Chapter 5
Knowledge Management Model for Electronic Textbook Design

Elena Railean
Informational Society Development Institute, Republic of Moldova

ABSTRACT

This chapter aims to describe a new knowledge management (KM) model, which can be considered an enterprise resources planning model proved in Electronic Textbook in Electronic Portfolio technology. The model comprises a dynamic and flexible instructional strategy which allows constructing the personalized digital content through development of core structure of competence. This strategy allows bidirectional transitions from tacit to explicit knowledge and hermeneutic dialogues. The KM model can be described using adjacency matrix and optimized knowledge graphs techniques. The target audience of this chapter is expected to be consisted of educational management students, professionals and researchers working in the field of education including policy makers, consultants, and agencies. Applications and methodologies validate the educational efficiency of KM model for electronic textbook design. The affordance of the KM model for education relies on informational / communicational processes, cognitive processes, and computerized assessment processes.

INTRODUCTION

Learning Management Systems (LMS) is an integrative set of elements or computer programs that accomplish and manage well-defined objective. There are different types of LMS: Information Management Systems (IMS); Learning Content Management Systems (LCMS); Competency (or Competence) Management Systems (CMS); Managed Learning Environment (MLE); Virtual Learning Environment (VLE) etc. Each of Learning Management Systems can be designed according to instructional objectives or learning objectives. "An instructional objective is a collection of words and/or pictures and diagrams intended to let others know what you intend for your students to achieve" (Mager, p.3). The instructional objectives are measurable and are related to an intended outcome of instruction, rather than the process of instruction and are specific, rather than general, broad, or "fuzzy." The objectives describe the student's performance rather than the instructor's performance. Instead

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of that, the "learning objectives (often called performance objectives or competencies) are brief, clear, specific statements of what learners will be able to perform at the conclusion of instructional activities. Learning objectives stem from course objectives; course objectives are broad statements reflecting general course goals and outcomes, while learning objectives are targeted statements about expected student performance. Generally, learning objectives are competency-based as they designate exactly what students need to demonstrate mastery of course material" (Mager, 1996). The learning objectives are SMART: Specific, Measurable, Attainable for target audience within scheduled time and specified conditions, Relevant and results-oriented and Targeted to the learner and to the desired level of learning.

There are many pedagogical tools, integrated in LMS, allowing archiving the instructional / learning objectives. One of the main pedagogical tools is electronic textbooks (Полат, Бухаркина, Моисеева, 2004). The electronic textbook is an e-book which contains educational material for teaching and learning methods, which use „the strengths of the computer, such as its ability to organize and reorganize information, its versatility in linking information, its capacity to use various media, its facility in adapting to a particular individual's needs, and its manner of demonstrating new concepts and information" (Frumkes, 1996). The electronic textbook, in its simplest form, must be understood as a computer-readable file, or document, containing an extended narrative and intended as the primary mode for studying course content" (Allison, 2003). Porter (2010) wrote that electronic textbooks are a marriage of a hardcopy book within an electronic environment with software, such as Adobe Acrobat PDF, XML, SGML, HTML files, or hardware, such as a Palm Reader, E-Reader, Sony Reader, and Amazon's Kindle among others. While available in different formats, electronic textbooks must have the following: portability, transferability and searchability. The electronic textbooks are available in different formats, which are portable, transferable, and searchable" (Porter, 2010). Usually "digital textbook materials offer quizzes, online journals, the ability to highlight and annotate pages and other interactive options that appeal to students and provide immediate feedback" (Reavy, 2011) and their benefits include interactive learning, easier and faster updating of textbooks and possible significant financial savings.

Stoffa (2007) emphases, that just a linear text in digital form cannot be considered an electronic textbook. In the author point of view an electronic textbook should meet requirements following from general theory and psychology of teaching through encouragement and providing for an active cooperation with educate; providing for a reciprocal feedback; simulation models; exemplary resolved problems; an adequate formulation and expression of thoughts, structure, arrangement and the way of presenting new knowledge and adaptively for an individual style.

Ideally, the instructional design is an enterprise resources planning for didactic processes. But, these processes can rely to scientific management, informational management or knowledge management. The management design models evolve from linear to metasystems. The perspective of the chapter is to describe the metasystems approach for knowledge management model, proved by Electronic Textbook in Electronic Portfolio Technology. The objectives of this chapter are:

1. To note the theoretical –practical issues of knowledge management models.
2. To describe issues, controversies and problems generated by evolution of educational ideal
3. To describe the concept of competence in electronic textbook design
4. To analyse the role of knowledge management in enterprise resources planning models for the education sector