# Accessing Best-Match Learning Resources in WBT Environment

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**Abstract:** In this paper, we analyse a so-called access to Best-Match learning resources in a WBT environment. We overview existing solutions and propose a new technical solution which extends the topic map functionality with a number of important features. This solution is based on a concept of so-called knowledge cards combined into a semantic network. The mechanism essentially utilizes such important property of semantic networks as a possibility to infer Learning Resources using semantic relationships.

## 1. Introduction

Traditionally, Web Based Training (WBT) (Gaines et al. 1996) system is supposed to maintain a training process available "anytime anywhere" by means of the World Wide Web technology.
Nowadays, WBT attracts more and more attention as a tool for so-called “training on personal demand” which utilises different training scenarios than a classical WBT (Shaw et al. 1996). The following scenario covers a representative number of the training on personal demand applications. An employee needs a training on a particular subject to acquire additional knowledge, and is aware about a WBT server containing a relevant information.The employee access the server to find most relevant training material, to work through these material and to communicate with the subject experts and with other learners working on similar materials.
Implementation of the “learning on demand scenario” obviously requires a special tool for *accessing best-match learning resources*.
There are two well-known technical solutions which potentially my fulfil the requirements for accessing best-match learning resources: *search engines* and *topic maps*.
Currently, search engines are capable of performing very intelligent and customisable searches that retrieve the most relevant documents or parts of documents that fit a certain *query*. However, search function often cannot be applied for selecting best-match learning resource simply because query languages are not capable of defining such crucial thing as “learning goal”.
On the other hand, topic maps are used to present a comprehensive conceptual overview of learning resources provided by a particular WBT system. This approach allows browsing and searching on meta-level rather than browsing of individual documents. However, application of the topic map concept put a serious additional work load on authors who are responsible for providing comprehensive topic maps of learning resources in a WBT environment.
In this paper, we propose a new technical solution which extends the topic map functionality with a number of important features. This solution is based on a concept of so-called knowledge cards combined into a semantic network (Lambiotte et al. 1984). This concept has been implemented as a component of multipurpose WBT system called WBT-Master (http://coronet.iicm.edu/wbtmaster/know.htm).

## 2. Knowledge Cards

A *Knowledge card* is a description of particular concept (i.e. *semantic entity*). For example, a semantic entity “Database technology” may be seen as a knowledge card.

Practically speaking, each Knowledge Card may provide access to a number of *associated Learning Resources*. For example, a course on "Relational Data Model" may be associated with the Knowledge Card "Relational Data Model", some other Learning Resources may be associated with the same Knowledge Card.
Knowledge cards may be interrelated into a *semantic network* using different types of relationships: "is a part of", "is a kind of", "synonym for", etc. For example, the knowledge card "Relational Data Model" may be related as "is a part of" to the knowledge card "Database Technology". The knowledge card "World Wide Web" may be related as "is a kind of" to the knowledge card "Hypermedia Systems". The knowledge card "Web Base Training" may be related as "is a synonym for" to the knowledge card "Computer Supported Collaborative Learning".
All possible semantic relationships are predefined in a special system thesaurus where the relationships are also provided with a numeric assessment of so-called *inference probability*. The inference probability is an assessment of "how much" a particular knowledge card is related to another knowledge card, and vice versa, in the semantic network. For instance, the inference probability between two knowledge cards can be set as 1.0/1.0 for the "is a synonym for" relationship.
Whenever an author contribute to the server with new material, he/she is supposed to associate it with one or more Knowledge Cards or create a new Knowledge card and place it into a proper position within the semantic network. Of course, it can be also done by a specially designated member of the server administration team (Knowledge engineer).
As a starting point, learners are not supposed to browse through countless learning resources. They are supposed, in a simplest case, to browse the semantic net consisting of previously defined Knowledge Cards.

## 3. Infer Procedure

The infer mechanism essentially utilizes the other important property of the semantic network (Nosek et al. 1990) - a possibility to infer Learning Resources using semantic relationships.
Whenever a user access a knowledge card, the system automatically infers all Learning Resources which are associated with this particular Knowledge Card and with Knowledge Cards related to this one.
For example, suppose that there were no resources associated with the knowledge card "Computer Science", but a number of other card (say, Databases, Programming, etc.) were defined as "is a part of" Computer Science. Accessing the "Computer Science" knowledge card will result in the resources inferred from other related cards with the "relevance" attribute equal to 1.0.

## 4. Conclusion

Generally, first experiments with the Knowledge Card system demonstrate a rather good functionality and acceptance by users. User evaluation questionnaire and analysis of the server log files show that users definitely prefer a personal knowledge card to be an entry point to the whole system. Authors generally like the situation when they can simply contribute to the server without paying much attention to accessibility of the material. Note, the contribution is automatically associated with the author's personal knowledge card which, in turn, refers to the author's area of interest.

## References


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