

APPLYING LEARNING STYLES THEORY IN EGYPTIAN DESIGN STUDIO; REVIEW, CRITIQUE AND VALIDATION (EXPLORATORY STUDY)

Dr. EMAD H. RABBOH*

ABSTRACT

This study was applied to the undergraduate class sophomore level (Level III) architecture students of the Canadian International College, El Sheikh Zayed Campus, Giza; Cairo (CIC) during the spring/fall 2018. The study aims are:

- (1) A review of the theory of different types of education, and,
- (2) Validate the application of this theory in the Egyptian design studio.

The aims of the study are reached via reviewing the theories of learning styles, moreover, distributing questionnaires as a survey of students to ask for their opinion on this experiment and the significant impact that they have had on their architectural learning achievement. Consideration will be given to the diversity of learning styles in all classes to the extent that faculty members are familiar with learning methods. In general, this study will not separate students into groups of learning styles. In addition, the study will also include workshops for tutors to guide them on different learning styles and how to deal with the diverse attitudes of teaching and evaluation they may encounter in different architectural critiques. Based on the findings of this study, it will be determined whether this pedagogical methodology should be applied to all architectural juniors or senior student. The results show that, the students responded positively to the importance of applying the theory in the design studio in Egypt.

KEYWORDS: *Architecture pedagogy- Learning styles- architectural design studio.*

1- INTRODUCTION

The learning process should adapt with the student visions in order to give them internal conviction about the importance of the curriculum and the prerequisites of it which ultimately will lead to student independence, without the dependence on the faculty, this marks the starting point of his/her personal career. To achieve the foregoing, more contact hours are required and deep understanding of their thinking, ambitions and goals for each separate curriculum.

This will create self-motivated individuals who will be inspired to construct their best work and optimal achievement. To effect this, what is needed is an awareness of the psychological factors and motives of the students. This can be achieved through an open discussion with the students, and individual discussion with under probation students, especially in challenging times. Learning disabilities must also be factored into consideration. Moreover furthermore, individual differences of the students should also be considered in group learning sessions and general lectures. General approaches to the personalization of instruction to learning styles and personality characteristics should be considered [1]. Individual supports should be put in place to support students and assist in avoidance of negative results, which could lead to discouragement. All of the above strategies would raise the level of student. This can be achieved through effective communication, studying individual personalities, and conducting an ongoing individual conferencing with the students, this will lead to a general image about the student,

and how best to deal with each student, as per their personalities. Assigning groups by learning style would help achieve the best learning performance and fulfill the ideal outcome of the entire learning process.

Extensively, contemporary models/trends of pedagogy have been utilized in the modern design studio [2] [3] [4], correspondingly, Pedagogical praxis in architecture design studio proposed [5]. Besides, transformative pedagogy in architecture studied [6]. The debate about learning styles has been ongoing for several years [7], frequently, a discussion conducted among pedagogues about supporting the use of the theory of learning styles, and their refusal to use them in education in general and higher education in particular, in regarding the association between learning style and improving the academic levels the researcher strongly divided, In addition to the proponents of this theory, some researchers criticize and oppose current association [8].

Moreover, certain papers have suggested that there may be harms correlated with the use of Learning Styles [9]. Myron H. (2007) focuses on there is a huge industry that has established around learning styles theory, which includes books and consultants promoting its use in education. Furthermore, Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008) claimed that the theory of learning styles doctrines and industry, Yet, However, some articles offer an enlightened appeal by proof to educators to stop spreading the myth of learning styles [10]. Learning styles: myth understandings about adult (Hong Kong) Chinese lear-

* Canadian International College (CIC)-Cairo. Egypt.
Email address: emadeldin_hamdy@cic-cairo.com

ners discussed [11]. Notably, understand if and why the myth of Learning Styles persists, examined in the previous study [12], the following is a summary of the most important research studies the approaches of the learning styles theory, contains the year of publication, study argument, main finding:

*Demirbas, O. O., & Demirkan, H. (2003) [13]

Study Argument and Main Finding: Kolb's theory utilized to explore the relationship between learning style, success of students in the various academic levels. The current study concluded that, a statistically significant association was found between students' grades and diverse learning styles in the various stages of the design studio.

*Kyan, T., & Yunyan, J. (2005) [14]

Study Argument and Main Finding: The learning style theory discussed, additionally experiment with learning styles uses Kolb Experiential Learning Theory conducted, in order to test performance within an architectural studio. Similarly, study result that, a statistically significant between learning styles and academic performance founded in the above study.

