논문

실내디자인 학생의 성격 유형과 CAD 적성 및 태도의 연관성

Personality Types of Interior Design Students: Implication for CAD

임영숙* / Lim, Young-Sook

Abstract

이 연구의 목적은 실내디자인 학생들간에 나타나는 CAD에 대한 태도, 적성과 그들의 성격 유형간의 관련성을 알아보고 이들 성향이 CAD 교수법에 미치는 영향을 조사하기 위한 것이다. 연구방법은 설문조사, 성격 유형 검사, CAD 성적, 그리고 교과목 성적을 통한 통계분석으로 이루어졌으며, 실험은 실내디자인 전공 3학년 학생 56명을 대상으로 실시되었다. 실험 실시 환경은 CAD가 디자인 도구로 쓰여지는 실내디자인 실기 수업으로 구성되었으며, 정확한 실험 결과 분석을 위해 CAD 숙련도 성적과 종합 교과목 성적이 분리, 채점되었다. 연구 결과 학생들의 성격 유형은 외향형, 직관형, 느낌형, 및 판단형(ENFJ)을 선호하는 것으로 나타났다. 이는 실험에 참여한 실내디자인 전공 학생들이 직관에 의해 사물을 인지하고, 문제 해결을 하는데 있어 감성에 의지하며, 체계적이고 조직적인 판단력을 가지고 있음을 의미한다. CAD에 대한 태도와 성격 유형의 관계에서는 CAD가 유용하다고 생각한 학생들이 느낌형에 강한 선호도를 보였으며, CAD 적성과 성격 유형의 관계에서는 CAD 숙련도 성적이 높은 학생이 판단형에 강한 선호도를 나타내었다. 또한, CAD 성적이 뛰어난 학생이 종합 교과목 성적도 좋은 것으로 나타났다. 이는 CAD 숙련도의 차이가 학생들의 전반적 디자인 능력에도 영향을 끼칠 수 있음을 시사한다. 결론적으로, 이 연구 결과는 학생들의 성격과 학습인지 성향이 컴퓨터 교육의 효율성에 영향을 미친다는 기존의 타 분야에서의 연구 결과가 실내디자인 분야에도 타당성을 지님을 증명해주었으며, 실내디자인 수업에 있어 컴퓨터 관련 교과목의 교수법이 실내디자인 학생들의 성격 유형을 바탕으로 개발이 될 때 그 활용 효과를 극대화할 수 있음을 제시하고 있다.

키워드 : CAD, Personality Types

1. Introduction

1.1. Purpose and Background

This study examines the relationship between attitudes and aptitudes toward CAD (Computer-Aided Design) and personality types among interior design students.

Computer technology has rapidly advanced in all areas of our society. One of the common uses of computer in the interior design field today is CAD and its application to education has become essential.

CAD requires a different way to draw compared to conventional drawing method. Today, many various and specialized CAD software packages are introduced in the interior design field. However, it is not certain if the designers get the full benefit of a CAD system. In addition, some studies have found that the proficiency level differ among students and professionals in their skills of operating CAD and other computer-assisted instruction.[1)]

In educational psychology, it has long been argued that students' preferences for receiving and processing information from their learning environment may differ in their learning performances when applying various educational media. Literature indicate that components of different personality types can influence the student effectiveness when employing computer-assisted instruction and suggest that the individual differences in personality types or learning styles should be considered when planning instructional strategies.[2)]

Therefore, investigating personality factors that affect CAD adoption in interior design will merit the future development of more adaptable CAD and other multimedia packages for interior

* 정회원, 명지대학교 산업디자인학과 조교수, 이학박사

1)Krouse, J., Training CAD/CAM operators, *Machine Design*, 1983, pp.79-81
Lim, Y., The Effectiveness of Multimedia Presentation Tools in Teaching Perspective Drawings for Interior Design Students, Unpublished Dissertation, University of Minnesota, 1996

2)Kern, G., & Metta, K., The influence of personality on self paced instruction, *Journal of Computer-Based Instruction*, 15, 1988, pp.104-108

designers that match the preference of users. This provides guidance for alternative teaching methods in CAD education and ultimate success in the field.

1.2. Methodology

A studio experiment was administered to 56 junior level interior design students during regularly scheduled studio class in a FIDER (Foundation for Interior Design Education and Research) accredited university. The size of the sample was the total number of the students enrolled in the class and they had the same level of interior design and computer background.

Information was obtained in three ways to examine the objectives of this study; 1) Survey questionnaire, 2) Keirsey Temperament Sorter, and 3) CAD course grade and overall course grade.

