

Prior knowledge and Hypertexts Structure: a Combined Effect of a Well-Organized Structure and a Coherent Pathway on Comprehension for Novices

Franck Amadieu (LTC¹, UMR 5551 - Toulouse 2) - amadieu@univ-tlse2.fr

André Tricot (ERT34 – IUFM & LTC, UMR 5551 - Toulouse 2) - andre.tricot@toulouse.iufm.fr

Claudette Mariné (LTC, UMR 5551 - Toulouse 2) - marine@univ-tlse2.fr

We investigated the interaction effect between the level of prior knowledge and the type of structure on comprehension with a hypertext device (i.e. parts of text related by links thanks to a conceptual map). 55 psychology students (undergraduates) studied a lesson dealing with the infectiousness process of a virus. Three structures of a conceptual map were compared: a network providing no guidance, a linear structure that provided guidance hinting a coherent pathway (i.e. respecting the temporal-causal structure of the infectiousness process), and a hierarchical structure that provided a “well-organized” structure of the content and guidance for a coherent pathway. Comprehension was assessed with text based questions (the answer was explicitly mentioned into a node) and with inferential questions for the situation model (to answer the learner needs to infer the relationships between two or more distinctive nodes). Two types of information were distinguished: the anatomic information (spatial information about the cell and the virus) and the functional information (causal and temporal information about the infectiousness process). On the basis of the Construction-Integration model of Kintsch (1988)², we hypothesised that the hierarchical structure combined with a coherent pathway would support the situation model scores of the novices and that experts would benefit from no particular type of structure.

The results showed an interaction effect only for the anatomic information for both text based questions and inferential questions. As expected, the hierarchical structure entailed higher scores for the low knowledgeable learners than the linear structure and the network structure. For the high knowledgeable learners, the linear structure supported the higher results than the network and the hierarchical structure. Thus, the structures effects were similar on both the text base scores and situation model scores suggesting that the two levels of text representation may be related and evolve together. Moreover, added analyses indicated that novices following a coherent pathway during a second reading of the content in the hierarchical structure obtained higher scores for the functional information. However, the high knowledge learners benefited from a low coherent pathway during a first reading for the anatomical information.

Our findings support partly previous results obtained by Salmeron, Cañas, Kintsch and Fajardo (2005)³ and suggest that: (a) a coherent pathway seems to improve the text base and the situation model for the lower knowledgeable learners, but (b) it seems to favour comprehension only during a second or more reading of the nodes.

¹ Laboratoire Travail & Cognition (Maison de la recherche)
Université de Toulouse-Le Mirail
5, allées Antonio Machado
31 058 TOULOUSE CEDEX

² Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review*, 95(2), 163-182.

³ Salmeron, L., Cañas, J. J., Kintsch, W., & Fajardo, I. (2005). Reading strategies and hypertext comprehension. *Discourse Processes*, 40(3), 171-191.