*Graham, H. (2005) [15]

Study Argument and Main Finding: The current study investigated how students motivated, the proposed method by the study remodeling the design activity into tasks. The study proposed instructional activities in the design studio for tutors in order to enhance student learning as the main conclusion.

*Demirbas, O.O., & Demirkan, H. (2007), Demirkan, H., & Demirbaş, ? . O. (2008) [16] [17]

Study Argument and Man Finding: These two studies explore the correlation between learning styles, gender, and academic performance. The study using Kolb's learning styles as an approach for pedagogy in the design studio. No statistically correlation found between learning style and gender for freshman students is the importing finding in this study.

*Datta, A. (2007) [18]

Study Argument and Man Finding: The design

studio Gender-based learning issues studied in this study, throughout the learning styles of the students. The main conclusion on this study highlights that gender/learning styles differences do exist in the design studio.

*Mostafa, M., & Mostafa, H. M. (2010) [19]:

Study Argument and Man Finding: This paper aims to explore the best ways to develop the spatial thinking skills of architecture students by addressing learning styles in design studio. This research shows that architectural students learn more visually and actively than ordinary students. In addition, they show a higher correlation between strong spatial skills and visual learning.

*Tezel, E., & Casakin, H. (2010) [20]

Study Argument and Man Finding: This paper is empirical study that examines the performance of interior design students in association with learning styles; moreover, the study provides evidence of this association. The results showed that the design process scores gained vary according to the student group.

*Demirkan, H. (2016) **Study Argument and Man Finding:** This study explores the preferences of the learning style of architectural students using the Feldere Soloman Learning styles Index.

Results indicate that the design of preferred learning methods for students based on adopted model. A review of the literature on the learning styles in the design studio revealed the conflicting views of researcher on the usefulness of the application of theory in the design studio or the futility of this, as well as the revisions of the spatial domains in which the previous studies were conducted, the absence of previous studies in Egypt and the Arab world revealed, however, one study in 2010, most of which were not focused on a specific level of education, were only two studies at the freshmen and sophomore level, as in Table (1). Thus, this study will be applied at the sophomore level to fill the knowledge gap in this field. Figure (1) shows time line for recent studies in applying the learning styles theory in design studio.

Table 1- Brief for Different Studies that Implementing the Learning Styles Theory in Design Studio, Source (Author).

	Reference	Study argument	Level	Main finding
1	Demirbas, O. O., & Demirkan, H. (2003)	The study uses Kolb's theory to examine the correlation between learning style, performance, and success of students in the various design process	All	A statistically significant association was found between students' grades and diverse learning styles in the various stages of the design studio
2	Kyan, T., & Yunyan, J. (2005)	Learning styles of architecture students in China, likewise, the learning styles of students' performance in the design studio studied in this paper	All	A statistically significant correlation is found between learning styles and academic performance
3	Graham, H. (2005)	The study describes how students engaged via translated the design activity process model into tasks	All	The study informs the design tutors of instructional activities for students to support student learning
4.5	Demirbas, O. O., & Demirkan, H. (2007). Demirkan, H., & Demirbaş, ? . O. (2008)	The study examines the influence of learning styles and gender on the grades of freshmen design students in three consecutive years	Freshmen	No relationship found between learning style and gender, however some correlations found between performance and gender
6	Datta, A. (2007)	The gender-based learning issues of architectural education in a second-year undergraduate architecture studio examined in this study, through the learning styles of the students	Sophomore	This study sheds light on the gender/ learning styles differences, and proves the correlation between them do exist in certain studio environments
7	Mostafa, M., & Mostafa, H. M. (2010)	This paper sets out to examine how best to evolve the spatial thinking skills for architecture students via assessing their learning styles in education	All	This research proves that architecture students generally learn more visually and actively than the average student. Additionally, they show a higher correlation between strong spatial ability and visual learning
8	Tezel, E., & Casakin, H. (2010)	This study explores the performance of interior architectural students in correlation to their learning styles	All	Results indicated that design performance scores gained in each design condition differed among the group of students in terms of their learning styles
9	Demirkan, H. (2016)	The study inspects the learning-style and knowledge building favorites of interior architecture students using Feldere Soloman's Index of Learning Styles	All	The findings indicate that design students' preferred learning styles based on the adopted model

