Process-Based Knowledge Organization

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ABSTRACT

To overcome some limitations of existing models that organize knowledge on the world wide web for online learning, this paper proposes a novel method of using graphical process models to organize knowledge on the web and to guide the learning process. Process models can not only visually represent the logical relationships (i.e., if … then, all, at least one, and exactly one) of knowledge elements, but also display learning paths that consist of logically connected knowledge elements. This paper also presents a design of an innovative learning system that integrates process models with some existing knowledge organization models to facilitate online learning. This paper makes a useful contribution by proposing process-based knowledge organization as well as providing a visual representation of learning paths that explicitly prompt people to follow a logical process for effective learning.

KEYWORDS

Knowledge Element, Knowledge Management, Knowledge Organization, Knowledge Representation, Learning Path, Logical Relationship, Online Learning, Process Modeling, Web

INTRODUCTION

The World Wide Web has been used to centralize and organize large bodies of knowledge and has been used widely for online learning. In a broad sense, **knowledge** includes facts, concepts, procedures, strategies, and beliefs (Mayer, 2011). However, simply presenting a tremendous amount of knowledge on the Web for easy access does not automatically make the Web an effective learning tool.

The objective of this research is to apply process modeling to knowledge organization for achieving more effective online learning. To accomplish this research objective, this paper first discusses the limitations of existing models that organize knowledge on the Web for online learning (Section 2). To overcome these limitations, this paper proposes a novel method of using graphical process models to organize knowledge elements based on their logical relationships (Section 3), where **knowledge elements** can be any identifiable pieces of knowledge. This paper also presents a design of an innovative online learning system that integrates process models with some existing knowledge organization models for improving online learning (Section 4). Theoretical and practical contributions are discussed in Section 5.

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EXISTING MODELS OF ORGANIZING KNOWLEDGE ON THE WEB FOR ONLINE LEARNING

Ambrose et al. (2010, pp. 49-54) discussed the chain model, hierarchical model, and cross-referencing model of people's knowledge organization. In these models, nodes are used to denote pieces of knowledge and undirected links are used to denote relationships among knowledge. These three models also can be used to describe many existing models of organizing knowledge on the Web for online learning (see Figure 1). In Figure 1, directed links are used to show the order of knowledge organization.

Chain Model

In a chain model (see Figure 1(1)), knowledge elements are arranged in the form of a chain, where directed links denote the order of arrangement. As an example of chain models, an indexing model in Figure 2 lists knowledge elements alphabetically. People can use an index list to quickly locate knowledge elements if they know the items to look for.

Indexing models are usually used for reference purposes. It assumes that people already know (or at least roughly know) the terms to look for, which is not the typical case in learning new knowledge. Hence, indexing models alone are not enough for learning new knowledge.

Figure 1. Existing models of organizing knowledge on the Web

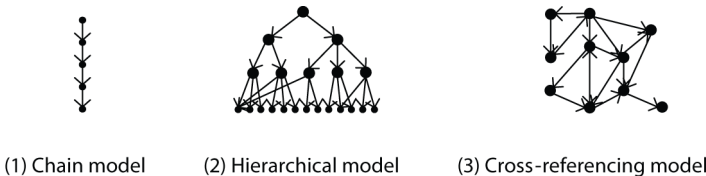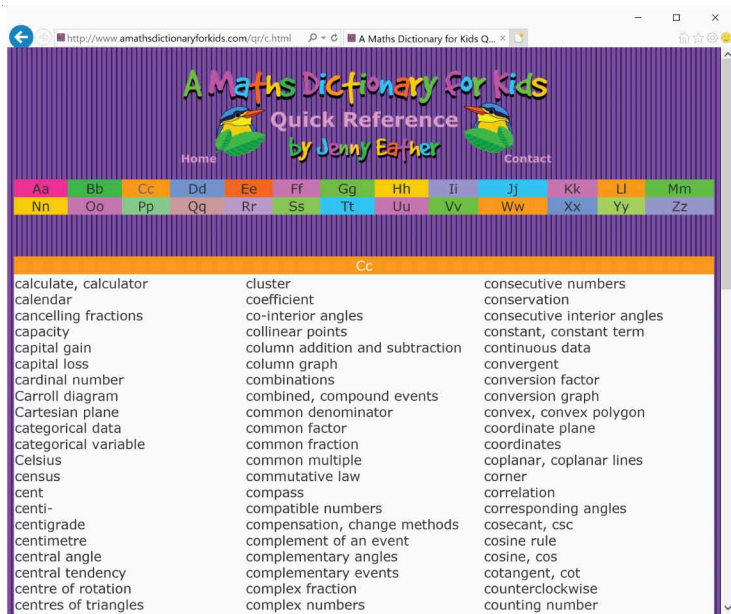(1) Chain model   (2) Hierarchical model   (3) Cross-referencing model

Figure 2. An example of using an indexing model to organize knowledge on the Web (accessed July 8, 2021)

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