Alexandria, a multilingual dictionary for Knowledge Management purposes

Abstract: Alexandria is an innovation of international impact. It is the only multilingual dictionary for websites and PCs. A double click on a word opens a small window that gives interactive translations between 22 languages and includes meaning, synonyms and associated expressions. It is an ASP application grounded on a semantic network that is portable on any operating system or platform. Behind the application is the Integral Dictionary is the semantic network created by Memodata. Alexandria can be customized with specific vocabulary, descriptive articles, images, sounds, videos, etc. Its domains of application are considerable: e-tourism, online medias, language learning, international websites. Alexandria has also proved to be a basic tool for knowledge management purposes. The application can be customized according to a user or an organization needs. An application dedicated to mobile devices is currently being developed. Future developments are planned in the field of e-tourism in relation with French “pôles de compétitivité”.

1 Introduction

Within the context of the globalisation of exchanges, companies feel an increasing need to gather and capitalise on multilingual strategic information issued from the web, as well as from various information sources. This is why a direct access to sense is crucial to the definition of an organisation’s business intelligence strategy.

Alexandria is an innovation of international impact. It is the only multilingual dictionary for websites and PCs. A double click on a word opens a small window that gives interactive translations between 22 languages and includes meaning, synonyms and associated expressions. Alexandria is the only multilingual dictionary for websites in the world. It is unique and has no equivalent whether it be in the field of private or academic research. The developments made for French and English include definitions. The dictionary can be queried from the Internet, intranets, collaborative, e-learning and e-commerce platforms or directly on a PC.

Alexandria can be customized with specific vocabulary, descriptive articles, images, sounds, videos, etc. Its domains of application are considerable: e-tourism, on-line medias, language learning, international websites. The PC version allows diving into languages and international information monitoring. It is not a software: a few HTML code lines added to a website of platform will give any user the possibility to query instantaneously the « Integral Dictionary », the result of 15 years of private and public research on semantic networks and sensemaking in multilingual environments.

The knowledge contained in the application can be expressed through the number of words contained in the semantic network. The application gives access to over 3 million words and definitions in twenty-two languages, through the work performed by Memodata on the semantic network.

2 Knowledge sharing through customization

Alexandria has also proved to be a basic tool for knowledge management purposes. The application can be customized according to a user or an organization needs. Specific
vocabularies or encyclopedic information can be added to the database and be accessed through a double click: newcomers, project teams can share an organization’s specific knowledge. The teams of different departments or foreign offices of a company that produce a technical language can thus communicate their language. Specific vocabulary, project explanation slips in independent window, specific know-how and methods of technicians or managers that will soon retire: the different company entities can share a common and explicit language. The company and its clients are therefore able to share knowledge, learn the same notions and thus speak the same language.

It is also possible for administrations to disseminate specific notions or vocabularies through their websites. In France two ministries are considering the possibility of simplifying access to the notions of electronic administration by making use of the Integral Dictionary through customization of Alexandria.

Through the semantic network, the dictionary gives access to a broad variety of functionalities. It can display definitions, explanations, news, unlimited possibilities of association, uses and combinations of technological supports that display contents. This possibility to display specific encyclopedic contents gives a strong added value to the information thus disseminated.

By querying the name of a town the system can display information about a public exhibition. In the following example, the query sent to the Integral Dictionary is the French town of “Avignon”. The system then displays geographical information about the town together with hot information about the local art festival.

![Figure 1 – Local contents with hot information display](image)

### 3 Technological background

Alexandria is not a software. It is an ASP application grounded on a semantic network that is portable on any operating system or platform. Technically a double click on a word opens a javascript window that displays a definition or translation in twenty-two different languages.

The following table summarizes the functionalities of the dictionary:
1/ in English and French
- 100,000 definitions
- Synonyms and associated expressions

2/ Translations of words and expressions
- **Between 22 languages**: English, German, Arabic, Bulgarian, Chinese, Corean, Spanish, Estonian, French, Greek, Italian, Japanese, Dutch, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian, Swedish, Czech, Turkish.
- The user can deepen his search by also clicking the words displayed in the window and thus navigate in a world of information.

3/ Access specific added information
**Specific information can be displayed by sector:**
For example: Tourism and pharmaceutical industry, holding companies, can add specific vocabulary including specific information slips about, medicines, a project, a monument, etc.
**In each domain it is thus possible to create a user oriented mini encyclopaedia.**

The application becomes accessible on a website after the webmaster has added a few HTML code lines to a website.