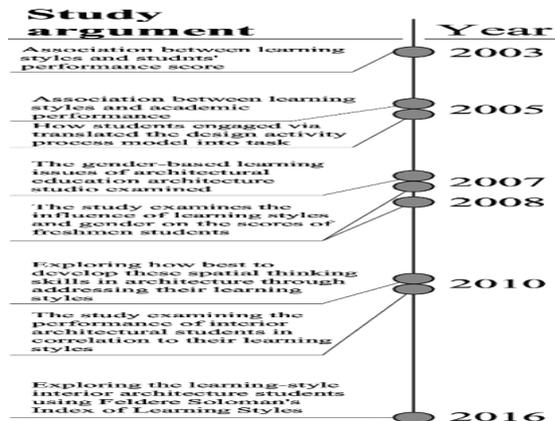


Fig. 1- A Time Line Of The Architectural Studies Related To The Application Of The Learning Patterns In The Design Studio. Source (Author)

2- METHODOLOGY

Many theories have been widely used in the design studio. The theory of learning styles is a contemporary theory in higher education. By reviewing the literature published in its field, the need for: (The first aim) is to provide a review and clarification of its aspects and to clarify the views supporting it and the opposition opinions as well. The need to test the application of this theory in the Egyptian design studio as it was clear from the review literature is the second aim, which is reached by the clarification of the students' opinions, after the clarification of the theory to them, while the third goal is to choose one of these approaches to apply in the future extensively, and selection which academic level will be applied on it, this objective is reached from the analysis of previous published literature. The research questions are: 1. what's the theory of learning styles? And what are the researcher's opinions regarding application of it? 2. Can learning theory be applied in the architectural design studio in Egypt at the present time? and 3. What's the approach through which this theory can be applied? Based on the above, the hypothesis of this study is: the theory of learning styles suitable for application in the design studio in Egypt. Figure (2) illustrates the methodology used in the study.

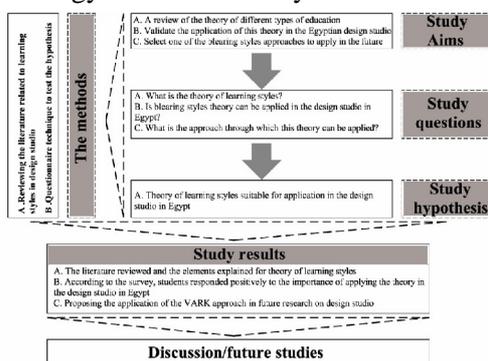


Fig. 2- The methodology used in the study, Source (Author).

This study was conducted on the sophomore

students, second level of the architecture engineering program. Broadly speaking, the current research reviewed the literature related to learning styles in general, then filtered it to the suitable learning style of higher education. It was further filtered to narrow the scope of the suitable learning style for architecture students. An analysis of the learning styles was utilized in the design studio.

The present study has been developed using an extensive review of literature looking at conferences articles, scientific journals and books to identify arguments, results, publication year, place of study, and academic level utilized. The study followed a three-step process to identify, collect and classify literature:

- 1- The search keywords (theory of learning styles in the design studio) were determined, based on the research aims.
- 2- Using the keywords specified in the previous step, for searching in Google Scholar and Science Direct, Elsevier online search engine, in 2018 and 2019.
- 3- The papers were sorted and chronologically arranged, to reach the first and third aims of the study.

The design studio in which the study was applied adopts the project-based technique, the different learning styles were explained to the students in the design studio as well as the tutors in order to examine the importance of learning styles application based on their point of view. Conjointly, the educational learning styles were explained collectively via the educational activities in the design studio. Similarly, students will be discussed about the learning styles individually. At the end of the project, their views will generally be taken in the design studio to make a decision rely on their opinion to apply theories of learning styles in the design studio in the subsequent phases. This study is a preliminary exploratory study of the utilization of learning styles in the architectural education in architectural engineering department and for the standardization of teaching methods at CIC. The pilot part of the study was based on qualitative measurement of the results of the research by questionnaire technique. Eventually, this paper aims to improve architectural education through the utilization of contemporary theories in undergraduate education, in addition to apply the most appropriate of these theories to architectural education in general and in the design studio in particular.

3- LEARNING STYLES THEORIES

The learning styles phase depends on personalization. The first use of learning styles was in 1954 by Herbert Thelen [22]. In the 1970's the concept of learning styles was further investigated [23].

Personal learning style defined as “a style or learning methods used in the procedure of learning” [24]. The dictionary of pedagogy, with reference to learning style methods used in the process of learning defines learning style as: “learning procedures used by individuals in a particular his/her life in most situations of the pedagogical types” [25]. Several researchers have defined learning styles [26] [27] [28]. The term learning style indicates the use definition reference “ways individuals and members of social groups prefer to receive process and illustrate information and ideas” [29]. According to Draco and Wagner, learning style is “differences that exist between individuals over each learning method.”

