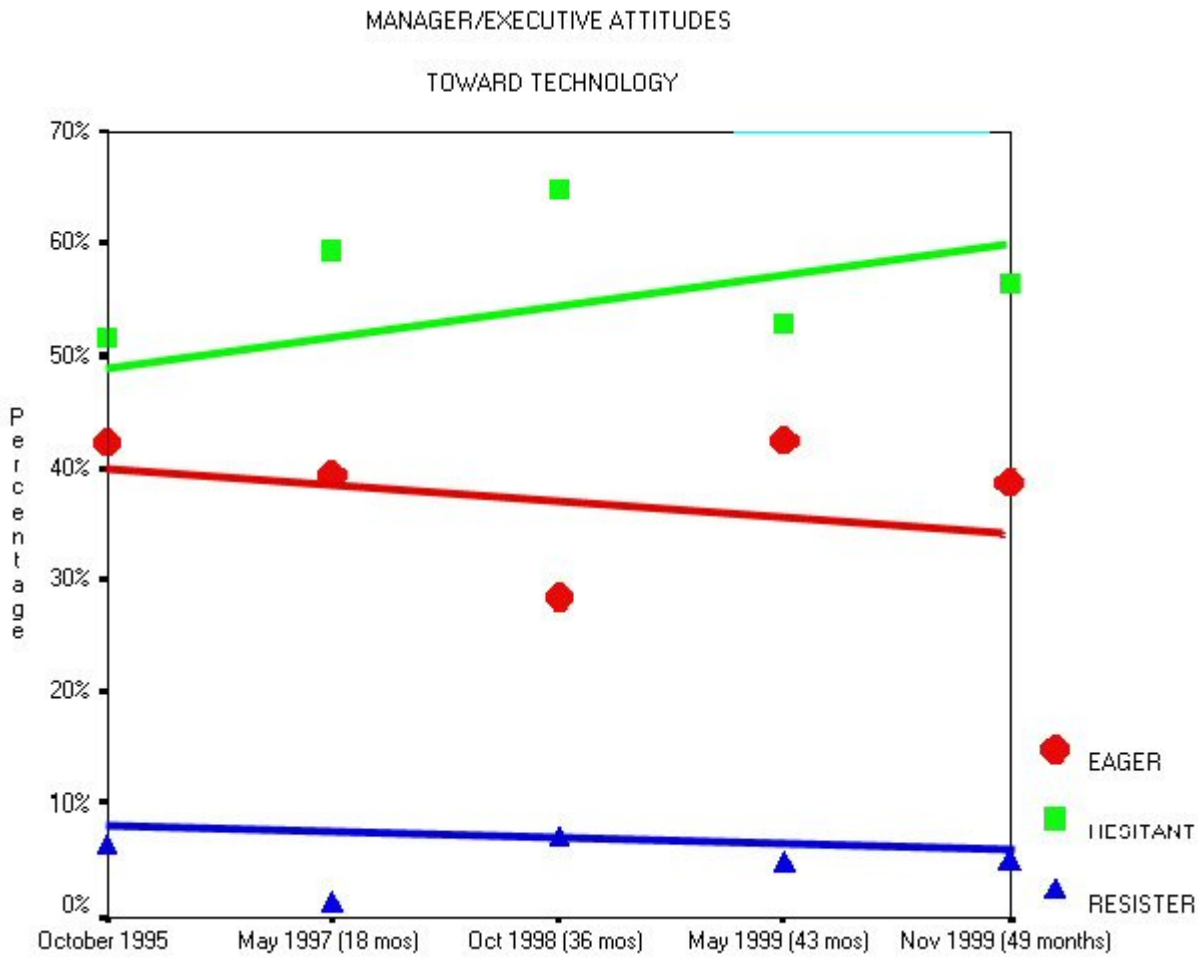
Hesitant "Prove Its" form the largest group (59% in MCI's study). Hesitant "Prove Its" are not anti-technology, nor are they usually technophobic (although they may be). Rather, they are waiting on the sidelines for someone to show them how technology can help them. They want to know how technology will specifically make their life easier. Hesitant "Prove Its" know that technology has problems and they do not necessarily enjoy dealing with those problems. They would rather wait on the sidelines until there are no problems.

Resisters made up 29% of the business executives in MCI's study. Resisters avoid technology. They do not like it, want it or find it enjoyable. They know that technology has problems and take technological snafus as reflecting a personal shortcoming. Although many Resisters are technophobic, some are not.

