Chapter 14

Experiencing Digital Design: Developing Interactive Workspaces for Visualizing, Editing and Interacting with Digital Design Artifacts

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ABSTRACT

To implement computational design applications into design education successfully, it is critical that educators consider the available facilities which allow students to develop, communicate, and experience their designs. A variety of media spaces can be used to facilitate greater interaction with digital content, along with the potential to foster greater collaboration on team focused activities. An interactive workspace can be designed to enhance authoring and interaction with digital content by using the INVOLVE framework, which includes seven elements: Interaction, Network, Virtual Prototypes, Organization, Layout, Visual Real Estate, and Existential Collaboration. This framework focuses on first identifying the fundamental uses and needs of the space, along with identifying the types of tasks to be performed within each physical space or room. For example, if a department has three different rooms available to students in a design studio or course, then the activities to be performed within the different spaces, e.g., design review, digital design authoring/modeling, fully immersive navigation of a model, collaborative brainstorming, et cetera, would suggest different displays and means of interaction. Once the use of each space is identified, then the framework guides the user toward the selection of fundamental space attributes, equipment and resources that should be available to students within each space. Exciting new technologies will allow future students to be more easily engaged in the digital content while gaining easy access to data and information which was previously difficult to generate.

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INTRODUCTION

Designers are increasingly using digital content to author and review their creations. For design disciplines within the Architectural, Engineering, and Construction (AEC) Industry, this use of digital content is particularly valuable due to the scope and scale of the artifacts that are being developed. A popular method for authoring this content is through individual interaction with a computer with traditional input devices such as a keyboard and mouse. While this method of interaction with a modeling application may seem natural to some, the interaction limitations can inhibit the ability for developing and reviewing digital models. This limitation is amplified when students work in teams to develop digital design content.

Computational design is becoming widespread with many students devoting significant effort into the development of a digital model of their design. With the increased use of Building Information Modeling (BIM) and digital design, there is a need for educators to focus on the design of interactive workspaces that support greater degrees of interaction with the digital content being developed by students. Unfortunately, the digital media environment is not always planned to enhance the tasks that will be performed within the environment. By developing well designed interactive workspaces that fosters interaction, students and faculty can be more productive and creative as they develop, review, present and engage with digital content.

This chapter presents a framework for designing interactive workspaces with a specific focus on creating learning environments, although there are many similarities to industry workspaces as well. There are many reasons for the development of interactive workspaces within an academic setting which include:

- Collaborative work environments for students and faculty;
- Visualization environments to allow students to be immersed within their designs, possibly through 3D stereoscopic visualization;
- Presentation spaces for conveying design concepts through multimedia presentations; and
- Recruitment environments to attract new students into the profession or university program.

To design an interactive workspace, the following steps are outlined:

- Inventory digital spaces;
- Identify tasks to be performed by students and faculty, e.g., group activities, individual visualization, class presentations;
- Match physical spaces with the task focus; and
- Design the workspace to support the task performance.

Throughout this chapter, we will:

- Describe the value of using interactive workspaces in an educational setting to facilitate student interaction with digital media;
- Present a framework for designing a series of the media environments that can be used to foster interaction with digital media;
- Provide illustrative examples of highly interactive workspaces implemented in various educational settings.

BACKGROUND

Using Media for Communication

Media possess fundamental capability, each of which may be more or less important for a particular task (Brennan and Lockridge 2006).