The researchers argued about dividing students according to their learning styles. Several studies adapted a customized approach and proved the students were generally satisfied and the adjustment enhanced student motivation [30]. Instructors should not depend only on Socratic lectures; nevertheless, rather they should diversify teaching strategies to adapt to different learning styles. What’s more, there is a requirement to diversity their teaching techniques to match with different cultures and psychology. Some academics segregate between learning styles and learning strategies. They claimed that both concepts are unique and different at the same time. For example, Reid (1998) debated that learning styles are internal skills that were developed unconsciously, nevertheless; learning strategies are external skills that can be learned consciously [31]. Importantly, understanding learning styles and the objectives of learning styles in the teaching and learning process is a key stone in effective teaching [32]. In 1988, Richard F. and Linda S. formulated a learning style model. The previous model classifies students as having preferences for one category or the other in each of the following four dimensions:

1- **Sensing** (oriented toward facts and procedures) or intuitive (oriented toward theories and underlying meanings).

2- **Visual** (oriented toward visual representations drawings and flow charts) or Oral (oriented toward written and spoken clarifications).

3- **Active** (oriented toward working in groups).

4- **Sequential** (oriented toward, learn in small steps) or global (oriented toward holistic thinking, learn in large leaps) [33].

Learning style theories focus on how the students prefer to learn and learning preferences of students. Ridining and cheema (1991) designed a wide-ranging categorization of style agreeing to tow fundamental dimension representing the way

in which information is processed and presented: holist-analytic and verbalizer-imager [34]. *David Kolb* presents his learning styles model in 1984 from which he *developed* his learning style inventory [35]. The Kolb Learning Style Inventory Version 3.1 (KLSI 3.1), published in 2005 [36]. Experiential Learning Theory (ELT) offers a comprehensive model of the learning process and a multi-linear model of adult learning [37]. (ELT) defines learning as “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” [38]. (ELT) is a dynamic view of learning based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction [39].

The ELT model portrays two dialectically related modes of grasping experience [40]. The Kolb model contains four processes of the learning cycle: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Dunn and Dunn indicated that there are five types: environmental, emotional, sociological, physical, psychological [41]. Kolb’s experimental theory learning is a cycle procedure commences with the experience enclose with reflection that conveys conceptualization and finally leads to an action [42]. Fleming illustrated VAK/VARK model in 1998. In this theory Fleming divided learning modalities to four types: visual learner, auditory (oral learner), kinetic and read/writing learner [43]. The Kolb learning theory provides with a few comprehensive and fully generalized models [44], as shown in fig. (3).

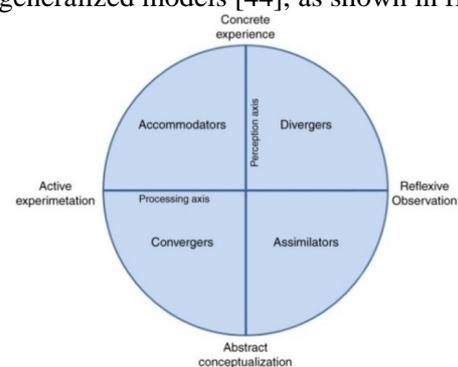


Fig. 3- Quadrant Model of Kolb’s Learning Styles. Source: Olivos, P., Et al. (2016) [48].

In yet a further study, Bar-Eli (2005) used Kolb’s model to recognize the correlation between designers’ learning styles, their features and the designing performances observed via the design process – her purpose being to provide confidence and support to students by aiding them become aware of their learning strengths [45].

Finally, some studies recommended matching

learning and training methods to individual difference variables. In other words, individuals with the sequential learning style should be accommodated by offering orderly and logical instructions and visual learners should be provided with visual illustrations (Baldwin & Sabry, 2003) [46]. Honey and Mumford's learning style questionnaire, known as (LSQ), this theory has been widely utilized as a tool of identifying students' learning style in higher education [47].

4- THE EXPERIMENT

This experiment was applied to the students enrolled in architectural design studio-3 spring, fall (2018), in order to inspect the importance of utilizing learning styles on architecture students, additionally, explain the several theories of learning styles for the students. The architecture students' opinion about the impact of utilizing learning styles in the design studio was tested through a questionnaire. In this questionnaire the students express their opinion about application of learning styles. In the above-mentioned questionnaire, a qualitative measure was developed to measure students' opinion. This measure consisted of equal linear distribution scores, which are very negative, negative, intermediate, positive, and very positive. The concluding results as shown in the figure below:

5- RESULTS

To achieve the first aim, and answer to the first research question of this study the literature reviewed, and the elements of the theory explained, various approaches clarified as well. Above mentioned is the first result reached by the study. Additionally, comparative analysis of the literature of contemporary theory in the design studio presented. In terms of the second aim of the study, Theory in Design Studio in Egypt, The results, as shown in figure (4), seem to indicate that the direction of the students towards positivism of the experiment under the study.