Keirsey Temperament Sorter is a shorter version of the Myers-Briggs Type Indicator. It is based on Jungian typology which forms the theoretical basis of this study and is one of the most common measurement of personality types.

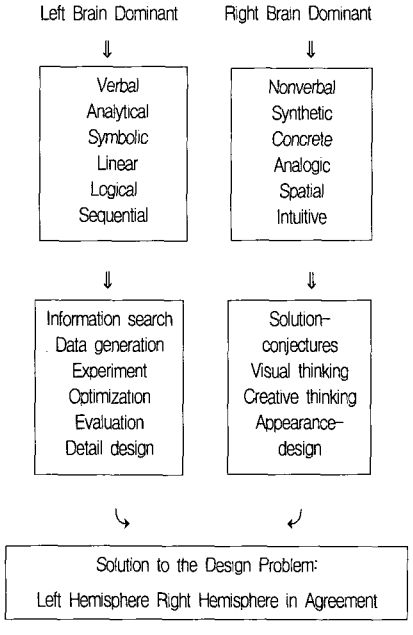
The collected data were analyzed by descriptive statistics. Analysis of Variance was conducted to determine if there exists significant relationship between students' attitudes and aptitudes toward CAD and their personality types.

The scope of this study is limited to AutoCAD software uses which is the most common and widely used software program in interior design.

2. CAD/Design Process

Split-brain theory and Jungian typology form the theoretical basis of this study. These theories suggest that the two hemispheres of the human brain have distinct differences in preferred styles of thinking. In designing, it seems necessary that both styles are engaged, with the designer switching from one to the other as appropriate.[3] Although both hemispheres symmetrically operate in solving the design problems, different information processing modes on each hemisphere influence the aptitudinal levels in adapting computer-assisted instruction. It is proposed that operating CAD system rely more on left hemisphere in its systematic orientation. In other words, CAD is more adaptive to analytical, sequential, and logical way of thinking rather synthetic, analogic and intuitive way. <see Fig. 1>

This type of temperament fall in to the category of Introversion, Sensing, and Judging type in the classification of personality types. The conceptual model based on these assumptions is developed that the interior design students with Introversion, Sensing, and Judging types have more favorable attitudes and higher aptitudes for CAD compared to their opposite temperaments. This can be interpreted that students who focus on the inner realms of ideas, perceive things by sense, and make systematic, orderly judgments should do better with CAD operations.



<Figure 1> The Dual Processing Mode (Adapted from Tovey, 1984)

3. CAD/Learning

CAD systems have made tremendous technical advancements in recent years and have become an important part of interior design education. The adoption of CAD technology to the smaller companies and interior design educational programs finally came during the 1980's when lower-cost microcomputer became available.[4]

Today, many specialized CAD software packages and multimedia programs are introduced on the market as well as the typical drafting applications. Some studies suggest that

3)Tovey, M., Designing with both halves of the brain, Design Studies, 5, 1984, pp.219-228

4)McLain-Kark, J., The Designer's AutoCAD Tutor, Van Nostrand Reinhold, New York, 1991

understanding of designers' attitudes is critical to the implementation of CAD in the design field.[5]

CAD requires a different way to draw in its own special ways. Manual drawing may be the easier way to enter drawing information initially, but the ease of changing and correcting CAD drawings surpasses the manual erasing and redrawing work.

Drawing with new technology, such as computer requires different attitude from those acquired through conventional drafting. It can be considered as a skill that is acquired over repeated practice. And, just as learning styles can affect the performance of students' learning with the computer, so too may personality types affect CAD instruction.

Learning is often used to designate the process of human behavior modified by individual experience and environment.[6] There are various circumstances under which learning tends to occur and various levels of complexity of the performance task to be learned. It is generally agreed that no two individuals perform a learning approach to a task in exactly the same way and the importance of individual differences are recognized.

In psychology, the differences of the people in the ways of learning are referred to as cognitive styles. Both teachers and students have different cognitive styles, and so vary the styles of teaching as well as styles of learning.[7] Fry and other studies[8] report that learning styles or individual differences are related to learner/instructor control of instruction and the effectiveness of learner control relied on aptitude as well as inquisitiveness. Also, these studies suggest that each student should be provided with the instructional systems that best suit to their individual differences such as cognitive styles, aptitudes, interests, and personality characteristics.

