



Chapter XXI

Requirements for Web Engineering Methodologies

Harri Oinas-Kukkonen, Toni Alatalo, Jouko Kaasila,
Henri Kivelä and Sami Sivunen
University of Oulu, Finland

Web information systems engineering means a collection of sound principles, methods, techniques and tools for developing Web-based information systems, which differ from traditional information systems in their unique technological platform and design philosophy. Key features of Web information systems engineering beyond traditional and object-oriented information systems development include emphasis on user navigation, the multilevel interactivity of the environment, and the advanced hypertext functionality in target information systems. A starting point for designing and modeling Web information systems is that these are essentially hypertext information systems. This chapter will specify requirements for Web information systems engineering methodologies from the viewpoints of hypermedia communication environments, adaptive hypermedia systems, and mobile hypermedia.

INTRODUCTION

The success of the World Wide Web derives basically from the fluent access that it provides to information and from its ability to promote options and allow freedom of choice. One of the key features of Web information systems is that their basic computational model is based on hypertext, which is integrated so seamlessly into Web technology through HTML (Hypertext Markup Language) that most users

This chapter appears in the book, *Information Modeling in the New Millennium* by Matti Rossi and Keng Siau. Copyright © 2001, Idea Group Publishing.

are unaware of its explicit presence. However, despite the fact that the Web is hypertext-based, current Web technology provides only a very limited set of hypertext capabilities (Bieber and Vitali 1997). Admittedly, plain vanilla Web features such as basic link traversal, bookmark and history lists, and browsing forward, backward or to home provide adequate functions for a large group of Web users. There are many users, however, who complain that they sometimes do not really know where a link will take them, or that they cannot really interact with people. The fluent access to information only helps to achieve a modest level of support for ways of working in practice, however. Current Web technology provides weak support for presenting the structure and interrelationships of information, which becomes a very important matter in practice. Yet, the Web provides a perfect opportunity to support ways of working in practice, and hypertext functionality has the potential to bridge this gap.

Web information systems (WIS) differ from Web pages in that they are often integrated with organizations' other information systems, and they support knowledge work (Isakowitz et al. 1998). On the other hand, in many cases standard Web pages are relatively complex so that their design and maintenance through a similar approach is appealing (Brereton et al. 1998). Web information systems also differ from traditional information systems in that they have the potential of reaching a much wider audience, and they are based on the notion of hypertext/hypermedia. Unfortunately, WISs are all too often developed in an ad-hoc manner instead of being thoroughly analysed and designed. New approaches to design and development are needed. **Web information systems engineering** (WISE) means a collection of sound principles, methods, techniques and tools for developing Web information systems, which differ from traditional information systems in their unique technological platform and design philosophy.

Systematic analysis and design methodologies for developing Web information systems are necessary and urgently needed among practitioners. Any prominent design methodology should conform to a set of key requirements (Lyytinen et al. 1989). It must embed several conceptual structures and description languages, and support several levels of abstraction at which the development process takes place. It should also cover the whole spectrum of activities in ISD, include a model of a necessary pattern of activities to be carried out during the development process, include a model of the organizational form of the development process (a set of human roles), and utilize existing descriptions and implementations. On the other hand, CASE tools and environments should provide support for the existence of facilities for drawing diagrams, describing and defining design objects, identifying relationships between design components, and providing annotations (Chikofsky and Rubenstein 1988).

A starting point for this paper is that Web information systems are essentially **hypertext information systems** (hypertext and hypermedia can be used interchangeably here), which allow flexible (cf. associative) combination and use of information units (nodes) through links. This emphasizes user navigation, the multilevel interactivity of the environment, and the incorporation of hypertext functionality into Web information systems. Key requirements for **basic hypermedia functionality** have been defined by Thüring et al. (1995) as: It must facilitate navigation, it must improve orientation, it must increase local coherence, and it must

21 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/requirements-web-engineering-methodologies/22998

Related Content

Internet Users' Privacy Concerns and Beliefs About Government Surveillance: An Exploratory Study of Differences Between Italy and the United States

Tamara Dinev, Massimo Bellotto, Paul Hart, Vincenzo Russo, Ilaria Serra and Christian Colautti (2009). *Handbook of Research on Information Management and the Global Landscape* (pp. 229-257). www.irma-international.org/chapter/internet-users-privacy-concerns-beliefs/20623

Leveraging Big Data for the Dissemination and Preservation of National Folk Music in China

Qiang Chen (2026). *Journal of Cases on Information Technology* (pp. 1-16). www.irma-international.org/article/leveraging-big-data-for-the-dissemination-and-preservation-of-national-folk-music-in-china/402404

E-Learning Investment Risk Management

Georgios N. Angelou and Anastasios A. Economides (2007). *Information Resources Management Journal* (pp. 80-104). www.irma-international.org/article/learning-investment-risk-management/1328

Simulation for Supporting Business Engineering of Service Networks

Marijn Janssen (2009). *Encyclopedia of Information Science and Technology, Second Edition* (pp. 3462-3467). www.irma-international.org/chapter/simulation-supporting-business-engineering-service/14088

IDS and IPS Systems in Wireless Communication Scenarios

dolfo Alan Sánchez Vázquez and Gregorio Martínez Pérez (2009).

Encyclopedia of Information Science and Technology, Second Edition
(pp. 1799-1704).

www.irma-international.org/chapter/ids-ips-systems-wireless-communication/13821