The two figures below show the results from the five samples in this study separately for Clerical/Support Staff and Managers/Executives. Because of the variability in percentages (shown as green squares for Hesitant "Prove Its," red circles for Eager Adopters, and blue triangles for Resisters), across the 49 months, a multiple regression line was generated for each group. The regression line is shown as a solid line through the individual percentages.

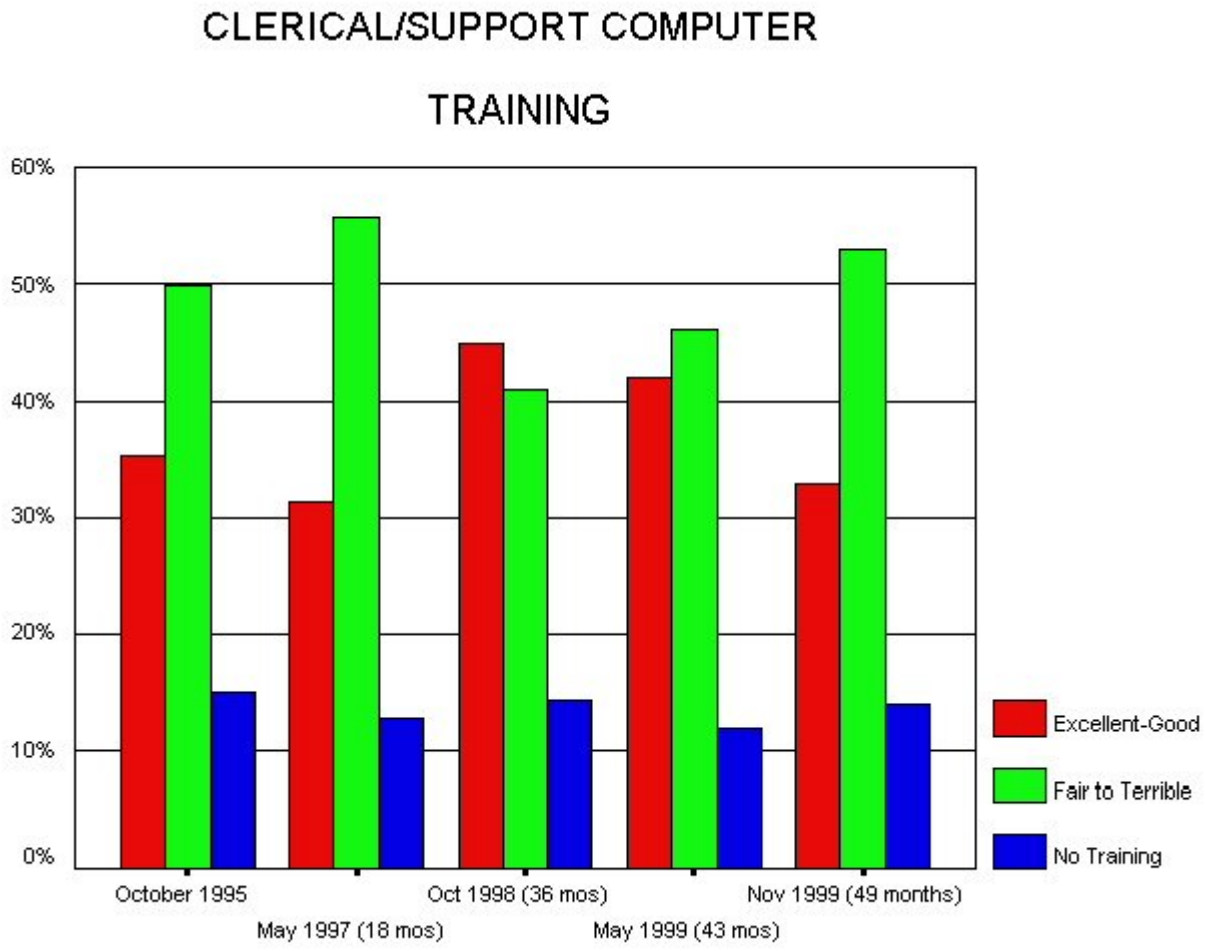
For Clerical/Support Staff, three trends are evident: Hesitant "Prove Its" increased while Eager Adopters and Resisters slightly decreased. For Managers/Executives, Hesitant "Prove Its" increased while Eager Adopters decreased and Resisters slightly decreased.

