Chapter 6
Interactive Concept Discovery (INCOD)

ABSTRACT

This chapter describe systematic exploration of important concepts in digital libraries with Key Word in Context (KWIC) semantic search that allow learners to explore specific conceptual situations by searching lexical label of a concept. Comprehensive record of a learner's sequence of searches allows for a detailed reconstruction of the learning episodes generated by Interactive Concept Discovery (InCoD) over time. It reveals the learner's consistency of 'drilling-down' for discovering deeper building blocks of the particular concept, and the temporal evolution of learning outcomes.

INTRODUCTION

Concept Parsing Algorithms (CPA) plays important role in learning and research in the digital age. In addition to traditional reading of a chapter in the course textbook, learners gain understanding of course material by engaging in Interactive Concept Discovery (InCoD), systematic exploration of important concepts in digital libraries. This is a novel Key Word in Context (KWIC) semantic search that allow learners to explore specific conceptual situations by searching lexical label of a concept; to discover concepts and their relations within particular knowledge domains; and to develop deep understanding of real and hypothetical conceptual situations under consideration (Figure 1).

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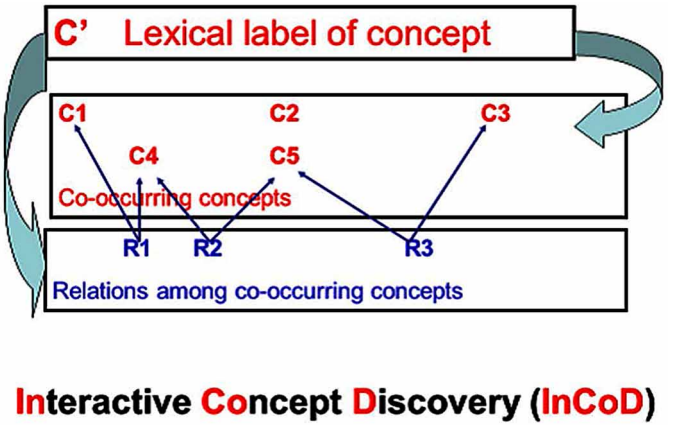
Figure 1. Interactive Concept Discovery (InCoD)



The traditional 'reading list for a course' has been replaced in the digital age by a Knowledge Repository (KR) that contain comprehensive collection of all relevant digital documents (books; journals; technical reports; databased; image-bases). Interactive Concept Discovery with KWIC semantic searches offer learners opportunities to discover a document's *Conceptual Footprint*, by marking all the locations in the document where relevant concepts are mentioned. As well as to compare discussions of specific concepts in different documents written by different authors. The reader is expected to choose several such discussions for comparison and annotation; to construct *Learner Individual Index* of names of concepts and their relations; and drill for deeper roots of building blocks of the concept under scrutiny. Interactive Concept Discovery facilitate the identification of hierarchical and lateral links in, and analysis of, conceptual structure in the course Knowledge Repository. The learner begins by conducting *concordance*, namely, semantic search of Key Word In Context (KWIC) of a Super-Ordinate concept (C'), and evaluating the consistency of appearance of co-occurring concepts and their relations across different documents found to contain (C') lexical label. In each successive iteration, the learner can read/save found documents online; mark/save lexical labels and candidate features of building blocks; annotate and evaluate the degree of relevance of a particular found document to the specific conceptual content under consideration; and construct alternative