Towards a Personalised Learning in Basic Design Studio: The use of Neuropsychological Tests

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Abstract

Basic design education was conventionally structured around standardised lesson plans and instructional methods. Although each architectural school considers itself as an ecole, the content and the methods of basic design courses mostly follow a particular layout. The principles or qualities, elements and compositional rules of design constitute the content, whereas the methods can vary according to the instructors. These content and dependent methods consider students as passive receivers, whereas students of basic architectural design course should be active learners, participants and even contributors to the process. Hence, it is of importance to consider the students as individuals with particular skills and learning domains. The characteristics of each student should be depicted. In this way, it could be possible develop personalised learning methods and more active and productive basic design studios. This study aims to present methods of educational psychology, particularly neuropsychological tests as key factors of personalised learning in studios.

Keywords: Basic design studio, educational psychology, neuropsychological tests.

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1. Introduction

Architectural design studios in general, particularly the introductory design level, has a peculiarity regarding their subjects, methods and tools. Students are expected to learn design by designing, which is often confused with learning by doing. Learning by doing, nevertheless, is based on the constructive nature of knowledge building. What it promises is the construction of new knowledge through a semi-structured discovery process, accompanied by a more experienced learner. It is expected to create a qualitative change in the learner in many ways. The articulation with previous experiences and knowledge is vital for sustainable learning. Besides, a proper introduction to the content, method, tools, objectives and the outcomes of the learning experience is of importance.

In the first year of architectural design education, on the other hand, students are asked to perform something that covers various intellectual activities at varying levels, from abstraction to composition. It is expected that the students discover the parameters, methods and the instruments of that performance, which would be criticised or corrected by the tutor. The tutor utilises the conceptual framework and terminology that already expects the students to discover, use, master and re-administrate to improve the design proposal. The architectural education, in that sense, promises to introduce and develop visuospatial and visuo-constructive skills, creative, multi-dimensional, and abstract thinking and imagination in second and third dimensions, multi-tasking and problem-solving abilities, and suppose that the students have those skills and abilities in advance to study architecture, respond and perform the studio activities.

If it is reframed within the developmental psychology and cognitive development, the first-year students are asked to master, monitor and adjust its own design process by means of design performance itself. Students are forced to administer a cognitive task in order to develop an awareness and skills about both the content of the task (architecture, architectural space, parameters of both) and the strategies to solve the task (design process) by means of metacognitive processes.

It is obvious that the intellectual climate of the introductory architectural design education heavily relies on not only basic cognitive abilities, but also high level cognitive functions and metacognitive awareness. The theories on cognitive development, however, are agreed that neither can every individual achieve that level of cognitive operations, nor would individuals who are supposed to be on the same level have the same competency over the same cognitive skills. Furthermore, curriculum and academic performance-oriented tests for university admission mostly ignore perception, and visuospatial and visuo-constructive skills. These tests define an academic range for the eligible candidates without any consideration of their varying cognitive levels and skills. In fact, it is of great importance to underscore that even though they have certain qualities in examining the analytical thinking and reasoning skills, general admission tests cannot foresee the good or bad performance of the candidate in architectural education. In that sense, both the students and faculty in architectural schools, particularly at the very beginning, are having difficulties. On one side, the faculty keeps changing the topics, requirements, design and presentation media, and sometimes instruction methods. Students, on the other side, struggle to discover the hidden path to the perfect architecture by solving the riddles and puzzles of the tutors.

The introduction of the multiple-intelligence theory and achievements of studies on learning styles to the research on architectural education has been an important shift appreciated by few, considered for the studio practice by fewer. Architectural education has rediscovered education where individual differences of the students do matter, in many cases more than the architectural content in improving the design knowledge and skills. Another important paradigm shift, however, crucial for architectural design education in order to realise that neuropsychological processes governing the students' perception and construction of space mentally and visually are much more vital than the correctness of the free-hand perspective drawings. In fact, accuracy or inaccuracy of those drawings is the reflections or results of cognitive processes. They should not be evaluated as the quality or assurance

of being a good architect. They might be a sign of distinguished perception and possibly a new way for visuo-spatial construction, which could open up new directions for architecture and education.

How to discover and appreciate these cognitive processes in relation to the content, tools, methods and genuine nature of introductory design studio becomes quite an issue. In this respect, the aim of this study is to present the possibility and potentials of administrating neuropsychological tests for a better and individualised basic architectural design education with respect to the ethical issues about human researches. For the sake of mutual understanding about the scope and approach of such a multidisciplinary perspective on the architectural design education, the definitions of the related concepts, borders of the disciplines and their intersection – interaction areas should be presented at the very beginning.

As a hypothetical or intermediary variable, cognition is a framework or guiding schema to comprehend the order, processes and functionality of brain, whose processes could only be distilled from the functional relationships between stimulus and response by means of experiments and statistical analyses (Karakas, 2008). Motor control, learning, perception, attention, memory, memory storage and retrieval are those processes (Anderson, 1995; Sparrow & Davis, 2000; Willingham, 2004). There are, however, high-level processes such as concept development, problem solving, decision making and reasoning, imagery and language. Metacognitive processes consist of monitoring, controlling and adjustment or manipulation of cognitive processes of own (Flavell, 1979).