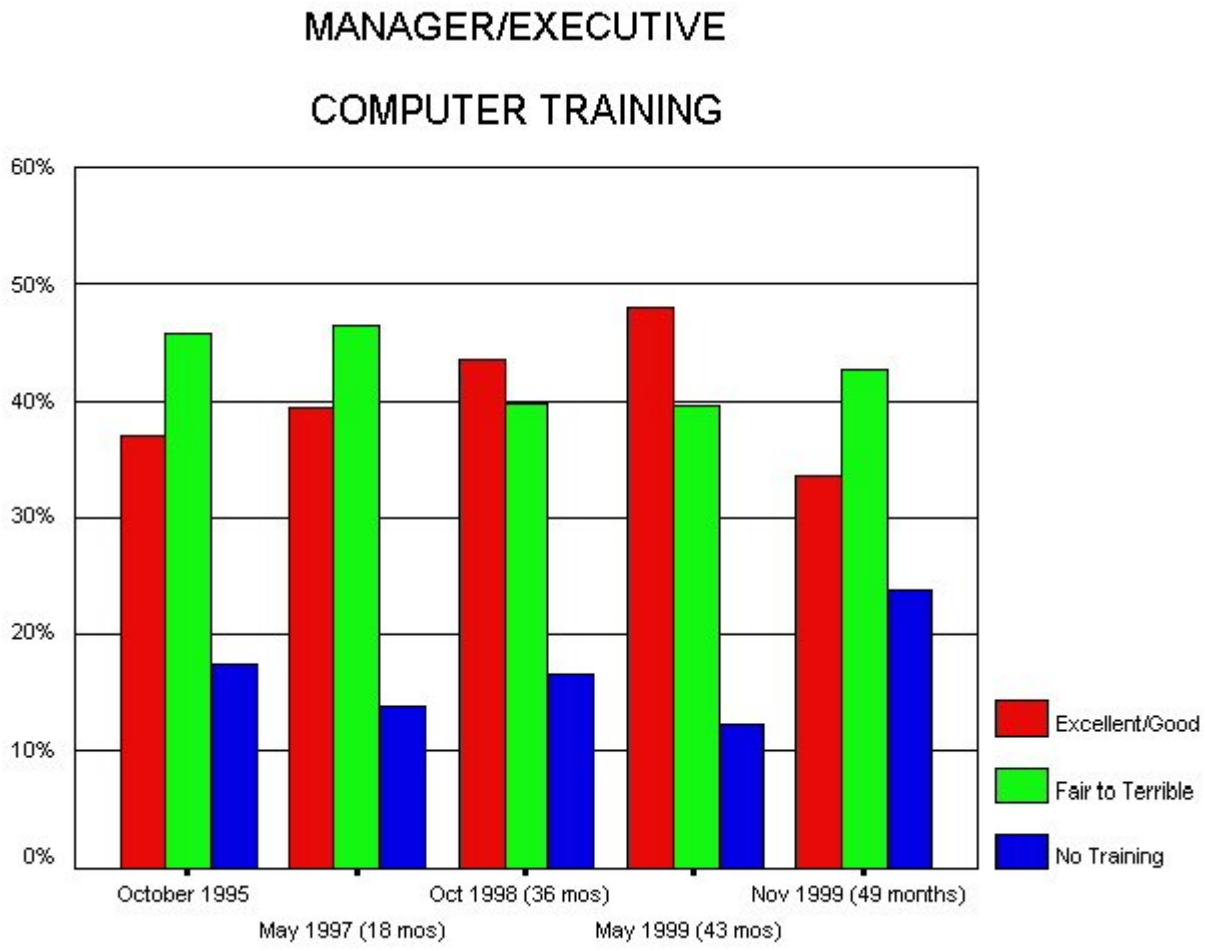

CLERICAL/SUPPORT STAFF ATTITUDES
TOWARD TECHNOLOGY
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
October 1995
May 1997 (18 mos)
Oct 1998 (36 mos)
May 1999 (43 mos)
Nov 1999 (49 months)
Eager Adopter
Hesitant "Prove It"
Resister



