KEYBOARD SHORTCUT USAGE: THE ROLES OF SOCIAL FACTORS AND COMPUTER EXPERIENCE

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Previous research (Lane, Napier, Peres, & Sandor, in press) has shown that despite the fact that it typically takes half as much time to issue a command to a computer application using that command's keyboard shortcut, most people issue a particular command by clicking an icon on a toolbar or by selecting the command from a pull-down menu. This study examined reasons why that might be the case with a structured interview survey and web survey that focused on demographic characteristics of people who do and do not use keyboard shortcuts, as well as social factors of computer use that might influence use of keyboard shortcuts. Participants' shortcut usage was influenced by social factors, such as working in an environment with other shortcut users and experiential factors, primarily the hours spent using a computer per week.

INTRODUCTION

There is a significant body of work to support the benefits of keyboard shortcuts (KBS) from a timesaving perspective. Formal Human-Computer Interaction methods such as GOMS (John & Kieras, 1996) use keystroke operator times to compare competitive interfaces. A study by Lane, Napier, Peres, and Sándor (in press)presented an in-depth look at the timesaving of KBSs in Microsoft Word. While they were the most efficient method of interaction in terms of time, experienced users frequently did not use them. Rosson (1984) also found that utilization of more advanced keyboard commands in a text editing software (XEDIT) did not increase with experience. Neither did many self-labeled computer experts use the most advanced and efficient methods in software such as Word and CAD (Bhavnani & John, 1997; Rosson, 1984), suggesting the barrier to KBS usage may persist over time.

Galitz (1996) reported that graphical interfaces were easier to use because they made the set of possible commands visible during the use of software, eliminating the need to memorize specific commands. Indeed, it is now widely accepted in the usability community (Zhang & Norman, 1994) that interfaces presenting information "on the device" are easier to use than those that require knowledge "in the head," due to the decreased demands on memory. This also corresponds with evidence of hill-climbing in instances of interaction with a computer (Gray, 2000; Polson & Lewis, 1990). Essentially, users were found to use perceptual similarity and cues on the interface alone to guide their actions, in keeping with our general tendencies as "cognitive misers."

The influence of social factors on computer usage pertaining to such phenomena as online trust, organizational culture, group collaboration, etc. has been widely reported in the literature (Bailey, Gurak, & Konstan, 2003; Dourish & Bly, 1992). There is a dearth of information, however, on whether or not social factors affect computer micro-strategies. Previous studies have compared the efficiency of various computer input devices and strategies (Card, Moran, & Newell, 1983) as well as their adoption by various categories of users (Bhavnani & John, 1997; Lane et al., in press). However, the specifics of how and why users adopt different micro-strategies has not been deeply explored from a social perspective.

Structured Interviews

As an exploratory procedure to begin to investigate why people do and do not use keyboard shortcuts, structured interviews were conducted with nine individuals. We asked questions about usage of KBS, general computer usage and demographic information. The results suggested that a primary method by which people learned to use KBS was through social interaction, such as working with and watching other people who used KBS. The results of these interviews were incorporated into an online questionnaire designed to further explore the relationship between KBS usage and social environments.

METHOD

A questionnaire was administered via a website (http://psych.rice.edu/HFES/) to 82 individuals - 49 women and 31 men (with one respondent not providing their gender). There were 21 respondents who classified themselves as not using KBS and 61 who used KBS to some degree. Users were asked a variety of questions about their computer usage, certain personality characteristics, how they came to their level of computer usage, and the computer usage of coworkers and acquaintances.

RESULTS

Differences were found between those who use KBS and those who do not use KBS on all of the questions regarding the environment where they use the computer. As seen in Figure 1, those who did not use KBS had lower ratings of agreement on all seven items than those who did use KBS and all differences were significant at $p = .02$ or less. The most notable difference between these two groups was found on the item asking if the respondent worked with people who use KBS.

Subjects who did not use KBS were asked what it would take for them to start using keyboard shortcuts. The results are provided in Table 1 and show that the most endorsed statement was "I would start using keyboard shortcuts if I had someone to train me to use them." While the least endorsed statement was "I would start using KBS if I thought they would save me time."

