A Literature Review of Indexing and Searching Techniques Implementation in Educational Search Engines

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ABSTRACT

The objective of this article is to analyze the searching and indexing techniques of educational search engine’s implementation while treating future challenges. Educational search engines could greatly help in the effectiveness of e-learning if used correctly. However, these engines have several gaps which influence the performance of e-learning actors (students, teachers, administration, and other stakeholders) which requires more attention. In education environments, the implementation of e-learning systems seems to be among the important topics on the agenda of universities. Considering the arduous research, the extensive pedagogical development and the large financial support, expectations for positive results are incredibly high. However, e-learning actors step back and think about the educational search engines that are part of e-learning systems; and reflect on what the different indexing and searching techniques are used by these search engines.

KEYWORDS
Challenges, E-Learning, Educational Search Engines, Searching and Indexing Techniques, Universities

INTRODUCTION

The search of information is a domain that dates from 1948 (Mooers, 1948). This domain concerns the process of storage, organization, representation, and access to information by the user.

These search engines are used in several areas. In the field of learning and research, e-learning systems use them under the name of educational search engines. Educational search engines bring many advantages for e-learning systems; we cite the identification, adaptation, re-using and sharing of Learning Objects (LO). Educational search engines are based on the exploratory learning approach. It allows the learner to conduct his own study by their search and allows the teacher to deposit and index his course. The impact of these changes must be assessed.

Within this study the indexing and searching concerns the LO that is an entity that we can find, share, reuse and adapt it in a learning process assured by technology. These modernizations encourage students to direct their studies according to exploratory learning. This literary study gathers information on several educational search engines. After the diagnosis of anomalies, we will present several challenges.

The rest of this paper will be distributed as follows, the next section presents the search engines in general, thereafter there is the section that presents various educational search engines, this section

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will be followed by a comparison of the current characteristics of the educational search engines as well as the future challenges and finally there is the conclusion.

**SEARCH ENGINE**

Several definitions of information searching have been defined, describe searching as a process of storage, organization, representation, and access to information by the user.

As shown in Figure 1, R. K. Belew (Belew, 2002) proposed a process that today considered as a general Information Retrieval System (IRS) process.

The general process is divided into several parts of which three processes are of paramount importance:

- **Indexing Process**: Indexing consists of summarizing a data by characteristic elements resulting from this thing data to be able to classify it and to bring it closer to similar things data, indexing makes it possible to group values in order to find them more quickly. There are three modes of indexing. Manual where the human is charged of indexing. Automatic where indexing is done in a fully automated process. Semi-automatic where indexing is done through a fully automated process, but the intervention of the human being is necessary to refine the index.

- **Searching Process**: Comparison between the index representation model of the query and the document. This process is used to measure the degree of similarity between the query and document. Finally, it generates a set of documents that respond to the request.

- **Evaluation of the Answer**: The user uses the documents reported and which meet his needs, otherwise he reformulates another request.

The indexation must support some issues that will be detailed in the subsequent pages, is concerned with recovering the important terms of the document what is called classical indexing or is interested in recovering the meaning of the important words of the document, relations and events that connect them; this type of indexing is called semantic.

**Classic Indexing**

The classical indexing is interested in finding from a large document the most important words with their weights, called the weighting. There is the technique based on the frequency of occurrences and technique based on Term Frequency (TF) Inverted Document Frequency (IDF).

![Figure 1. The IRS Process](image-url)
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