COMPUTER TRAINING RECEIVED BY BUSINESS PEOPLE

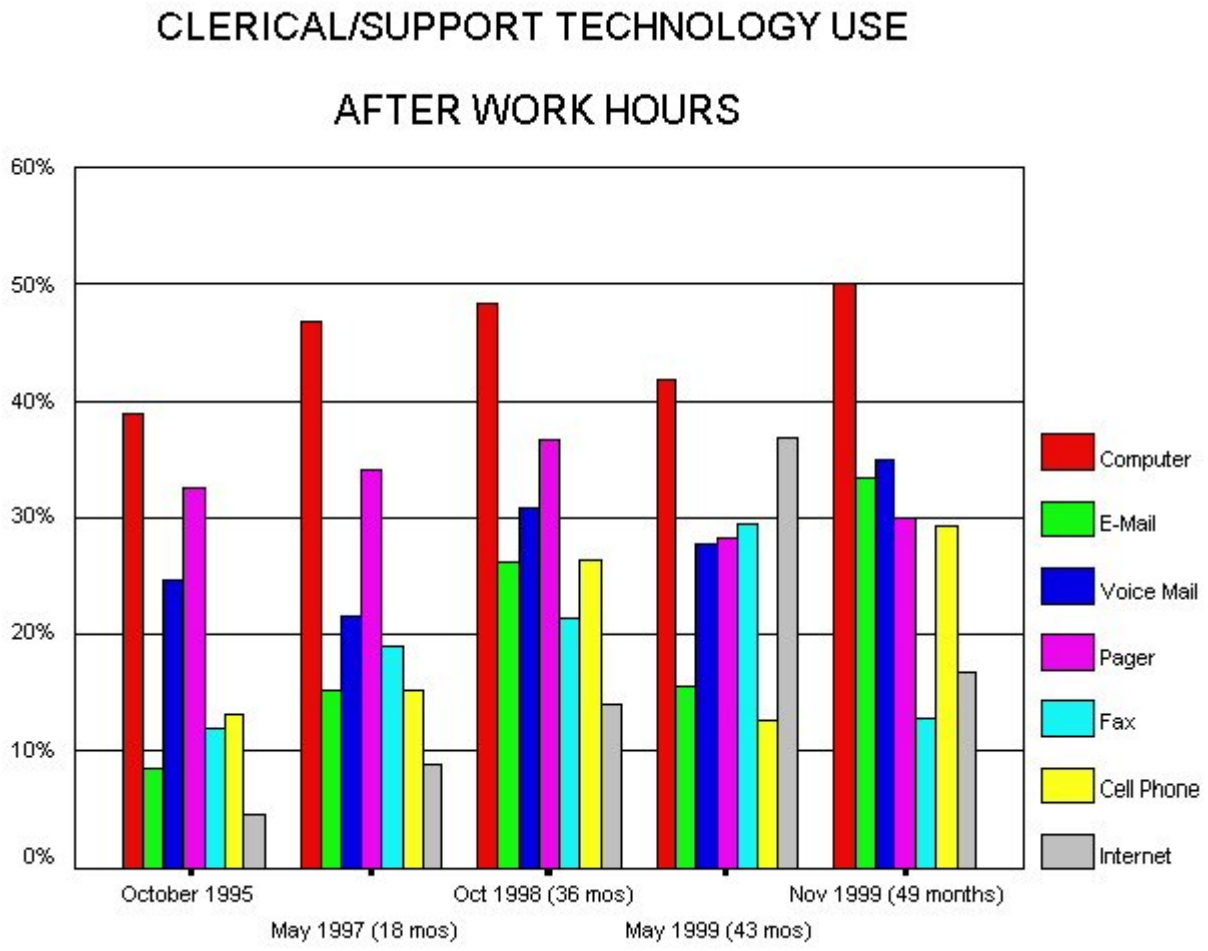
Each person who used a computer in the workplace was asked to rate their computer training. As the two figures below indicate, only one-third received excellent or very good training and a sixth received no training at all. The rest had only marginal training at best. When the level of training was compared with Psychological Reactions to Technology, those business people who had either "excellent to good" or "no training" had more positive reactions to technology. Those who received either "fair to terrible" training had more negative reactions to technology.


