Abstract

Configurable environments are presented as a specific vision for information technologies to support design and construction professionals. Configurable environments combine data integration capabilities with visualization and analysis tools in a format customized to the needs of specific users and projects. A key component of the approach is the deployment of formal user models to direct configuration of generalized tools and distributed data. This chapter details the need for and technical aspects of the configurable environments approach in the context of an illustrative case study of construction space management. Issues with current practice and implications for future practice are discussed in the context of project professionals’ information processing and evaluative capabilities and needs. Also discussed is the relationship of the configurable environments approach to current technologies and to broader visions for information technology development in design and construction.
Introduction

The intention of this chapter is to outline a novel approach—configurable environments—to make information more accessible and useful to design and construction practitioners. The configurable environments approach combines personalization with complex collection and processing of data. “Personalization” remains a current buzzword encompassing various approaches, including custom filters, data visualization, user modeling, intelligent user interfaces, and so forth. Collection and processing of data is a broad concept that includes interoperability, autonomous agents, and mediation. At least by inspiration and example, the configurable environments (CE) approach combines elements of all the above.

Novel aspects of the CE approach are the complexity of the problem addressed (e.g., real problems in design and construction) and the ability to support users who, while professionals, are not narrow technicians or computer scientists. For design and construction users, the authors envision a toolkit that: (1) provides complex analysis and visualization tools to provide what-if type analysis capabilities, (2) draws data from multiple sources, and (3) is configurable to the needs of the user (and hence is not a static toolkit). CEs differ from current approaches that provide users a set of (rigid) applications that make use of specific sets of information. These current approaches have been characterized as “information tunnels” (Tannenbaum, 2002). Further, the authors argue that such tunnels persist in an environment with data standards designed for interoperability.

The chapter presents the case for, vision, and pathways to configurable environments as follows: After some brief background, a motivating case study concerning space management on construction sites is used to highlight issues with current practice and limitations of existing technologies. This supports generation of the configurable environments vision for practice. Supporting research in problem-solving environments, user modeling, and information integration are reviewed, enabling detailed description of the CE information architecture. The chapter concludes by considering future trends, including the potential scope of CEs in practice and pathways between existing technologies and development of commercial CEs.

Learning Objectives

Upon completion of this chapter, the reader shall be able to:

1. Understand the limitations of current information technology applications to support personalized views and analysis of project information, with particular reference to the challenges facing project superintendents.

2. Understand the concept of and proposed implementation architecture for the configurable environments (CE) approach.