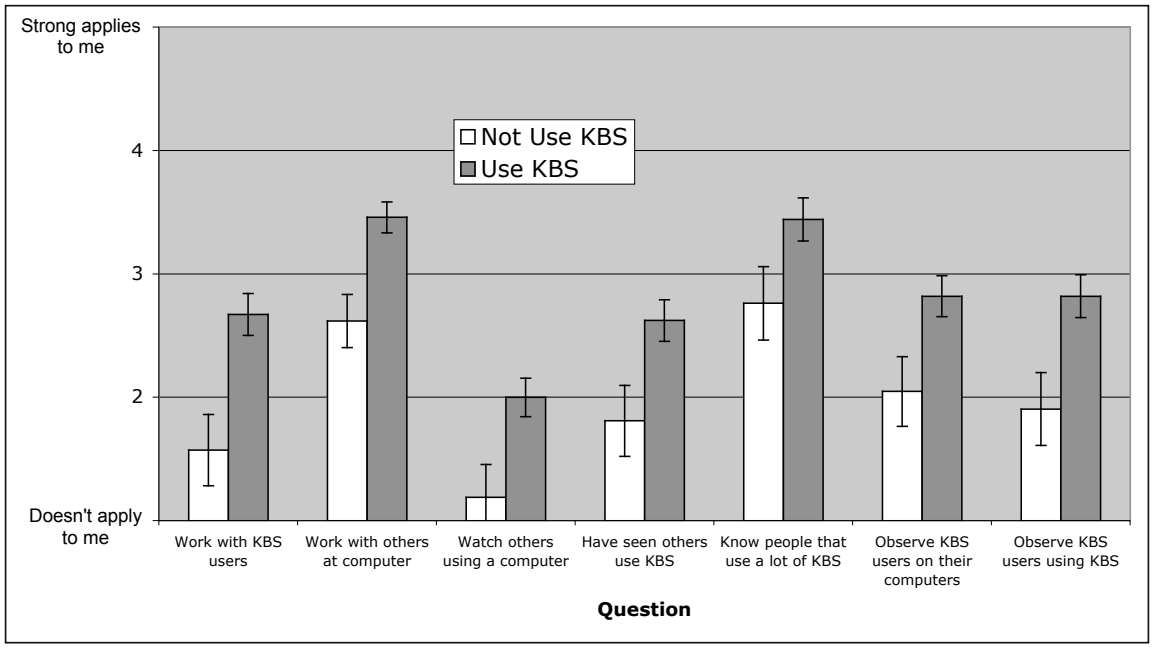

Figure 1 Mean responses for questions regarding participants' environments as a function of whether or not they used KBS.

Table 1 *Mean response from non-KBS users on what it would take for them to use keyboard shortcuts. 1 – Strongly Agree to 5 – Strongly disagree*

I would use keyboard shortcuts, if…	Mean
I had someone train me to use them	3.2
they were easier to remember	3.4
they were easier to learn	3.6
I could use them more frequently	3.6
they were easier to execute	3.8
I thought they would save me more time	4.1

Participant's ratings on all statements regarding observing the use of KBS in social situations were correlated with their report of the percentage of time they use KBS for issuing commands (0% was used for those that did not use shortcuts). There was a correlation between the percentage of time that participants used shortcuts and the degree to which participants (1) are in a working environment with people who use KBS, r = 0.43, $p < 0.001$, (2) watch other people use a computer, r = 0.34 $p < 0.001$, (3) know people that use a lot of keyboard shortcuts, r = 0.33, $p < 0.001$, (4) work at a single computer with a group of people, r = 0.29, $p < 0.01$, (5) observe people using keyboard shortcuts when they issue commands, r = 0.27, $p < 0.01$, (6) have seen other people using keyboard shortcuts, r = 0.26, $p < 0.001$, and (7) are able to watch KBS users at their computers, r = 0.21, $p = 0.03$.

Table 2 *Mean responses for level of expertise (10 = expert), hours p/week using a personal computer, and years using a personal computer.*

	Group	
	Not Use KBS	Use KBS
Expertise	3.2	6.7
Hours p/week on PC	16.7	36.0
Years using a PC	12.2	12.5

Table 2 shows participants' responses to demographic questions as a function of whether or not they used KBS. These results show that the participants who did not use KBS rated their degree of expertise with computers as lower than those who do use KBS, $t(85) = -8.108$, $p < 0.001$. KBS users also reported spending more time on a computer each week, $t(70.9) = -5.629$, $p < 0.01$, and spend more time using the internet each week, $t(79.8) = -4.512$, $p < 0.001$. Interestingly, there was not a reliable difference in the reported number of years since they started using computers between the two usage groups, $t(29.1) = 0.260$, $p < 0.797$.

