



An investigation of design studio performance in relation to creativity, spatial ability, and visual cognitive style



Ji Young Cho

Department of Housing and Interior Design, Kyung Hee University, 26, Kyunghedae-ro, Dongdaemun-gu, Seoul, 02447, Republic of Korea

ARTICLE INFO

Article history:

Received 25 November 2014

Received in revised form 1 November 2016

Accepted 16 November 2016

Available online 19 November 2016

Keywords:

Creativity

Design studio

Performance

Spatial ability

Visual cognitive style

ABSTRACT

Design is a complex, multifaceted problem-solving activity involving various cognitive abilities. Creativity and spatial ability are considered critical in design process and outcomes, and visual cognitive style represents the potential of artistic and scientific creativity; however, little empirical research exists on their relationships and roles in design studio performance. This paper is an investigation of how one's creativity, spatial ability, and visual cognitive styles relate to design studio performance, measured by grade. Identifying students' cognitive abilities and their relation to design studio performance is important for the development of meaningful pedagogy and the holistic understanding of student capacities. Fifty-nine freshman architecture and interior design majors' creativity, spatial ability, and visual cognitive style were measured using the Torrance Tests of Creative Thinking, Mental Rotation Test, Paper Folding Test, the Architectural Spatial Ability Test, and the Object-Spatial Imagery Questionnaire, and compared with one another and with final grades in their design studio course. The effect of gender and academic major was investigated through a two-way ANOVA. The analysis revealed no correlations between studio course grade and the observed scores; but a positive correlation existed between general spatial abilities and visual cognitive styles. It also revealed males' outperformance in general spatial ability tasks and tendency of spatial visualizers. The results show that design studio performance cannot be measured and predicted directly by creativity, spatial ability, and visual cognitive style. The results highlight the necessity to develop measurement criteria of domain-specific creativity and spatial ability, and the importance of holistic understanding of student capacities and the nurturing process in education.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Design is a complex, multifaceted problem-solving activity involving various cognitive abilities, including “so many intangible elements, such as intuition, imagination, and creativity” (Zeisel, 2006, p. 19). Many researchers have studied the nature of design activity through experiments, observation, and the psychometric assessment of designers to demystify the design process and identify it as teachable and learnable instead of mysterious (e.g., Jones, 1992; Lawson, 2006; Schön, 1983). Whether design ability is from nature or nurtured has been an ongoing debate (Cross, 1990).

Creativity and spatial ability are representative cognitive abilities considered important in architectural and interior design (Allen, 2010; Ho, 2006; Zacks, Mires, Tversky, & Hazeltine, 2000). Recently identified, visual cognitive style repre-

E-mail address: cobi7799@gmail.com

sents the potential of artistic and scientific creativity (Kozhevnikov, Kozhevnikov, Yu, & Blazhenkova, 2013). However, little empirical research exists on their relationships and roles in design studio performance. Identifying students' cognitive abilities and their relation to design studio performance, measured by final grade, is important for the development of productive pedagogy to determine which abilities need be nurtured and prioritized (Nazidizaji, Tomé, & Regateiro, 2015) and for the holistic understanding of student capacities.

The ultimate goal of architectural design and interior design is to create three-dimensional spaces while considering multifaceted aspects, such as firmness, utility, aesthetics, human behavior, welfare, and safety (Gabielli & Gardner, 2014; National Council for Interior Design Qualification, 2016). *Firmitas* (firmness), *utilitas* (utility), and *venustas* (beauty) are three essential qualities of good architecture (Vitruvius, 15 BCE/1914). In order to acquire such qualities, designers need to approach design projects creatively, resulting in suggested solutions to be creative, not conventional. Nurturing students' ability for creative problem solving is one of the important purposes of education (Runco, 2004) as creativity is a desirable graduate attribute (Williams, Askland, & Boud, 2012).

Designers are also expected to have spatial ability, so they can fluently transform two-dimensional (2D) or three-dimensional (3D) spatial information (Ho, 2006; McKim, 1972; Oxman, 2002). Spatial ability encompasses visualizing, mentally rotating, and transforming spatial information (Linn & Petersen, 1985); it is considered essential in new building design or renovation and interior design (Ho, 2006). Males' outperformance in spatial ability has been consistently reported (e.g., Kozhevnikov et al., 2013; Linn & Petersen, 1985).

In addition, visual cognitive styles, divided into two distinct styles—spatial visualization style and object visualization style, are known to represent the potential of scientific creativity and artistic creativity, respectively (Blazhenkova & Kozhevnikov, 2009). Architecture and interior design require knowledge and understanding of design components in terms of both scientific aspects (e.g., structure, building technology, and computer-aided system) and artistic aspects (e.g., aesthetics, color, and visual composition of spatial elements); thus, identifying the relationship between these cognitive styles and design studio performance will illuminate the nature of architectural and interior design.

Different from common assumptions, no strong evidence of their role in design education has been revealed (Ho, 2006; Palmiero & Srinivasan, 2015; Sutton & Williams, 2010). Thus, this paper aims to identify the role of creativity, spatial ability, and visual cognitive styles in students' performance in design studio courses in regard to gender and academic major.

Freshman architecture and interior design majors were selected as research participants because they are novices in the design discipline and can reveal their preexisting ability before acquiring enough design knowledge and skills. Fifty-nine students' creativity, spatial ability, and visual cognitive style were measured using the Torrance Tests of Creative Thinking (TTCT), Mental Rotation Test, Paper Folding Test, the Architectural Spatial Ability Test (ASAT), and the Object-Spatial Imagery Questionnaire (OSIQ), and their final grades in the design studio were obtained. The relationship between design studio performance (grade) and the scores of the above cognitive abilities, and relationship among the scores were analyzed using the Statistical Package for the Social Sciences (SPSS). The main effect of gender and academic major was investigated through a two-way ANOVA. This paper consists of following five sections: theoretical background, research methods, results, discussion, and implications.

2. Theoretical background

2.1. Performance in design studio

Performance in school depends on various factors, but they can be grouped in following three categories: "student characteristics, teacher impact and school properties" (Gajda, 2016; p. 246). Regarding student characteristics, variables include personality, cognitive abilities, motivation, self-esteem, and socioeconomic factors (Gajda, 2016). School performance can be represented by course grades, the result of continuous assessment or tests.

Design studio is a core of architectural and interior design programs because it models professional design practice and occupies the largest number of credit hours in the programs (Anthony, 1991; Bunch, 1993). Different from lecture courses, where objective exams and tests are used to measure student performance, in design studio it is measured by assessment of students' design process and outcomes according to the learning objectives of the course (Cho, 2013). Whether students with better grades will become better designers in the future is debatable (Nazidizaji et al., 2015), but the final grade in design studio represents the level of design performance and skills demonstrated.

Design foundation studios, or beginning design studios, are typically venues to learn the language of design for verbal and graphical communication and fundamentals of design involving 2D and 3D composition of design elements. In contrast with advanced studios, where students solve actual architectural or interior design problems for human beings, in beginning studios students tend to solve abstract design problems with emphasis on aesthetics than functionality (Yoon & D'souza, 2009).

2.2. Creativity and design performance

Creativity is characterized by the ability to solve problems and to generate original and useful outcomes (Runco, 1988). A person's creativity is understood as a sum of creative products that the individual achieves (Piffer, 2012). Measuring a person's creative potential typically occurs through psychometric assessment kits, whereas that of the creative product

Download English Version:

<https://daneshyari.com/en/article/4941829>

Download Persian Version:

<https://daneshyari.com/article/4941829>

[Daneshyari.com](https://daneshyari.com)