5)Clemens, S., & McCullugh, J., Attitudes of interior designers toward CADD and CADD education, *Journal of Interior Design Education and Research*, 15, 1989, pp.29-34
McLain-Kark, J., & Tang, R., Computer usage and attitudes toward computers in interior design field, *Journal of Interior Design Education and Research*, 12, 1986, pp.25-32

6)Sawrey, J., & Telford, C., Adjustment and Personality, Allyn & Bacon, Boston, 1975.

7)Cross, N., Style of learning, designing and computing, *Design Studies*, 3, 1985, pp.157-161

8)Fry, J., Interactive relationship between inquisitiveness and student control of instruction, *Journal of Educational Psychology*, 63, 1972, pp.459-465
Leith, G., The acquisition of knowledge and mental development of students, Journal of Educational Technology, 1, 1970, pp.116-128
Tallmadge, G., & Shearer, J., Interactive relationships among learner characteristics, types of learning, instructional methods, and subject matter variables, *Journal of Educational Psychology*, 62, 1971, pp.31-38

4. Personality Types

4.1. Theories of Personality Types

In a given environment, a particular characteristics of human being in regard to behavior is fixed. Although no one particular definition of personality is universally agreed by psychologists, there are certain components of personality types that are widely accepted.

One of the most accepted theories on personality comes from Carl Jung. Jung[9] described three different dimensions of personality in his psychological types he invented:

1) the way people relate to the world,
2) the way information is taken in, and
3) the way information is processed.

On the other hand, some other classical personality theories emphasize more on the conception of adaptation.[10] In adaptational psychology, it is believed that future behavior can be predicted by studying how people adjust to their fixed environment through their learning and the use of past experience.

The concepts of personality and adaptation in learning have been adapted in many different studies in relation to creativity and aesthetic preferences.[11] These have found to be effective in predicting or describing preferences of individuals in different occupations.

In a study of Kern and Matta,[12] it was found that components of different personality types influence the student effectiveness when employing computer-assisted instruction. They argued that educators should consider the individual differences in personality types and their students' needs when planning an educational programs which will include computer-assisted instruction.

Also, Hoffman and Waters[13] have found that the personality

9)Jung, C., *Analytical Psychology: Its Theory and Practice*, Vintage, New York, 1968

10)Hettema, P., Personality and adaptation, North-Holland, Amsterdam, 1979

11)Buchanan, D.R., & Taylor, J.A., Jungian typology of professional psychodramatists: Myers-Briggs Type Indicator analysis of certified psychodramatists, *Psychological Reports*, 58, 1986, pp.391-400
Ireland, M.S., & Kernan-Schloss, L, pattern analysis of recorded daydreams, memories, and personality type, *Perceptual and Motor Skills*, 56, 1983, pp.119-125

12)Kern, G., & Matta, K., The influence of personality on self-paced instruction. *Journal of Computer-Based Instruction*, 15, 1988, pp.104-108

13)Hoffman, J., & Waters, K., Some effects of student personality on success with computer-assisted instruction, *Educational Technology*, 22, 1982, pp.20-21

types correlate with the task performance rate and attrition rate of the students in computer-assisted instruction program. Students who showed higher preference for Sensing type are likely to do well with computer-assisted instruction and those with Extroversion, Intuitive, and Perceiving types were more tended to drop out of the program. This report was supported by Lawrence[14] that individuals with Extroversion and Intuitive styles like variety and action, and tend to pay more attention to the whole rather than the details.

In interior design, personality types were studied in relation to career aspirations and computer-assisted instruction. In regards to personality types, interior design students tend to be Catalyst who prefer to rely on Intuition and Feeling in decision making.[15] In a study to examine the effectiveness of computer-assisted multimedia instruction in interior design, students who fall into the category of Convergers in their learning styles did better consistently in dynamic multimedia instruction compared to static manual instruction. This result strongly suggests that learning style is also an important factor to consider in explaining different learning outcomes.[16]

4.2. Measurement of Personality Types

Among various measurement devices of personality types or learning styles, the Myers-Briggs Type Indicator(MBTI) is the most widely used measure. It is based on Jungian typology and its educational uses are indicated as to understanding individual learning style, identifying differences in approaching learning tasks, developing teaching methods and evaluation tools, and analyzing and improving curriculum.

MBTI measures only preference toward a certain type. If one has a high score on one dimension, the other dimension on the continuum is viewed as complementary.

There are four pairs of preferences designated on the MBTI test.[17]

1) Extrovert E vs. Introvert I : Extrovert prefers to focus on the outerworld of people and things and Introversion emphasize the inner realms of ideas and concepts.

