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# First Time Users and Obstacles to Software Usage

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## Introduction

The cost to companies of training first time users of a package is high, especially if the claims made by MacGregor (1993) are true. In a newspaper article reviewing the WordPerfect package, he suggests that 95% of the package's features will never be used by 98% of its users. As this wordprocessing package is one of the most widely used packages, there is no reason to believe that this might be any different for less frequently used packages. This less than optimal use of package capabilities, which was also found by Czaja (1986), may be a result of conceptual hurdles which are encountered by users and never surmounted. These may never have been surmounted as a consequence of not having been recognized and addressed in software design and training material for same.

In an exploratory study which examined users interacting with one of two statistical package for the first time, users were found to experience various conceptual hurdles. Although the packages had different requirements for executing the simple data entry task assigned, the same conceptual hurdles were noted in each. These were evident from the analyses of the detailed keystroke level traces collected from each user. The packages were Merlint, a mixed command structure package, and a command driven version of Minitab.

## Conceptual Hurdles

Some of the hurdles found were consistent with those which have been examined in prior research. These included:

1) Command Naming - On one package, subjects investigated the commands FILE and STORE as potential commands for Saving. Others tried to use the INSERT command rather than READ or SET to enter the data, while others sought help with the command TABLE for the same purpose. There was also confusion on the second package regarding command names which seemed synonymous, FILE versus TERM versus SAVE, and NAME versus HEADING.

2) Syntax and Command Operations - One package required single quotations around the filename assigned to files being saved while the other required no quotations. This posed a problem to users especially on the latter package where the instruction for saving showed the filename surrounded by quotation marks but was meant only to highlight the need to assign a filename. Some subjects tried to save one column at a time, but then did

not know how to get it into the same file. The concept of changing one element of the data table also proved a hurdle for some. Users were unsure if one element could be changed or whether the whole row had to be changed. There was also difficulty in knowing whether it had to be deleted first and then the change made.

3) Resistance to Help - On the mixed command package, many refused initial help and subsequent menu guidance. These were individuals who either did very well or very poorly. Because of the mixed menu/command format of this package, users can conceivably attempt to perform the tasks without help. This is not possible on the other package because the version used is entirely command driven, so the user must know the commands before anything can be accomplished.

4) Mental Models - Some candidates seemed not to have or to develop a mental model of the task or of the requirements of the package for accomplishing it. They displayed a seeming lack of logic or pattern in their path through the tasks, seeming to make random entries.

5) Anxiety - Interestingly, two subjects demonstrated acute anxiety during the experiment. One of these subjects left the room angrily, after shouting her frustrations at this author. No attempts to appease her succeeded, and she refused to leave her diskette and task sheet behind. The other subject stayed the duration, but also vehemently expressed her frustrations. She was incredulous that she should have had such difficulty, given that she uses a computer regularly in her work. On further investigation, this experience proved to be with canned packages, requiring menu selection and form-fill-ins, rather than with packages that allow the design and analysis of problems. Evidently, the type of prior experience may be an important factor in novice performance with, and perceptions of, a package. In a study examining the impact of anxiety on performance and perceptions, it was found that both were adversely affected by anxiety. (Thomas, 1994).

Other conceptual hurdles were also identified which have not previously been alluded to in the literature. These included:

6) Starting and Restarting - There was a tendency by some individuals to go in and out of the package, restarting at any indication of a problem. This seemed to be preferred over accepting the help prompts provided. This led to problems in not knowing up to what point in the task they had accomplished, and in not knowing how to get back to an earlier version of what had been previously accomplished, not knowing where it had gone.

7) Differentiating the Essential - The inability to distinguish the essential from the non-essential in a task was evident in some subjects trying to undo automatic formatting and trying to determine how many spaces to leave between data items entered in a row. Another conceptual hurdle was the effect of auto-formatting. One package automatically formatted the numeric data input to two decimal places. Some subjects got bogged down trying to remove the decimals rather than continuing with the rest of the task. The task

showed whole numbers. Once the data was entered, a few subjects attempted to change or remove the row enumeration which is automatically generated by the packages.

8) Distinguishing Data from Labels - A significant problem revolved around the concept of the separation of data and labels. This issue is particular to packages which are designed around a line-editor concept. (The advent of full-screen editors overcame this problem). As a consequence, many subjects tried to enter the column headings before entering the data which is not permitted by the packages. The programs require these to be entered under separate operations. Novices with various packages, which may or may not include a statistical package, are perhaps influenced by prior exposure to spreadsheets which do not make the distinction between data and labels.

9) Concept of File - There seemed to be a lack of understanding of what a file is, and how and where it is saved and retrieved, which seems to indicate a lack of understanding of random access memory and secondary storage. Subjects did not know what had become of the file once it had been saved and so did not know what was required to get back to it to add or make changes to it. Fortunately, the programs automatically assign a filename when one has not been furnished. This created problems, however, for those who then wanted to see the file, but did not recognize that it had been saved under this name, nor understood where it had gone once it had been saved. The traces also indicated that they did not know what would happen when they resaved a file. Other data entry difficulties were experienced by a few subjects attempting to access a file they believed already existed. Again, this may be the influence of spreadsheets which provide an empty worksheet which is to be filled.

## **Conclusion**

The results of the study suggested that these underlying difficulties should not be ignored as they are likely to have an adverse impact on the user's performance. Novice users, with little or no experience with any packages, for whom these problems were particularly marked, were found to have statistically significantly lower performance on the packages they used than other user categories. An Expert Performance Benchmark was established by having an expert user on each package perform the experimental task. This Benchmark, in both packages, was found to be 100% of the task completed error-free in 3 minutes. Novices took as much as one hour, sometimes without accomplishing any of the task. In fact, the fastest performances exhibited by the more experienced users was 100% of the task in 20 minutes which is, itself, well below the Expert Benchmark. This suggests that even for experienced software users on an unfamiliar package, there are hurdles which must be surmounted before expert performance levels can be attained. The problems faced by first time users of a package then should not be dismissed as trivial.

It is important for designers of software to be aware of these hurdles if the assistance required by these users is to be adequately provided. This is particularly true if software design is to move from generic models to the accommodation of individual differences. (Mahling & Lefkowitz, 1989; Wolf, et.al., 1989). Individualized learning and adaptable

interfaces are features of package design and instruction which promise to reduce training and retraining costs for organizations.

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