It is of importance to understand that cognition indicates a complex structure. The investigation and analyses of cognitive processes require an inter-disciplinary approach that includes cognitive psychology, neuropsychology, neuroradiology, neurochemistry, neuro philosophy and so on so forth (Karakas, 2004). Securing that mind and body constitute a whole, all these disciplines examine the relations between them by means of their unique perspectives and techniques (Ibid, 3). Neuropsychological assessment is the examination of the relation between the differentiations in brain's functionality and their cognitive and behavioural consequences. This examination considers not only deviations or anomalies in brain and its cognitive and behavioural implications (Karakas, 2004; Lezak, 1995; Sparrow & Davis, 2000). How cognition varies with respect to age, sex, intellectual development, social and cultural background, and within a population of a fixed age, sex or any other dimension, etc., is involved in neuropsychological assessment. For the scope of this study, the depiction and understanding of how cognitive abilities vary in a fixed age and education group by means of neuropsychological tests is crucial.

Neuropsychological tests should be administrated, assessed, and interpreted by licensed experts. Ethical issues and consents should be concerned and maintained carefully. It should be kept in mind that the use of tests and similar material in educational practice does not imply training of licensing design studio tutors for test administration. As mentioned above, as a multidisciplinary educational issue, it is not expected that the disciplines interfere with each other's domain. The student's profile based on its unique abilities, performance and development is the intersection of the disciplines. At this point, the definition ability with respect to the studio tasks should be defined.

According to Carrol (1993), 'Every ability is defined in terms of some kind of performance, or potential for performance.'

As used to describe an attribute of individuals, ability refers to the possible variations over individuals in the liminal levels of task difficulty (or in derived measurements based on such liminal levels) at which, on any given occasion in which all conditions appear favourable, individuals perform successfully on a defined class of tasks.

…

… a task as any activity in which a person engages, given an appropriate setting, in order to achieve a specifiable class of objectives, final results, or terminal states of affairs. …a cognitive task, therefore,

as any task in which correct or appropriate processing of mental information is critical to successful performance.

…

A cognitive ability is any ability that concerns some class of cognitive tasks, so defined.

It is obvious that, design studio tasks are a class of cognitive tasks requiring the engagement of a set of cognitive abilities. Based on the basic cognitive abilities are visuospatial and visuo-constructive skills alongside imagery. The metacognitive awareness necessary for monitoring, controlling and manipulating the processes administrated by those skills is a vital parameter of the studio practice as well. As Carrol (1993, p. 304) defines:

Spatial and other visual perceptual abilities have to do with individuals' abilities in searching the visual field, apprehending the forms, shapes, and positions of objects as visually perceived, forming mental representations of those forms, shapes, and positions, and manipulating such representations 'mentally'.

Design studio, furthermore, considers creative and constructive visual and three-dimensional representations and manipulations of those elements. During the first year of their education, students are expected to learn and advance certain techniques, tools, and physically and digitally enhanced environments for design representation, ranging from pencil and sketch papers to virtual and mixed-reality technologies. The conventional studio practices set the aesthetic and technical judgement of the tutor(s) as the assessment tool. Therefore, students perform to meet design, aesthetic and professional criteria forming that judgement. Students are expected to develop proposals conforming to the rules of visual composition, and produce accurate freehand perspectives, orthographical sets and correct scaled models in order to present technically, aesthetically, emotionally and philosophically well-defined ideas. It is clear that the objectives of that practice concern a level of perfection based on another paradigm for cognition, learning and development, but today, it does not take the individual differences into consideration. Any, so-called inaccuracy or peculiarity in any level of design or, particularly, presentation is judged as an anomaly to be fixed or got rid of, which is secured with lower scores for academic performances.

On the other hand, an inaccurate perspective drawing because of an unusually placed vantage point or a horizon line, deviations in rhythm, disproportionate or inappropriate placement of the elements, ignorance of visual, spatial, architectural or technical parameters may be sign of an individual difference or variance in brain functionality reflected on perception, cognition and behaviours. Depression, which has a significant negative effect on cognitive processes, may cause unexpected results in design and representation. Certain visual or acoustical factors (low or high music, discussions, colourful graffiti on the walls, dancing people around, etc.) could have various impacts on the attention, motor skills and cognition of the students. They are beyond the studio conduction skills, professional experience or theoretical competency of the tutors, or the creative power of the students.

The brain is still an unknown territory. The idea and form of cognition are under continuous construction and change. In this respect, neuropsychological tests, conducted, assessed and interpreted by the experts, in correlation with the performances of the students on design (cognitive tasks) would provide invaluable data and information without framing the individuals within the tight and prejudiced limits. The cognitive development levels of the students, visual and spatial perception and thinking, analytical reasoning, working memory, problem solving skills, abstraction and speed of cognitive functioning can be examined without relying on language or verbal material. The influence of socio-cultural differences and backgrounds, however, should be concerned. It is also remembered that there are many other parameters, such as inner motivation, expectations from the studio, future plans and so on, effecting the academic and cognitive performance of the students. These tests cannot be held as model or analogies for studio practice; or formulas for design thinking; or pedagogical or instructional methods.

The objective of contemporary and individualised learning is not elimination of unfits by means of subjective intellectual obstacles, and rewarding and licensing the fitting ones. The main goal should be providing an appropriate atmosphere in which individuals develop their own motivation and are encouraged to discover their own boundaries of learning and development. From this point of view, neuropsychological tests might offer great help for the introductory design studio. Basic design studios mostly concern creating or increasing awareness in the students. The awareness of the tutor and studio practice about the student, their needs and abilities, however, have been ignored for many years. By having the support of experts and tests, tutors can develop individual the perspectives for each student and the whole population of the studio. Architectural design education practice should notice that the importance or popularity of the content of the education cannot secure the academic performance of the students. If the cognitive development level and abilities of the students are mapped properly, each of them can be supported, motivated and advanced accordingly. Besides, further studies can be conducted to investigate the correlation between the general university admission tests, objectives of architectural design studio, academic performance of the students and cognitive abilities.

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