Teaching an Explicit conceptual Model As a Mean to Improve the Work with Computer Applications

by Tzipi Yeshno

Abstract

Computers are essential tools found almost in every home, where they are used for both work and play. Software packages are developed as interactive systems which are supposed to be user-friendly and thus accessible to a large variety of users. Nevertheless, many people find it extremely difficult to learn how to use them. This research project is intended to investigate the use of conceptual models to aid people who are learning to use these software packages. A conceptual model is an explicit description of the functioning of a hardware or software system that can be "run" in order to explain and predict the behavior of the system.

This research project investigated subjects learning to use the word processor, Microsoft Word. Specifically, I investigated how the learned to work with bilingual bidirectional text in both Hebrew and English, which is a complex, but essential, skill for Israelis using this popular software package. Learning to use MS Word is usually by trial and error, and the anxiety that users exhibit on non-trivial tasks demonstrates that there is much room for improvement.

The project was carried out in three stages. In the first stage, a conceptual model of this feature of MS Word was created, a tutorial was written based upon this model and the research tools where prepared. The model used the concept of blocks, which are sequences of characters typed in the same language with the same paragraph and cursor direction. The tutorial based upon the block model was used to teaching the experimental groups, while the control group was taught using a similar tutorial that presented the same function without basing the description on an explicit conceptual model. The tutorials were reviewed by two senior teachers and their feedback used to improve them. Preliminary testing on two classes was also used to improve the tutorials. as well as the research tools such as exercises and examinations. In the second stage of the research, material intended for the experimental group was tested again, in order to further refine the presentation and the teaching strategy.

The third and main stage of the research was carried out on a control group and an experimental group, both classrooms and in computer labs. In the classroom, the students were asked to predict the results of certain operations

and to complete a closed examination. In the computer lab, they were asked to perform editing tasks and to record results. The results of the closed exam did not show any improvement in the performance of the experimental group as compared with the control group. On the other hand, the two groups used different methods in the lab. The students in the experimental group worked systematically to achieve the goals, analyzing the text in terms of the block model in order to carry out the tasks. The students in the control group did not work systematically, and used trial and error instead.

The experimental group found the model difficult to use, indicating that to obtain the full benefit of conceptual models, they need to be used consistently from the beginning of the instruction. Despite these difficulties, this research project has shown that conceptual models have much to contribute to improving learning, and to enabling users to work more systematically with software packages.