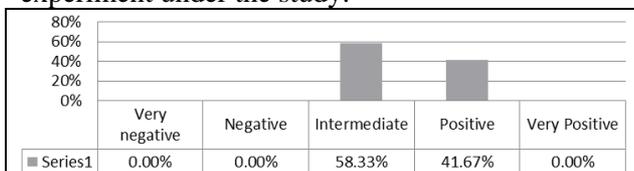


Fig. 4- The Opinion of the Students Represented Via Percentage of Their Opinion About the Utilization of Learning Styles in Studio Design, Source (Author)

Thus, the second result, which answers the second research question, confirmed the validity of applying the theory in the design studio in Egypt, which responds to the research hypothesis positively. As for the third aim, the third question of the research, a comparative analysis of previous

studies shows that the Kolb approach has been used in most research on the subject of the study, followed by the application of the Feldere Soloman approach, and the least approach in the application is the VARK theory, Therefore, the study is recommended to be used the previous approach in upcoming research. Accordingly, the third conclusion of the study is a proposal to implement the VARK approach into future research for learning styles.

*Comparison of the Results of the Study with Previous Studies

As for the results of the previous studies, three studies showed that there is a statistically significant relationship between the application of the theory of learning styles in the design studio and the academic and architectural performance, and the scores of students in the projects, which is in line with the positive trend towards this theory in the current research. Demirkan, H. (2016) emphasized that there is a preference for students to apply the theory of learning patterns in the design studio by applying the Feldere Soloman's Index of Learning Styles in the design studio, which is consistent with the results of the present study, but differs from the current study examining the different approaches to learning styles in general. This approach can be tested in the future in the design studio in Egypt and the Arab region. The relationship between gender and learning styles does not exist and the gender does not affect the different learning styles. This result needs to be verified by applying it to the design studio in Egypt and measuring the results. With regard to the diverse learning styles for architectural students, it has been shown from previous studies that architecture students are more active and visual than other students, which can be measured in future studies.

6- DISCUSSION

The current study incorporates illustrations for the types of learning styles in higher education. The study examined the possibility of applying the theories of learning styles in the design studio. The various learning styles were studied through the literature review, to reach the appropriate learning style in order to apply the design studio. In 1976, The Kolb model proposed. Dunn and Dunn indicated that there are five learning style types. Fleming illustrated VAK/VARK model in 1998. Kolb's theory of Experiential Learning, Feldere Soloman and VARK are the three main approaches that could be used in the design studio. Most previous studies focus on the use of Kolb's theory. Few studies focus on the theory of Feldere Soloman or VARK, as shows in table (2).

Table 2- The Recent Studies of Implementing Learning Styles and Approaches Utilized, Source (Author)

	Reference	Approach
1	Demirbas, O. O., & Demirkan, H. (2003).	Kolb's model
2	Kyan, T., & Yunyan, J. (2005).	Kolb's model
3	Graham, H. (2005)	Kolb's model
4,5	Demirbas, O. O., & Demirkan, H. (2007). Demirkan, H., & Demirbaş, ? . O. (2008)	Kolb's model
6	Datta, A. (2007).	Kolb's model
7	Mostafa, M., & Mostafa, H. M. (2010).	Feldere Soloman's Index of Learning Styles
8	Tezel, E., & Casakin, H. (2010).	Kolb's model
9	Demirkan, H. (2016).	Feldere Soloman's Index of Learning Styles

Emerged from the diversity of the results of the questionnaire above, necessity to use patterns of learning experiments. The students' opinions investigated to verify success of the recent experiment. The results of the research revealed and proven the possibility of applying the learning styles. Accordingly, the impact of its positive implications for the design studio. In a prospective study, the most appropriate learning style will be selected for the architectural design studio and will apply it in practical experiment. Based on the above (Figure 4), the utilization of learning styles

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in the design studio, teaching methods should be promulgated in the educational process in higher university education in general and education architecture in particular, it entails, more in-depth studies on the various models of teaching and learning and applying it in the process of education and improvement it, in order to engage students to scientific specialties, as well as the development of education within the design studio to keep pace with modern pedagogical developments.

Design Studio requires a variety of teaching methods to attract the attention of different types of students, because of the diversity in the educational activities of architecture during the design process, from the preparation of the project and the selection of the project site location by the students and the preparation of the function program is a stage that requires physical and intellectual effort.

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