CLERICAL/SUPPORT COMPUTER
TRAINING
60%
50%
40%
30%
20%
10%
0%
October 1995
May 1997 (18 mos)
Oct 1998 (36 mos)
May 1999 (43 mos)
Nov 1999 (49 months)
Excellent-Good
Fair to Terrible
No Training



BUSINESS TECHNOLOGY USED AFTER WORKING HOURS

The following figure shows that half of the clerical/support are using their computer for work after standard work hours, two-thirds are using the Internet and about one-third are using other communication technologies. For the Managers/Executives, three-quarters are using their computer after work hours, half are using e-mail and the Internet, and other communication technologies. Clearly, technology has extended the work day long after standard work hours. In fact, when asked how much time they spend using technology after work hours, half said less than one hour per day, one-third said 1-2 hours per day, and one-sixth said they were hooked up for three or more hours a day! For both groups, this usage has increased consistently over the four years of this study.


CLERICAL/SUPPORT TECHNOLOGY USE
AFTER WORK HOURS
60%
50%
40%
30%
20%
10%
0%
October 1995
May 1997 (18 mos)
Oct 1998 (36 mos)
May 1999 (43 mos)
Nov 1999 (49 months)
Computer
E-Mail
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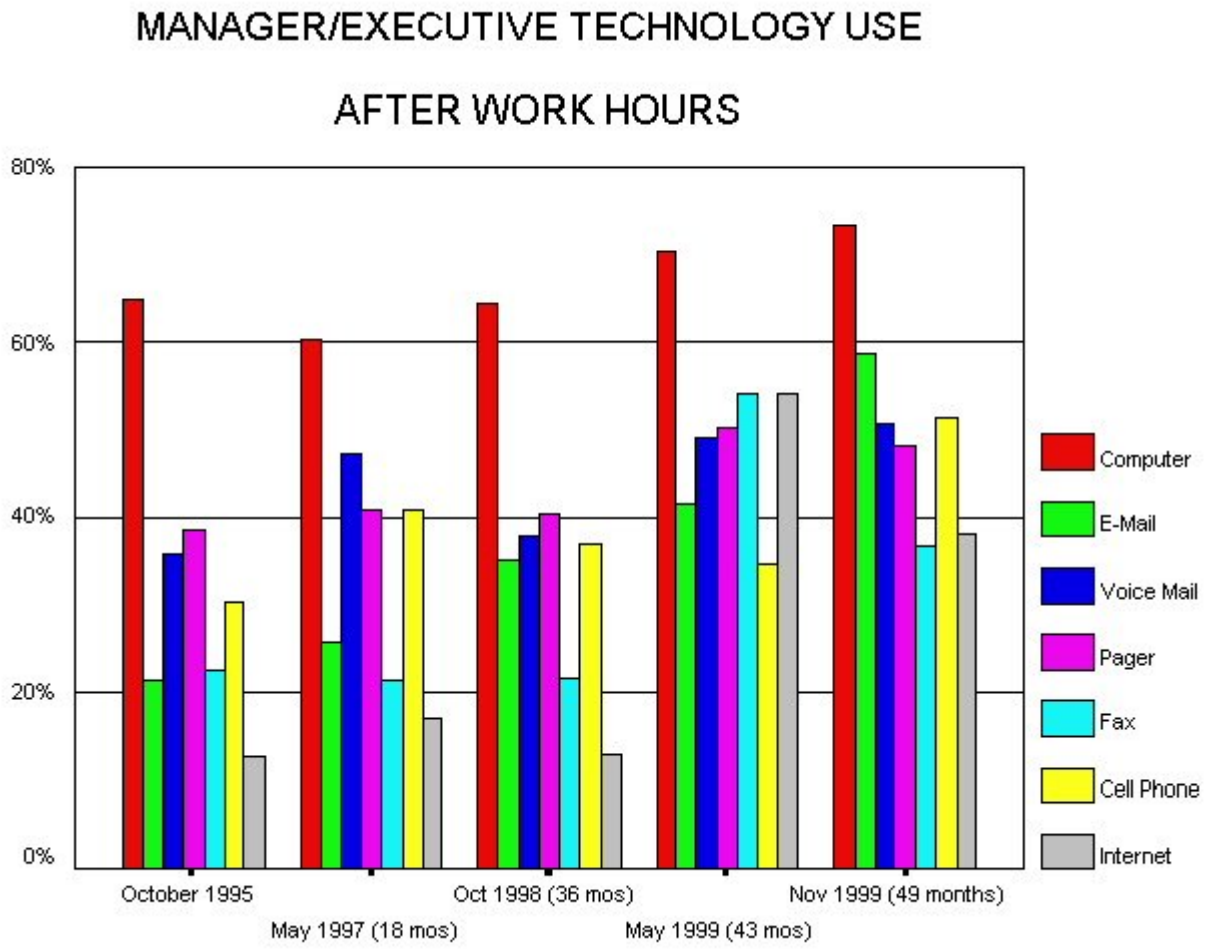
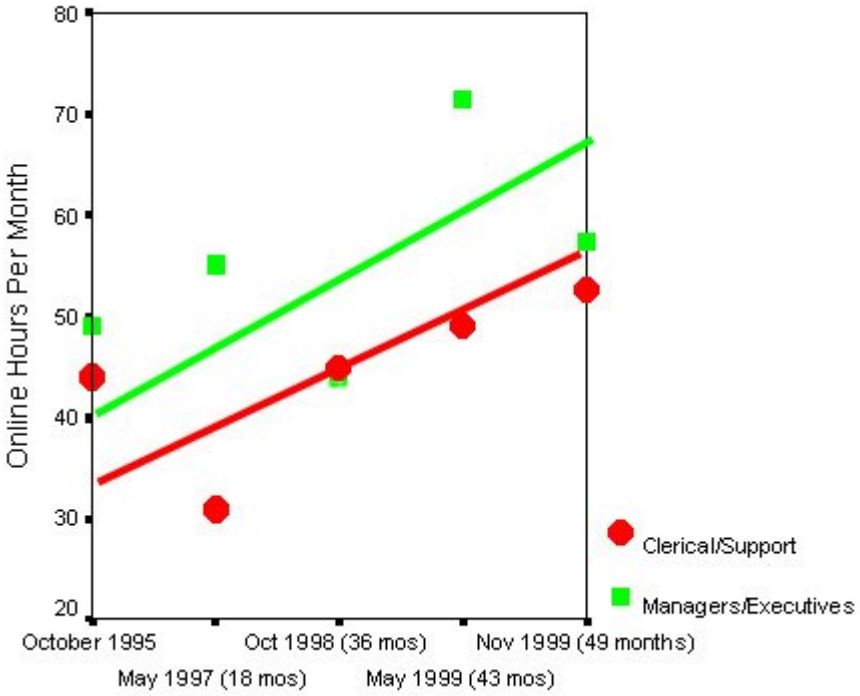
Fax
Cell Phone
Internet



