Chapter 8
Integrating Medicinal Learning Objects with Daily Duties

Juha Puustjärvi
Helsinki University of Technology, Finland

Leena Puustjärvi
The Pharmacy of Kaivopuisto, Finland

ABSTRACT

Lifelong learning is a term that is widely used in a variety of context. The term recognizes that learning is not confined to the classroom, but takes place throughout life and in a range of situations. The authors of this chapter have analyzed lifelong learning in healthcare sector, where the fast development of drug treatment requires special knowledge that needs to be renewed frequently. This chapter analyzes various ways of ensuring that the employers of medicinal organizations are aware of the relevant medicinal instructions such as medicinal learning objects and guides. In particular, the authors consider three complementary ways for the dissemination of medicinal instructions: (i) by providing keyword-based searching, (ii) by providing ontology-based searching, and (iii) by automatic integration of medicinal instructions to employers' day-to-day work tasks. The integration can be based either on the similarity of the metadata descriptions of the tasks and learning objects, or on the ontology which specifies the relationships of the tasks and instructions. The authors' argument is that integration is most preferable as medicinal instructions are provided just-in-time and tailored to their specific needs. In addition, a notable gain of ontology based integration is that employees will be aware of the existence of the all relevant instructions.

INTRODUCTION

The role of continued education and lifelong learning is becoming still more important as the fast development of technologies requires specialized skills that need to be renewed frequently. E-learning adopts well for continued education as it can be done in parallel to other work. However, e-learning sets new requirements for organizations: they have to build global learning infrastructures, learning material has to be in digital form, and learning material has to be distributed. In addition, organizations need

DOI: 10.4018/978-1-61520-777-0.ch008

learning processes that are just-in-time, tailored to their specific needs, and ideally integrated into day-to-day work patterns.

Healthcare is a field where the fast development of drug treatment and the introduction of new drugs require specialized skills and knowledge that need to be renewed frequently (Puustjärvi & Puustjärvi, 2006). As each drug has its unique indications, cross-reactivity, complications and costs also the prescribing medication as well as the distribution of medicinal products becomes still more complex (Jung, 2009). As a result, also the amount of new instructions concerning new medication increases rapidly. An interesting question arising from this reality is how medicinal instructions should be organized and retrieved in order to ensure that the employees are aware of the relevant medicinal instructions.

Ideally, the (medicinal) information retrieval system should be able to retrieve all the medicinal instructions, which are relevant while retrieving as few non-relevant instructions as possible. This kind of quality of information retrieval system is usually measured by two fractions, called recall and precision (Baeza-Yates & Ribeiro-Neto, 1999). *Recall* is the fraction of the relevant documents (e.g., medicinal instructions), which has been retrieved. *Precision* is the fraction of the retrieved documents, which is relevant. The values of these fractions are highly dependent on the way the query and the content of medicinal documents are presented.

Though the high quality in retrieving medicinal instruction is of high importance, our ultimate goal has been the integration of learning processes and daily duties in a way that searching educational material does not require extra efforts. That is, with respect to the dissemination of instructions, we have adopted the push technology instead of the pull technology, which is generally used with e-learning systems. In general, *push technology* describes a style of communication where the request for a given document originates with the publisher. It is contrasted with pull technology, where the request for the transmission of documents originates with the receiver.

A notable gain of integration is that by integrating learning objects as well as all other relevant information (or their links) with daily task is that we can ensure that employees will be aware of the existence of all the relevant material. This has turned out to be crucial as the volume of information coming in from a variety of information sources such as pharmaceutical companies, medicinal wholesalers, social insurance institutions and other authorities is increasing all the time.

In the following sections, we restrict ourselves on this topic. In particular, we consider three complementary ways for the dissemination of medicinal information: (i) by providing keyword-based searching, (ii) by providing ontology-based searching, and (iii) by integrating the medical learning objects to employers´ daily duties. Our argument is that integration is most preferable as medical learning objects are provided just-in-time, tailored to their specific needs, and integrated into daily duties. However, as we will show, automating the integration of learning objects to daily work patterns is not an easy task as it requires the management of medicinal ontologies and the deployment of business processes.

LEARNING OBJECTS AND METADATA BASED SEARCHING

Learning Objects

During the past few years the term learning object (LOM, 2004) is widely used in the discussion concerning educational information systems. Generally the term is understood to be a digital entity deliverable over Internet such that any number of learners can use them simultaneously. For example, a study course, a course book and a lecture are typical learning objects. By the term *medicinal learning objects* we refer to learning objects that deal medicinal information.