2) Sensing S vs. Intuition N : Individuals with Sensing type perceive things by using physical senses (sight, hearing, touch, smell, and taste) where Intuition type prefers data-gathering by employing intuition, imagination, and inspiration.

3) Thinking T vs. Feeling F : Individuals with Thinking type prefer to judge things and rely more on logical analysis. Feeling type prefers to evaluate things with heart and rely on empathy and relative importance of competing alternatives.

4) Judging J vs. Perceiving P : Individuals with Judging type are concerned with making systematic and orderly judgments about the world where the Perceiving type approach problems by experiencing, understanding, and accepting it.

Keirsey and Bates[18] grouped these preferences into four categories of personality types. These are Traditionalist(SJ), Troubleshooter(SP), Catalyst(NF), and Visionary(NT). Each category has a career preference according to its unique characteristics.

The Traditionalists are known for being nurturing and conserving. They are mostly found in professions such as teaching, religion, accounting, medical rehabilitation, and management. The Troubleshooters are most capable of long hours of continuous action such as in performing arts and work best in a crisis situation. The Catalysts find well in a profession that requires inspiring and persuasion. They are mostly found as novelists, writers, journalists, clinical psychologists, teachers, and ministry. The Visionary people strive to find out the why of the universe and enjoy developing models, exploring ideas, and building systems. They are mostly found in science, philosophy, mathematics, and engineering.

5. Results

The results of this study revealed that the interior design students in this study have higher preference for Extroversion (64.3%), Intuition (58.9%), Feeling (71.4%), and Judging (71.4%) types rather than Introversion, Sensing, Thinking, and Perceiving types in their personality types. This finding suggests that the students tend to perceive things by intuition, rely more on

14)Lawrence, G., *People types and tiger stripes: A practical guide to learning styles*. Gainsville, FL: Center for Application of Psychological Type, Inc., 1979

15)Russ, R., & Weber, M., Personality Types of Interior design Students: Implications for Education, Journal of Interior Design, 21, 1995, pp.30 38

16)Lim, Y., The Effectiveness of Multimedia Presentation Tools in Teaching Perspective Drawings for Interior Design Students, Unpublished Dissertation, University of Minnesota, 1996

17)Hoffman, J., & Waters, K., Some effects of student personality on success with computer-assisted instruction, *Educational Technology*, 22, 1982, pp.20-21

18)Keirsey, D., & Bates, M., *Please understand me*, Prometheus Nemesis, Del Mar, CA, 1984

empathy and sensitivity in making decisions, and make systematic and orderly judgments about the world (see Table 1). In this study, personality types are not categorized as Traditionalist(SJ), Troubleshooter(SP), Catalyst(NF), and Visionary(NT) due to small sample size.

<Table 1> Summary of Personality Types

Personality		Frequency	Percentage	Mean
Extrovert	L:	12	21.4 %	64.37
vs.	M:	8	14.3 %	
Introvert	H:	36	64.3 %	
Sensing	L:	33	58.9 %	45.95
vs.	M:	3	5.4 %	
Intuition	H:	20	35.7 %	
Thinking	L:	40	71.4 %	40.79
vs.	M:	5	8.9 %	
Feeling	H:	11	19.6 %	
Judging	L:	14	25.0 %	62.20
vs.	M:	2	3.6 %	
Perceiving	H:	40	71.4 %	

N=56 * L: Low, M: Medium, H: High

The Analysis of Variance test revealed that the students who have more favorable attitudes toward CAD usefulness tend to have higher preference for Feeling type rather than Thinking type (see Table 2). Considering that Feeling type is one of the favored personality types of the interior design students participated in this study, this result can be explained that CAD might be a positive design tool that matches the personality types of interior design students.

<Table 2> Analysis of Variance for CAD Attitudes and Personality Types

	F-value			
	Personality Types			
CAD Attitudes	Extrovert /Introvert	Sensing /Intuition	Thinking /Feeling	Judging /Perceiving
CAD Anxiety	-.05	-.03	.09	.12
CAD Confidence	.05	.06	.01	.18
CAD Liking	.02	.01	-.01	.12
CAD Usefulness	-.09	-.01	-.25*	.05

N=56 * significant at p < .05 level

In terms of relationship between aptitudes of CAD and personality types, students who perform better in CAD proficiency scores had stronger preference for Judging type (see Table 3). In addition, students who performed well in operating CAD also received higher overall course grades which included other design criteria (see Table 4). This suggests that the skillful operation of CAD might affect the overall quality of the design projects.

