Learning Patterns in Procedural Skills Acquisition With Complex Enriched Information (Poster)

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Abstract

Several studies have demonstrated that performance in a new procedural skill is more accurate, faster, and more flexible when learners are provided with enhanced information: specifically, "how-it-works" knowledge (Fein, Olson & Olson, 1993; Kieras, 1988; Kieras & Bovair, 1984) in addition to "how-to-do-it" (Taatgen, Huss, Dickison & Anderson, 2008). However, enhanced information does not always improve procedural skills acquisition. Kieras and Bovair (1984) and Taatgen et al. (2008) explain this by hypothesizing that enhanced information improves performance only if it allows learners to directly and simply infer the precise procedural steps required. The present study examined the influence of providing complex enriched information during procedural task training on the development of learning patterns and their efficiency using a 75-step LEGO® assembly task. Participants used a training application that presented step-by-step assembly instructions. A Control group was trained with the application only, and a Model group was also given the real-world final LEGO® model to study and analyze during the training. Performance measures were similar between the Control and Model groups, but learning patterns were found to differ between the groups. The Model group spent a smaller proportion of time in short learning sessions than the Control group, whereas the Model group spent more time in long learning sessions than the Control group. In addition, several learning patterns were correlated with poor performance in the Model group. Specifically, the time allocated to long learning sessions was found to be significantly detrimental to the time per brick assembly, while the time allocated to short learning sessions was significantly detrimental to the number of corrected bricks. Interestingly, no significant correlations were found for the Control group. The correlations between learning patterns and poor performance may suggest a failure in the trainees' metacognitive processes for the Model group. It appears that having the model available during training gave some trainees false confidence in their ability to remember the assembly procedure, and, as a result, they spent less time than they should have on certain diagrams. On the other hand, having the model during training may have caused participants to choose poor learning strategies – specifically, to focus on analyzing the model, instead of the better strategy of rehearsing the assembly steps by interacting with the diagrams. Conclusions are that when the real model was provided during training, learning process became more complex, and hence choosing the best training strategy was harder for participants.

Keywords: Training, Active integration, Overconfidence, Metacognition.

References

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