

Editorial

Architectural Engineering Technology

Open Access

Three Areas of Research on Spatial Ability in the Architectural Design Domain

Ji Young Cho*

College of Architecture and Environmental Design, Kent State University, Kent, Ohio 44242, USA

In the research of spatial ability in the architectural design domain, three areas require further study: (a) relationship between spatial ability and design studio performance, (b) development of domain-specific tools that measure spatial ability, and (c) the use of virtual reality technology in spatial ability training.

Architectural design aims to build three-dimensional structures that consider multifaceted aspects like firmness, utility, aesthetics, and human behaviors. For new building design or existing building renovation and interior design, the basic communication media of architecture information are either two-dimensional (2D), such as floor plans and section drawings, or three-dimensional (3D), such as physical or computer-generated models.

Designers also use these 2D and 3D representations in the design process to generate and test their design ideas before actually constructing building and finalizing their design. Thus, the ability to read, interpret, and visualize 2D information in 3D or vice versa is critical for designers for both design communication and design generation [1,2]. The ability to read, interpret, and visualize 2D to 3D is known as spatial ability.

However, whether or not these spatial abilities are significantly related to studio performance and whether spatial abilities measured through existing tools measure domain-specific spatial ability are unclear. Based on my research [3], which measured spatial ability through three tests, the mental rotation test by [4], paper folding, and visualization of viewpoints by [5] the three spatial ability scores did not correlate with the architectural studio performance score. However, scores from the Architectural Spatial Ability Test, developed by me in response to the lack of tools to measure the spatial ability of architecture students specifically, correlated with studio performance score. This raises a question about whether existing tools measure domain-specific spatial ability as well and whether the development of tools to measure domain-specific spatial skills is needed.

In research of and training for spatial ability, one of the recent

changes regards the use of virtual environment technologies. Many recent publications [6-8] have reported the improvement of spatial tests through the use of virtual reality. Such studies also showed the potential of using virtual technology in spatial ability training, which is simultaneously interactive so that students can roll and spin the 3D shapes and easily understand the multiview drawings.

More research efforts in the above three areas will contribute to revealing the role of spatial ability in architectural and interior design ability. In addition, those findings will provide to design educators insights about how architectural spatial ability relates to design performance and what abilities contribute to studio performance.

References

- 1. McKim R (1972) Experiences in Visual Thinking. Monterey: Cole Publishing Company.
- Oxman R (2002) The thinking eye:Visual re-cognition in design emergence. Design Studies 23: 135-164.
- Cho J, Fischer T, De Biswas K, Ham JJ, Naka R et al. (2012) Spatial Ability, Creativity, and Studio Performance in Architectural Design. Beyond Codes and Pixels: Proceedings of the 17th International Conference on Computer-Aided Architectural Design Research in Asia 131–140.
- Peters M, Laeng B, Latham K, Jackson M, Zaiyouna R et al. (1995) A redrawn Vandenberg & Kuse Mental Rotations Test: Different versions and factors that affect performance. Brain and Cognition 28: 39-58.
- Guay R., McDaniels RE (1976) The visualization of viewpoints, The Purdue Research Foundation, West Lafayette, IN.
- Martín-Gutiérreza J, Saorína J, Conterob M, Alcañizb M, Pérez-Lópezb D et al. (2010) Design and validation of an augmented book for spatial abilities development in engineering students. Computers & Graphics 34: 77–91.
- Rafi A, Samsudin KA, Said CS (2008) Training in spatial visualization: The effects of training method and gender. Educational Technology & Society 11: 127-140.
- Rafia A, Anuarb K, Samadb A, Hayatib M, Mahadzir M (2005) Improving spatial ability using a Web-based Virtual Environment (WbVE). Automation in Construction 14: 707–715.

*Corresponding author: Ji Young Cho, PhD, Assistant Professor, College of Architecture and Environmental Design, Kent State University, Kent, Ohio 44242, USA; E-mail: jcho4@kent.edu

Received September 09, 2012; Accepted September 10, 2012; Published September 11, 2012

Citation: Cho JY (2012) Three Areas of Research on Spatial Ability in the Architectural Design Domain. J Archit Eng Tech 1:e108. doi:10.4172/2168-9717.1000e108

Copyright: © 2012 Cho JY. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.