Alexandria also is an innovation that simplifies information access: with a double click on a word a website visitor can access its definition in French and English on 100,000 entries and its translation in 20 other languages, in a small independent window.

The information displayed by Alexandria is a partial view of the Integral Dictionary, a multilingual semantic network developed in France by Memodata a language processing company and the CRISCO CNRS laboratory. The Integral Dictionary has integrated data from Wordnet and Balkanet programmes and the semantic network shifts from words to ideas by linking synonyms, antonyms, domain specific information based on isotopies. Following a query, Alexandria displays a suite of synonyms and associated expressions in which the word of a query can be found.

### 3.1 The Integral Dictionary

The Integral Dictionary is the semantic network created by Memodata. It processes 22 languages to this date.

Its name only refers to the multiplicity of its possible uses, its organisation, and to the many different types of information it contains. This dictionary is made of a databank that is processed through a relational database. It is represented by a semantic graph as in the following example in French.
The contents of the Integral Dictionary are a connection between words, expressions (or collocations) and concepts. The Integral Dictionary is a compound of a syntactic layer and distinct levels of utterance together with many different types of expression that can link words and concepts. The relations are oriented according to a “father-son” model.

4 Alexandria the KM springboard

The information watch domain, whether it be information filtering, information routing, Knowledge Management applications, collaborative platforms or social networks, is at the crossroads of different domains that did not use to share common issues. Technology providers now meet document processing specialists and take on similar priorities. In this context, the translation tasks inherent to multilingual information monitoring systems have become a crucial issue for the building of a knowledge based economy.

4.1 Managing explicit knowledge

By favoring the standardisation and dissemination of technical or patrimonial knowledge, Alexandria has the potential to become a reference tool for the quick gathering and dissemination of specific vocabulary and cultural knowledge.

4.1.1 Reaffirming knowledge explicitation

Alexandria encourages the process of knowledge explicitation. Specialized lexicons are a support that will make explicit the terms used by an organization or a community. And beyond the contents of a definition, uses, explanations and standards are described, illustrated and disseminated more widely than through any other media.

Explicit knowledge can be formalized, reaffirmed by the simple fact of its inclusion into Alexandria. Reaffirming an explicit piece of knowledge addresses collective knowledge acquisition issues, together with organisational and cultural evolutions in the case, for example, of company merges, partnerships or the development of collaborative distant cooperation.
4.1.2 Agreement between partners

There can be a participative process to that leads to consensual definitions, knowledge explanation or the choice of shared multimedia documents.

The KM processes that take Alexandria as a support encourage participative creation of a shared common language. These processes can also aim more generally at sense disambiguation.

4.1.3 Procedural knowledge

Alexandria is a procedural knowledge base that can be used only when necessary. Its contents are always connected with the needs of a user in a work situation. A specific knowledge bank is a complementary tool, but Alexandria may become the support of any knowledge item whatever the media used to display it.

4.1.4 Speed and ubiquity

Alexandria gives explicit knowledge unprecedented characteristics.

It is neither centralized into a database nor on a platform, nor is it disseminated in thousands of documents. Knowledge becomes permanently accessible at the background of any document or process, and appears whenever it is necessary. Knowledge spreads through any company or virtual community immaterial information media. Alexandria makes it ubiquitous: knowledge is everywhere behind the word, and solicited only in a specific context when a user wants it to be displayed.

4.1.5 The levels of interaction and navigation into the knowledge network

Alexandria in fact comprises various possible levels of sense production and dissemination.

1/ According to the principles and adopted ergonomics: integration of new items into the semantic network. Integration into the network encourages interpretation and navigation into a network of knowledge.

2/ According to knowledge explicitation modes, the circumstances and methods will vary. For example this induces the constitution of knowledge banks or knowledge gathering. The forms of transmission take place through definitions, explicitations or demonstrations, story telling, podcasts, videos, with a natural prolongation through blogs and communities of practice.

3/ According to the induced contacts: towards domain experts, managers or communities of practice, that may thus become a reference for domains and issues addressed in this context. Then it becomes possible to see the semantic network as a new entry into a sub-network that comprises reference experts.

4.2 The hermeneutic function: representation

The semantic network and the possibility to navigate into the network itself, its themes and semantic classes, associated terms, whether they be generic or specific, offers in itself an original method of knowledge acquisition based on interpretation.

It is a methodology particularly adapted to complexity. It gives the possibility to reach the borders of knowledge remaining centered however on the original query.

