



A domain specific software model for interior architectural education and practice

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ABSTRACT

Interior architectural education and practice employ various general-purpose software packages. This study problematizes that as none of these packages is developed specifically for interior architectural design process and purposes, both interior architecture education and market seek ways to fulfill their specific needs. It is argued that currently interior architecture does not fully benefit from digital opportunities. A specific software package for interior architecture will enable the discipline to put forth its assets and manifest its existence. Consequently, this study proposes a domain specific model for interior architectural software.

Initially, general-purpose and domain specific computer aided architectural design (CAAD) software used in interior architecture are determined. Then, selected software packages are analyzed according to Szalabaj's [1] set of features: 'drawing', 'transformation', 'view', 'rendering' and 'other'. Based on these analyses, domain specific requirements for interior architecture are obtained. Consequently, questionnaires and interviews are performed with interior architectural students and professionals in order to determine the user needs. Finally, based on the findings, a software model for interior architecture is proposed.

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1. Introduction

Computer aided architectural design (CAAD) software packages are mostly developed for general-purpose use and then they are customized to serve for specific needs [2,3]. Most software packages used in interior architecture are such general-purpose software, which are originally developed for architecture. Often, customization of these packages to meet fundamental requirements of interior architectural design process is left to the user. Most of the interior architectural companies utilize bespoke or general CAAD software by integrating plug-ins [4]. Similar to many other professions, today interior architectural companies are becoming more dependent upon digital technologies and software packages for their daily operations [5], thus the number of individual software packages used in interior architectural practice increases. However, a domain specific interior architectural software package, which is widely accepted and used, is not existent.

Interior architecture is a distinct design field which specializes in interior space's detailed design requirements related to color, texture, lighting, heating, acoustics, furniture and all details of human use [6,7] and actually, it owes its independent existence as a field to these details. These details put forth a special characteristic for interior architecture and express its "otherness" [8]. However, interior architecture still struggles to manifest its existence; deprived of connotations of decoration and sublimed from the subduing effects of

architecture. Often, interior architecture is merely taken as decorating the space that could even be done by those who are interested and tasty, with no formal education, and/or it is overlooked as already being taken care of within the architectural agenda.

This dilemma has already obstructed interior architecture from benefiting from the medium of computer fully. Currently, the available software for interior architecture reflects the quandary about interior architecture. On one hand, there are how-to-do-it-yourself packages that reduce the process to selecting from a bundle; totally reducing the process of design to a series of selections. On the other, there are general-purpose packages that encompass architectural shell making, comprising all the details of the shell and its making. Using the latter packages is like taking a plane to go to the grocery store, in other words, it is employing an over-equipped a tool for an otherwise too random a function for interior architecture.

In fact, given the right tools, the digital opportunities could enable interior architecture to assert itself by putting forth its differences and potentials in terms of creating and assessing spaces with color, light, materials and sounds, which could eventually alter the way how the profession is perceived. Interior architecture is concerned with the changing effects of light on different colors and materials, the manipulation of sound within a space and the quality of the interior space in terms of issues pertaining to sustainability, like heat distribution in a space or ventilation. These issues can be displayed through digital opportunities better than in any other medium, largely because real-time animations are possible.

Surprisingly, with the advancements of the technology interior architecture loses the grip of its design field, instead of having the upper hand. Not only contractors are producing optimized interiors

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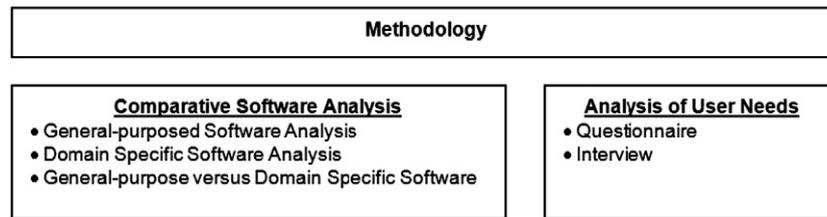


Fig. 1. Analyses of the study.

based on cliché visions, which are nonetheless professional looking thanks to the computer aid; even clients are becoming capable of creating their own images of the interiors through the do-it-yourself packages [9].

