

# **Annotating Exploration History and Knowledge Mapping for Learning with Web-based Resources**

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Exploring hyperspace provided by hypermedia/hypertexts often involves constructing knowledge from the contents that have been explored. This would enhance learning. However, learners often fail in knowledge construction since what and why they have explored so far become hazy as the exploration progresses. The main way to resolve this problem is to encourage learners to reflect on what they have constructed during exploration in hyperspace. The reflection also involves rethinking the exploration process that they have carried out since it has a great influence on their knowledge construction. In particular, exploration purposes, which mean the reasons why the learners have searched for the next node in hyperspace, play a crucial role in knowledge construction. For instance, a learner may search for the meaning of an unknown term to supplement what is learned at the current node or look for elaboration of the description given at the current node. Each exploration purpose would provide its own way to shape the knowledge structure. The reflection support accordingly needs to adapt to their exploration activities and the knowledge structure being constructed by the learners.

As a proper reflection support for learning with hypermedia/hypertext based learning resources on the Web, we have developed a reflection support system that encourages learners to annotate their exploration history with exploration purposes that have arisen during exploration. It also transforms the annotated exploration history into a knowledge map that spatially represents semantic relationships between the WWW pages that the learners have visited. Although such semantic relationships, which are not always defined in web-based learning resources, these are specified by the exploration purposes. Using the system, the learners can annotate the exploration history to rethink their exploration process that they have carried out so far. They can also view the knowledge map to reflect on what they have constructed in hyperspace.

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