A set of pieces of knowledge often proves necessary to answer a formulated query. They can be part of different paradigms or result from a combination of meanings that question our capacities of interpretation. Alexandria and its associated navigation facilitate our capacity to discriminate senses.
4.3 Skill referential, experience directories, problem solving

Alexandria can be enriched with an XML database that contains a company or profession skill referential.

This referential allows deepening and illustrating in concrete terms, practices, concepts, and the experience they refer to. For example a referential created for nutritionists (this referential was produced by the French association of nutritionists) indicates:

"Decide of, conceive, conduct, adapt, therapies or projects

- Decide of, conceive, conduct in the field of nutrition prevention (education, communication, product conception, etc.)
- Decide of reasonable and well documented therapies in relation with the diagnosis established, while taking specific and individualised treatment measures.
- Conceive and adapt teaching and nutritional education strategies whether they be individual or collective"

This statement could also lead to project return of experience, the setting of a dietetical diagnosis associated to a network of concepts that could clarify this diagnosis and be used as a decision making assistance tool.

Similarly, technical terms, whether they be linked to skills or knowledge can be related to an experience directory made of the compilation of voluntary testimonies. The entry to this knowledge base can be a search engine, that would use Alexandria for result analysis on the one hand, and the semantic network for contextual and intelligent indexing and information processing on the other hand.

In fact, this would lead to providing an interactive data compound constituted of operating representations. A professional will not act according to stimuli but from the interactive representation of these stimuli (Le Boterf .157). The choice of the adapted representation, guided by the semantic network also allows a professional to make the right decision and find his way out of confusion.

4.4 Multilingualism and a shared language

Sharing a common language is an increasing need in a globalization context.

Alexandria brings an immediate response to this need from which the most commonly used Knowledge Management tools can benefit immediately without any change in their structure. Communities of practice may share knowledge and experiences without stepping on the obstacles of misunderstanding and cross language ambiguities that often depreciate the value of the exchange.

Social interactions, project teams, local actors networks, clusters and « poles de compétitivité »... any entity that requires sharing a clear language, agree on meanings or key representations can rely on this new tool to produce a common meaning and invent new ways of communicating, understanding each other and explain concepts. In this configuration, the dominant logic is not any more in information filtering but in the re-appropriation and sharing of a common meaning.

5 Mobility

5.1 Alexandria Micro application

An application dedicated to mobile devices is currently being developed.

It is a MIDlet application that has been developed for smart phones. Once the MIDlet is selected the user has to press a command key on the bottom right of the screen. When the MIDlet is launched, the application main screen appears as illustrated below.
Figure 3 – Smart Phone application display

As can be seen on the main screen, only minimal information is displayed. Thus a user used to searching word translation into a given target language can directly type the word into the query window and press the «submit» key.

If the user wishes to modify either the source or target language, he can make his choice with the up and down keys and press the select key. The language selection screen thus appears.
Once the settings have been chosen the user enters the word to be translated. After pressing the “submit” key, the results appears.

If the result does not fit into the window it is necessary to press the « bottom » key to display the following sequence. The parameters are memorized when the user has finished using the application and the same source and target language can then be used again.

5.2 Further developments

Further developments identified in relation with mobile devices user needs are the following :

– The description of authentification mechanisms that allow the identification of a user of a Smartphone or PDA.
– The security mechanisms available on mobile terminals (secured protocols, secured applications, etc.)
– Micro payment technologies on mobile terminals
Multi-threading management on PDA management systems.
- Screen shot management on mobile terminals including key combination on mobile phones
- Validation of the «Alexandria mobile» application now developed for mobile phones with Java compatibility

6 Projects, realizations and future developments

The creators of the system wish to increase the size of the semantic network and extend multilingual lexical covering through the addition of thesauri and large multilingual databases. The MESH CISMEF and EUROVOC thesauri have already been added to Alexandria.

Through a partnership with i-KM a company specialized in language processing research and Knowledge Management issues, Alexandria is reaching another dimension: specific adaptations and vocabularies are being created, particularly in the field of e-tourism. A collaborative platform designed to share specific vocabulary and accessible to domain specialists has been created. Multilingual vocabularies are being created in a collaborative mode by domain experts. In addition to the inclusion of domain specific vocabulary into a knowledge base, this unprecedented collaboration between domain experts aims at creating a concept based, reliable, and domain-specific referral system.

This experience being carried out in the field of e-tourism will create a reproducible model that can be adapted to other domains and used to generate other domain specific professional referral systems.

Collaboration with the French laboratory of usage is presently under study to integrate Alexandria to the French SCS competitiveness pole and consider the development of various e-tourism mobile applications and other developments of the network for knowledge management purposes.

7 Bibliography