It has been long since academia realized that adding CAAD courses to their curricula would improve students' marketability [10,11]. In interior architectural education, general-purpose CAAD software packages are taught [12,13]. There are efforts to develop software packages to serve for particular areas of interior architecture and integrate them to the curriculum, yet these remain separate and experiential [14–18]. Interior architecture students who learn using general-purpose software during their education, often have difficulties when they start working in interior architectural companies, as they need to get accustomed to the bespoke software package the company uses. One of the reasons for this difficult adaptation process is the different approaches to design between general-purpose software and bespoke ones.

The assets of interior architecture (like color, light, texture, materials, acoustics) are usually overlooked in the overpopulated services provided by the general-purpose software, and/or experiencing them requires the prerequisite of a shell to be developed first, whereas they take the central stage in the bespoke packages. Teaching all the bespoke packages would be impossible and pointless. However, integrating the issues that are standing up in the bespoke ones into a domain specific package could speed up the profession both in revealing itself in full force, and getting rid of unnecessary bulks of the packages.

Within this framework, it is worth investigating how a domain specific CAAD software would be built for interior architectural requirements and what would be the specific issues to be taken into consideration while establishing domain specific software for interior architecture?

2. Methodology

In order to answer the above question, this study analyzes three components:

1. Features of the commonly used CAAD software in interior architecture
2. Domain requirements of interior architecture
3. User (student and professional) needs.

These analyses are made with the assumptions that:

1. General-purpose CAAD software packages are not sufficient in meeting the needs of interior architectural design.
2. In order to meet their specific needs, interior architectural students utilize general-purpose or architectural domain specific CAAD software during their design process, whereas interior architectural professionals use customized software (Customized software may be developed specifically for a firm or they may be developed by adding plug-ins to general-purpose software).
3. Interior architectural design students and professionals need domain specific CAAD software that serves for detailed interior architectural requirements (color, lighting, material, furniture, etc.).

Within this framework initially, commonly used CAAD software packages in interior architecture are analyzed in order to understand whether they suffice the requirements of interior architecture fully or not.

The comparative analyses of software packages are followed by questionnaires with students and in-depth interviews with professionals (Fig. 1). These analyses helped to determine the required features of interior architectural software.

Based on these analyses, a domain specific software model for interior architectural design process and purposes is proposed. This model brings together two sets of feature lists – the one gathered from comparative analyses of general-purpose and domain specific software, and the list of user needs. This model can be used as a reference for establishing domain specific CAAD software for interior architects.

2.1. Comparative Analysis of Software Packages

The analyzed software packages in this study are classified as 'general-purpose' and 'domain specific'. General-purpose software packages are developed to serve for a wide range of tasks or requirements. Domain specific software packages are developed to address a specific set of tasks or requirements. General-purpose software may be customized to obtain domain specific software, which shall meet specific needs in the market.

General-purpose software packages, analyzed in this study, are AutoCAD,¹ 3D Studio MAX² and ArchiCAD³ and domain specific ones are Giotto,⁴ Arcon⁵ and WebDekor.⁶ The general-purpose software are chosen due to their wide spread use and long existence in the market, as well as their varied utilization in 2D drawing, 3D modeling and building information modeling (BIM) [4,19]. The domain specific packages are chosen so that they address particular areas of interior architectural design like kitchen, bathroom and ceramic design respectively.

Based on the categorization made by Szalapaj [1], general-purpose and domain specific CAAD software packages are compared to each other regarding their features related to;

- Drawing
- Transformation
- View
- Rendering
- Other (such as texting, layering, dimensioning, etc.)

2.2. Analysis of user preferences

User preferences are obtained through questionnaires with students and interviews with professionals.

¹ AutoCAD is a registered trademark of Autodesk.

² 3D Studio MAX is a registered trademark of Autodesk.

³ ArchiCAD is a registered trademark of Graphisoft.

⁴ Giotto is a registered trademark of Computer Office.

⁵ Arcon is a registered trademark of Eleco.

⁶ WebDekor is a registered trademark of Virtual Décor.

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