<Table 3> Analysis of Variance for CAD Aptitudes and Personality Types

	F-value			
	Personality Types			
CAD Aptitudes	Extrovert /Introvert	Sensing /Intuition	Thinking /Feeling	Judging /Perceiving
CAD Proficiency Grade	.13	.11	.28	.40*
Self-Rated CAD Skill	.11	.13	.21	.28
Overall Course Grade	.09	.03	.08	.02

N=56 * significant at p < .05 level

<Table 4> Analysis of Variance for CAD Proficiency Grade and Overall Course Grade

	F-value
	Overall Course Grade
CAD Proficiency Grade	.60*

N=56 * significant at p < .05 level

In summary, the results of this study indicate that certain personality types have better aptitudes toward CAD performance among interior design students. Design process requires both functions of the hemisphere modifying the other depending on the problems to be solved. It is recommended that CAD instruction that appeals to both sides of the brain is desirable. As different instructional or teaching strategies is needed for different learning styles, so too may CAD instruction need to have different strategies for different students.

6. Conclusion

Computer usage has rapidly increased in the interior design field in recent years. This trend called for an investigation of the factors of different levels of CAD skills found in CAD operators in both educational and manufacturing aspects. Based on the assumption that individual characteristics determine the level of individual learning performance when applying various educational media, this study investigated the personalty factors that might influence different levels of attitudes and aptitudes toward CAD among interior design students.

The results of this study indicate that relationships exist between attitudes and aptitudes toward CAD and personality

types of interior design students. The information revealed in this study is useful to the interior deign educators incorporating CAD into their curriculum as well as for the manufacturers developing more flexible software programs to different users.

Design students can not be classified to only one specific type of personality. This implies that one selected way of teaching method can not be generalized and applied to all students for different learning tasks. Developing instructional strategies that match the personality types between students and instructor or grouping students with different personality types, sharing different possible approaches to draw the best solution, will assist students with more variety of ideas and help minimize the disadvantage of using CAD in creative design process.

References

1. Buchanan, D.R., & Taylor, J.A., Jungian typology of professional psychodramatists: Myers-Briggs Type Indicator analysis of certified psychodramatists, Psychological Reports, 58, 1986
2. Clemens, S., & McCullugh, J., Attitudes of interior designers toward CADD and CADD education, Journal of Interior Design Education and Research, 15, 1989
3. Cross, N., Style of learning, designing and computing, Design Studies, 3, 1985
4. Fry, J., Interactive relationship between inquisitiveness and student control of instruction, Journal of Educational Psychology, 63, 1972
5. Hettema, P., Personality and Adaptation, North-Holland, Amsterdam, 1979
6. Hoffman, J., & Waters, K., Some effects of student personality on success with computer assisted instruction, Educational Technology, 22, 1982
7. Ireland, M.S., & Kernan-Schloss, L., Pattern analysis of recorded daydreams, memories, and personality type, Perceptual and Motor Skills, 56, 1983
8. Jung, C., Analytical Psychology: Its Theory and Practice, Vintage, New York, 1968
9. Keirsey, D., & Bates, M., Please understand me, Prometheus Nemesis, Del Mar, CA, 1984
10. Kern, G., & Metta, K., The influence of personality on self paced instruction, Journal of Computer-Based Instruction, 15, 1988
11. Krouse, J., Training CAD/CAM operators, Machine Design, 1983
12. Lawrence, G., People types and tiger stripes: A practical guide to learning styles. Gainsville, FL: Center for Application of Psychological Type, Inc., 1979
13. Leith, G., The acquisition of knowledge and mental development of students, Journal of Educational Technology, 1, 1970
14. Lim, Y., The Effectiveness of Multimedia Presentation Tools in Teaching Perspective Drawings for Interior Design Students, Unpublished Dissertation, University of Minnesota, 1996
15. McLain-Kark, J., The Designer's AutoCAD Tutor, Van Nostrand Reinhod, New York, 1991
16. McLain-Kark, J., & Tang, R., Computer usage and attitudes toward computers in interior design field, Journal of Interior Design Education and Research, 12, 1986
17. Sawrey, J., & Telford, C., Adjustment and Personality, Allyn & Bacon, Boston, 1975
18. Russ, R., & Weber, M., Personality types of interior design students: Implications for education, Journal of Interior Design, 21, 1995
19. Tallmadge, G., & Shearer, J., Interactive relationships among learner characteristics, types of learning, instructional methods, an subject matter variables, Journal of Educational Psychology, 62, 1971
20. Tovey, M., Designing with both halves of the brain, Design Studies, 5, 1984

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