ONLINE ACTIVITY

Each subject was asked if they used e-mail, were online and/or used online services. In addition, they were asked to estimate the number of hours per month devoted to these activities. The graph below summarizes the data from the five samples including a regression line for each. As is clear from the regression lines, both Clerical/Support Staff and Managers/Executives increased their monthly online usage during the 49 months. In addition, Managers/Executives were online more than Clerical/Support Staff.

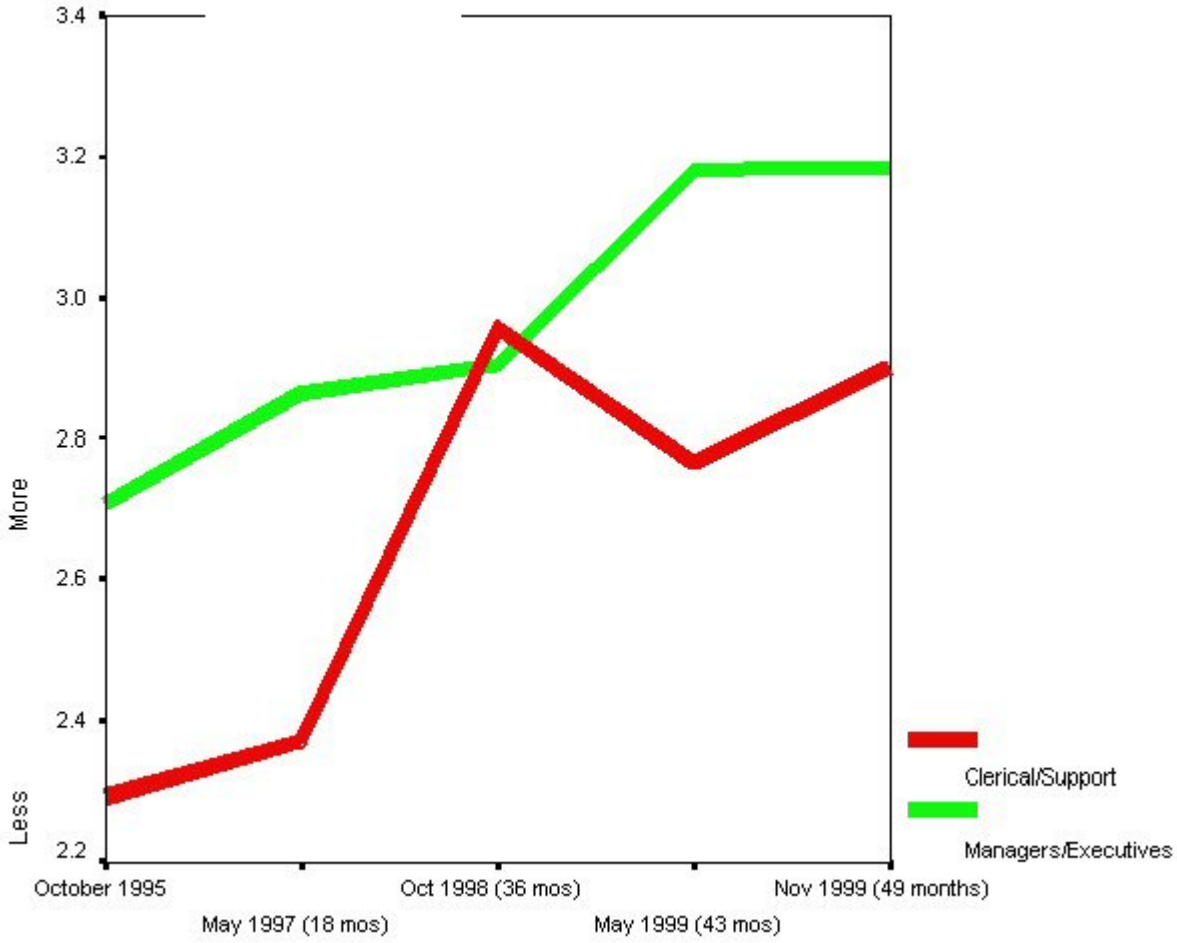


REPORTED WAYS HOW TECHNOLOGY HAS MADE WORK MORE STRESSFUL

In the first study only, an open-ended interview question assessed how and why workplace technology had resulted in stressors and benefits. Although the data on benefits were not at all categorizable, the data on stresses added by technology produced clear categories as shown in the figure below. First, only 20% of the sample said that technology had brought no additional stresses to their lives. Second, clear major themes appeared in the answers centering around the additional work technology brings to the job (solving problems, learning, etc.). Clearly, the vast majority of our business people were telling us that workplace technology had added stress to their lives. This is corroborated by recent research on Communication Overload and Information Fatigue Syndrome.

UNDERSTANDING OF CYBERSPACE

Subjects in all samples were asked to rate their understanding of the Internet, Online Services and the Information Superhighway, each on a four-point scale, from "Completely Understand" to "Do Not Understand at All." The graph below indicates that across the 49 months, both groups showing significantly increasing understanding of Cyberspace with Managers/Executives showing more understanding than Clerical/Support Staff.



SUMMARY AND CONCLUSIONS

Over a 49-month period, Clerical/Support Staff and Managers/Executives have become more hesitant toward technology while increasing their technology use both in the workplace and after standard work hours. Specifically,

1. Clerical/Support Staff and Managers/Executives both showed an increase in the use of all technologies over the 49-month period. The largest increase for both groups was in use of e-mail and the Internet, although Clerical/Support Staff showed double digit percentage increases in the use of all tools except pagers and Managers/Executives showed double digit percentage increases of all tools. The latter showed substantially larger increases in usage than the former in the Internet, e-mail, pagers and faxes.
2. Use of less complex tools were predicted by a variety of demographic factors while use of more complex tools were predicted by Psychological Reactions to Technology. More positive reactions

led to more usage of computers, e-mail, the Internet, and fax machines.
3. Clerical/Support Staff and Managers/Executives indicated increased usage of all technologies after working hours with the majority using their computer, the Internet and e-mail at least 1-2 hours after standard working hours.
4. Computer training was basically only fair at best for the majority of Clerical/Support Staff and Managers/Executives with one in six receiving no training at all.
5. Both Clerical/Support Staff and Managers/Executives increased their average hours per month online over the 49-month period with Managers/Executives spending more time online in all samples.
6. Both Clerical/Support Staff and Managers/Executives increased their understanding of cyberspace across the 49 month period with the latter showing more understanding.

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