

The Trouble with Shortcuts

Andrew Howes, Stephen J. Payne and Amelia Woodward

School of Psychology,
Cardiff University,
Cardiff CF10 3YG. UK.

HowesA@cf.ac.uk
www.cf.ac.uk/psych/howesa

ABSTRACT

Shortcut icons are often provided for commands that are used most frequently. However, there is no published evidence to support the view that shortcuts improve a user's overall efficiency. A preliminary experiment is reported that investigates the effect of shortcuts on performance time, both for the commands for which shortcuts are provided and for those for which they are not. The results suggest that shortcuts may in some circumstances have an overall effect of slowing users down.

KEYWORDS

performance time, decision time, shortcuts, methods.

INTRODUCTION

Many applications provide users with shortcut icons to what are believed to be frequently used commands. For example, in Microsoft Powerpoint, shortcuts are provided on a toolbar for the commands that are used to draw rectangles and lines. The shortcuts consist of icons that are persistently displayed and thereby obviate the need for the user to select a sequence of menus to access them. While it is commonly assumed that shortcuts save the user time, research by Olson and Nilsen has demonstrated that, in practice, providing multiple methods for achieving a task may generate additional costs [2]. In this article we describe a preliminary study that was designed to reveal the costs and benefits of providing shortcuts to the shape-drawing commands in Microsoft Powerpoint. The results show that, while shortcuts do allow a user to access some commands more quickly, they also have a negative impact on the time required to use other commands.

EXPERIMENT

The experiment was designed to test the hypothesis that shortcuts would have significant consequences for the time required by users to select commands that do not have

shortcuts. Thirty-two first- and second- year undergraduates with little if any Powerpoint experience were asked to complete 64 simple drawing tasks each using modified versions of Microsoft Powerpoint.

There were 4 experimental conditions in a between-participants design that manipulated two independent variables: (a) whether or not the 'standard' shapes menu (16 items including rectangles, circles etc.) had shortcuts; and (b) whether or not the 'stars_and_banners' menu (32 items) had shortcuts. In condition (1) participants were given a toolbar that contained the standard shapes menu-header and the stars_and_banners menu-header. In condition (2) participants were given a toolbar that had the same two menu-headers but in addition had shortcuts to 4 of the standard shapes. Condition (3) was similar to condition (2) except that the shortcuts were taken from the stars_and_banners menu. Lastly, in condition (4) the participants were given a toolbar with both menu-headers and eight shortcuts, 4 from each menu.

The 64 tasks consisted of 2 blocks of 32. Each set of 4 tasks consisted of 1 shortcut from each menu, and one non-shortcut from each menu (in a randomized order). As there were only 4 shortcut tasks per menu, for each participant, each shortcut was repeated 4 times during the course of the experiment. In contrast, there were more non-shortcut tasks available and they were therefore repeated at most once. All participants were given the same tasks. When they were given 'shortcut' tasks on menus without shortcuts, they carried them out using the menu.

The time taken for each participant to select either a shortcut or a menu-header plus a menu-item were measured.

Summary of Results

The mean overall performance time for the 32 tasks that did not have shortcuts (regardless of whether the menu had shortcuts) was analysed. A two-way ANOVA on this data showed that participants who were given a standard menu with shortcuts were significantly slower than participants who had no shortcuts, $F(1, 28) = 4.85$, $p < .05$. Similarly, participants who were given a stars_and_banners menu

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with shortcuts were slower than participants who had no shortcuts, $F(1, 28) = 8.95$, $p < .01$. In the condition where there were no shortcuts present, participants performed tasks in an average of 4.7 sec. When the standard menu had shortcuts the mean time was 5.0 sec. When the stars_and_banners menu had shortcuts it was 5.4 sec, and when both menus had shortcuts the mean performance time for non-shortcut tasks was 7.4 sec (more than 50% slower than the no-shortcuts condition). In contrast to the times required to select menu items without shortcuts, when shortcuts were used, the mean performance time was only 1.7 sec.

The overall performance time data was split into the first 32 tasks and the second 32, and each block was analysed using separate two-way ANOVAs. It was found that an effect of the presence of shortcuts was evident in both the first and second block. For the stars_and_banners, first block, $F(1, 28) = 8.96$, $p < .01$ and the second block, $F(1, 28) = 9.00$, $p < .01$. The effect was attenuated in the second block.

The mean time between when a participant selected a menu-header and when they selected an item, for the single-shortcut conditions only, was analysed using a two-way ANOVA with task and time-taken as independent variables. There was no significant effect of whether there was a shortcut.

DISCUSSION

The results of the study indicate that while participants were able to make use of shortcuts to reduce performance times on frequently used tasks, they suffered an increase in the time required to complete tasks for which there were no shortcuts. Moreover, the increase in performance time occurred both prior to and after the selection of the menu-header.

The fact that participants were slower to select a menu-header when there were shortcuts available for that menu may have been due to one or both of two factors: (1) participants with shortcuts got less practice at moving to the header; or (2) the choice between the header and the shortcuts cost time. While practice did have an effect on performance time, an informal inspection of the practice curves shows clearly that participants are slower when shortcuts are present from the very first trial. In addition, the same pattern of results is observed in both the first and the second block of tasks. It is not the case that the differences emerge after practice. It therefore seems likely that the slower selection times were due to the cost of the increased number of choices caused by the provision of shortcuts.

The magnitude of the effect of providing shortcuts is worth examining further. First, the cost of providing standard menu shortcuts was 0.3 sec whereas stars_and_banners menus cost 0.7 sec. This difference may be due to the extra difficulty of matching the more complex star shapes to the

shortcuts (participants found it difficult to tell exactly how many points a star shape had). Second, the mean time required by participants when both sets of shortcuts were present was 2.3 sec longer than when no shortcuts were present. This is a very large difference that seems at first glance difficult to explain. It is more than twice the sum of the independent effects of the two sets of shortcuts. One explanation may be that the participants had, on some occasions, to scan and rule-out all 8 of the shortcuts before deciding to select a menu-header (rather than just 4 of them). If this was the reason, then it would suggest that participants were less able to make use of the menu categories to constrain search when shortcuts from more than one category were provided on one toolbar.

Participants were not significantly slower to select menu items when there were shortcuts available for the menu. However, previous research has demonstrated that people learn about items on a menu other than those that are implicated in the tasks for which they have used the menu [1,3]. As shortcuts reduce a user's exposure to a menu, they might, as a side-effect, be expected to cause a slowdown in the use of the menu for other tasks.

In summary, we have observed that shortcuts are a pervasive control mechanism in computer applications. An experiment to test the hypothesis that they have both positive and negative consequences, revealed the advantages of shortcuts but also that under some conditions, when shortcuts were present, novice users took more than 50% longer to select items without shortcuts. However, despite this finding, we do not wish to conclude that shortcuts should not be used in computer applications; rather further research is needed to determine the relationship between the costs and benefits of shortcuts in the contexts of particular patterns of usage.

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