Chapter 12

Developing Context Sensitive BIM Based Applications

Timo Hartmann
Twente University, The Netherlands

1 INTRODUCTION

The use of BIM based applications on AEC projects is still rudimentary and fragmented (Hartmann et al. 2008). One reason for this is that their development is complicated by two characteristics of the AEC industry. For one, the AEC industry is a project based industry that organizes its workforce around projects. Companies form project teams that work detached from the formal hierarchy of the firm. Ad-
Developing Context Sensitive BIM Based Applications

ditionally, on projects different project teams from different companies work together. Thus, projects are quasi-organizations (Eccles 1981) consisting of different project teams from different companies that need to work together to achieve project success (Dubois & Gadde 2002). To account for this project based structure of the AEC industry, BIM based software therefore, need to account for a large number of different and often conflicting groups of stakeholders. Moreover, AEC projects are mainly concerned with the construction of unique facilities and thus, operate in uncertain, complex, and frequently changing environments (Kreiner, 1995). Thus, information from and about the environment is also conflicting and changes frequently. This further causes needs and objectives of different project stakeholders to become ambiguous and ill-defined. It is often, not even easy to formally understand the requirements of a single stakeholder group never mind accounting for the multi stakeholder perspectives. Overall, due to the above reasons it is hard for software developers to develop general use software applications to meaningfully support AEC work processes.

In general, it is of utmost importance during the development of any software program to account for the different perspectives and roles of the intended users (Checkland & Scholes 1990). This is important to ensure that these software solutions become meaningful to improve the users’ work practice (Carroll 2000: 45-47). Technology developers need to focus on users and their actions instead of focusing on the technical possibilities (Carroll 57). Additionally, developers need to focus on supporting interactions between different user groups (Sato 2004; Lim & Sato 2006; Haymaker et al. 2004). It is obvious that due to the above characteristics of the AEC industry this should hold especially true for technology developers that work on BIM based applications.

Unfortunately today, many BIM development efforts focus on establishing standardized databases to store building related models – so called building information models (Fox & Hi- etanen 2007; Vanlande et al. 2008) – or they focus on how AEC practitioners can model a building to store in such a database – so called building information modeling (Eastman et al. 2008). Contrary to these efforts, this chapter focuses on the development of applications that support the work processes of AEC practitioners for which the chapter uses the term BIM based applications. The chapter defines a building information model as exactly what its name states: a model to describe information related to a building. In this way, BIMs allow storing information that is related to a building in electronic databases. Such BIM information can describe the physical shape of the building, so called product information, and the management processes to build or manage the building, so called process data. Simple storage of information alone however, cannot in itself, improve work practices. Software applications need to meaningfully access, visualize, and offer the possibility to alter the electronically stored product and process information. To account for this difference between BIM databases and applications that use such databases, the chapter therefore uses the term BIM based applications. BIM based applications allow users to understand information stored in BIMs better, by for example providing possibilities to easily access and visualize information. Further, BIM based applications enable users to generate new knowledge with respect to a building’s design or related management process and to again store this data within a BIM database.

To help BIM based application developers with their efforts to purposely support the decision making of AEC professionals, this chapter introduces context sensitive software design as a method of how developers can explore and describe the context of stakeholders and theoretically argues.