Merging Design Thinking With Digital Media To Overlap Real And Virtual Design Worlds

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This paper presents a pedagogical model to investigate the concept of overlapping real and virtual design spaces by merging design thinking with digital media. The model is based on a set of exercises that emphasize the use of digital media not only to enhance the spatial sensibility, but also to explore the possibility of space and form, including its organization, interpretation, transformation and representation. Simultaneously, the diverse metaphor behind digital media integrated with design-thinking enable them for communication with ideas, knowledge and experience between two design spaces—real and virtual.

Keywords: Spatial composition; design thinking; integration; curriculum; CAAD education.

Introduction

Design itself is a complex and fragmentary activity. With digital media involved, design process not only has very large amount, and sometime self-conflict, of information, but also covers two similar-but-different design spaces—“real” and “virtual”. Therefore, many architectural educators try to develop several pedagogical researches around the understanding and integration of these two design spaces. In briefly, there are three main relevant groups of researches are concentrated in finding the possibilities of a curriculum for design learning. Only partial references are mentioned here just for the purpose of discussion. There are 1) exploring the applications of digital media by comparing the usage of conventional design media, such as the applications of thinking media (Paranandi, 1996), design tools (Brown, 1987) and representation technique (Kalisperis and Pehlivanidou-Liakata, 1998); 2) enhancing the knowledge of spatial senses by interactive media design, such as the knowledge of space composition (Ozcan, 2001) and analysis of form and space (Saleh Uddin, 2001); 3) establishing the design methodology to interact and integrate design learning in process, such as design method (Asanowicz, 1999), teaching model (Achten, 1996) and cognitive science studies (Lee, 1996). However, we believe spatial composition not only the foremost discipline in architectural design education, but also it has an important role in the formation of design media interaction. Also, the design thinking of spatial composition is the obvious concept to integrate between digital media and design in process. This paper investigates the concept of overlapping of real and virtual spaces based on the proposed design-thinking model, and uses several experiments to reify the hypothesis.

Two spaces: virtual and real

Virtual and real spaces have its unique design process by using conventional design media. The very initial design thinking is conducted in “virtual space first (may be interpreted as “mental”
space), then, is visualized in “real” space. Two spaces cannot be mixed and the process of integration of both spaces consumes a lot of time. Designers often project the design outcome itself “exists” in mind in which could be constructed in the real space spontaneously. They tend to skip the thought of long process of designing and making in the real time that demands a lot of time. Utilizing the computational digital media, the “reality” comes in no time. The transformation (interpretation) of one space to another has become reflective actions. The overlapping space (transitional zone) between two spaces has become a crucial aspect for learning design thinking.

**Overlapping by merging design-thinking**

The hypothesis of this research is by directly merging design thinking with digital media learning process, we can then enhance the understanding of overlapping of two spaces, and further to the design behavior itself. The design thinking discussed in this paper is established on three logical stages—generation of spatial issue, operation of digital media and inference of successive arguments (what, why and how). Under this logical design-thinking model, designers can interact and overlap continuously between two design spaces, as well as explore the new possibility of spatial concept. Under this model, we set up several experiments using a group of students during one semester. The outcomes as well as the possible impacts of these experiments are documented in this paper in details.

**Experimental courses and student cases**

The target group of our experiments is trained with technician background and just starts to study architectural design. In addition, the use of computers for their original training is for production of architectural drawings such as plans, elevations, and sections before they are exposed to the concept of digital design media in the experiments. The main contents of experimental courses are digital media oriented which have been integrated with spatial composition and learning of design thinking. The motivation of such intention is to explore the dynamical interaction between operations of computers and design thinking. Four experimental exercises will be practiced to enhance standardized capability of knowledge in design world as mentioned before.

This curriculum is using fundamental spatial composition, such as organization of space, generation of form, interpretation of light and material, etc (Ching, 1996) and logical design thinking based on computing media. The main purpose of these concepts is to discover the overlap and interaction of design process between real and virtual design world, besides the basic training of 2D graphic drafts and 3D modeling. Simultaneously, the design thinking integrated with diverse digital tools and media not only reconsiders the possibility of presentation and communication, but also stimulates insight and creativity of design. Therefore, four courses are designed to investigate the impacts of overlapping between two design spaces as followed:

![Diagram of logical design-thinking model](image-url)
The organization of spaces and form making—creating a series of axonometric and perspective views by 3D computer models not only evaluate the relationship between spaces and forms, but also establish the logicality of space organization that could represent the idea of spatial senses, such as geometry, function, composition, and so on.

The interpretation of lighting and materials—manipulating 3D model rendered images by different parameters of lighting and materials in order to communicate the ideas of design, and interpret the hidden meaning of spatial senses metaphorically. The examples are such as sacred and evil, happy and sad, warm and cool respectively.

The transformation of forms and spaces—conversation with computing media is based on the logical design thinking (what, why and how) which explores the possibility of forms and spaces. It also creates the new forms of experiences such as infusion instead of binary, seamless instead of collage, interactive instead of transparent and, also, the ideas of folding.

The representation of digital media—using diverse digital tools (e.g. digital scanner, camera, recording, video) and media (such as homepage, image, animation and music) to integrate the ideas to advance the design thinking logically and to re-evaluate the new way of communication and presentation in design learning.

Conclusion

This study concludes that digital media create a far more interactive design environment than conventional media. By simplifying the complex design process, such environment eases the operation interface to make design thinking transparently and logically, which is shown in the experiments to be the key to assist students for overlapping their own two spaces. Through these experimental courses, students have a different dimension at operating architectural designs by using digital media. They not only enhance the sensibility and capability of making spaces in a very short time, but also generate creative ideas and approaches to explore spaces, forms, shapes and images based on the different design thinking methodology. In addition, students encourage themselves to use diverse digital media and tools to represent their ideas, and exploit various unconventional materials such as metal, plastic, gypsum that will not be possible even just in the mental space before. The “unexpected” free forms generated by digital media besides traditional
analogue design tools show further encouragement for the transparency issue between two spaces. However, to execute functional and tectonic works practically in real space is the common problem for students by using such diverse media. Therefore, the further investigation from both ends of digital aesthete, digital tectonics and digital functions will be required for the next step for interweaving the real and virtual design worlds within digital architectural education in near future.

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References

Achten, Henri: 1996, Teaching advanced architectural issues through principles of CAAD, Education for Practice, 14th eCAADe Conference Proceedings, Lund (Sweden) 12-14 September 1996, pp. 7-16

Asanowicz, Aleksander: 1999, Computer in creation of architectural form, AVOCAD Second International Conference Proceedings, Brussels (Belgium) 8-10 April 1999, pp. 131-142

Brown, John L: 1987, Integrating computers into the design studio – A critical evaluation integrating computers into the architectural curriculum, ACADIA Conference Proceedings, Raleigh (North Carolina / USA) 1987, pp. 29-38


Lee, Shu Wan: 1996, a cognitive approach to architectural style several characteristics of design thinking in architecture, CAADRIA '96 Proceedings of The First Conference on Computer Aided Architectural Design Research in Asia, Hong Kong (Hong Kong) 25-27 April 1996, pp. 223-226