The relationships between the percent of time participants reported using KBS and reported computer use was examined. Reliable correlations were found between the percentage of time that participants used shortcuts and (1) their ranking of their level of computer expertise, r = 0.66, $p < 0.001$, (2) the number of hours that they use a personal computer per week, r = 0.50, $p < 0.001$, (3) the number of hours that they use the internet per week, r = 0.35, $p < 0.001$. There was not a correlation between the percentage of time that participants used shortcuts, and the number of years that they had been using a personal computer, r = 0.23, $p < 0.08$. There was a negative correlation between the percentage of time that participants used shortcuts and their age, r = -0.32, $p < 0.01$.

DISCUSSION

Bhavnani and John (1997)suggested that experience alone may not determine use of efficient strategies and that there seems to be an influence of the environment in which the computer is used. Responses to the current survey certainly support the role of social factors in the adoption of efficient computer usage strategies. In the current study, being around and watching others use shortcuts corresponded to self-reports of keyboard shortcut use. Additionally, the results suggest that people who do not use KBS would not be motivated to learn keyboard shortcuts because of possible timesavings but instead want someone around to train them on how to use the shortcuts. The finding that those who use KBS are more likely to have people around them who also use KBS suggest that the micro-strategy of using keyboard shortcuts increases when users have co-workers to teach them how and when to use this efficient strategy.

Although the prevalence of social influence is well known in other arenas, it is interesting that such factors come to bear in the use of keyboard

shortcuts, a seemingly automatic micro-strategy adopted by a subset of computer users.

While it would seem intuitive that more experienced computer users would be more efficient computer users, past research has not found any support for a link between experience with a personal computer, or a particular program, and its efficient use (Bhavnani & John, 1997; Lane et al., in press). The current research also found no relationship between years of experience with a computer and the use of KBS, however, we did find a relationship between use of keyboard shortcuts and hours spent using a computer per week. These findings suggest that the amount of time someone currently spends on the computer may be a more predictive a factor for the efficient use of a computer program than the number of years or level of expertise a person has with a particular program.

It is important to note that Lane et al. did not find a relationship between hours per week on the computer and KBS usage. A possible reason that they did not find a relationship between these two variables and our study did is the nature of the data collected. Specifically, the current study collected a continuous measure of the number of hours per week spent on the computer while Lane et al used a forced-choice measure of experience. As shown in Table 3, 72% of their sample reported more than 15 hours per week on the computers. While we had a similar sample, with nearly 70% reporting more than 15 hours per week on the computer, the use of a continuous scale allowed for a more even distribution.

Table 3 *Comparison of hours p/week of computer use for current sample and Lane et al.*

Hours per Week	Current Sample	Lane et al.
< 1	0	0.4
1 - 5	4.7	6.4
6 - 10	15.3	14.4
11 - 15	10.6	56
16 - 20	9.4	72
21 - 25	5.9	
26 - 30	14.1	
31 - 35	7.1	
36 - 40	10.5	
41 - 45	2.4	
46 - 50	8.2	
> 50	11.8	

At the same time, the current study asked subjects to report the "overall" percentage of time they used KBS while Lane et al. asked subjects to report the percentage of time they used KBS for fourteen commands in Microsoft Word. Thus the current study may not have as clear a picture of the participants KBS usage as Lane et al.

While an individual may not save a large amount of time by issuing commands via the keyboard (e.g. one would have to issue at least 450 commands to save 15 minutes per day; (Lane et al., in press), timesavings to an organization would be more prominent. Additionally, keyboard shortcuts are just one way of using a computer program efficiently and it is conceivable that any principles discovered regarding increasing keyboard short use might also be applicable to increasing other efficient strategies. Finally, computers users report less musculoskeletal discomfort when using a keyboard rather than mouse (Jorgensen, Garde, Laursen, & Jensen, 2002).

These findings have implications for computer training and suggest that it would be advantageous to an organization to construct training courses in such a manner as to facilitate social interaction – either during the training and/or after the training. That is, an optimal training environment for the instruction of the efficient use of computer applications may be to have a group of co-workers in an interactive training setting. If the co-workers are trained together, they may then be able to act as support for each other when they return to work and implement what they have learned.

To further explore the self-report results described herein, future research will attempt to experimentally examine the roles of experience and social factors in the use of efficient software strategies. Although these factors have been identified as relevant, the importance of each factor in the adoption of shortcut strategies remains unresolved. Further, the nature of the effect of the social dynamic is also of interest. For instance, seeing a coworker may alter the schema of command issuance by presenting an alternate method prior to the execution of that command (rather than presenting the shortcut after the menu item has already been selected). If that is indeed the case, altering the presentation of shortcut reminders

may be equivalent to the social influence of coworkers.

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