Architecture Design Studios, between Implied Ideas and Process Generated Outcomes

Kesseiba Karim[1]

[1]*Lecturer, Cairo University*

ABSTRACT

Teaching first year architecture students is an important challenge, both to the young architect and to the tutor. The problems associated with that challenge is the completely different experience the student faces in their first studio, in addition to the urge to glorify the product by the tutor. This duality is very important to observe and relate to especially in the process of developing the quality of learning and teaching architecture. Thus, the paper aims to discuss the different approaches and design studios targeting first year students based upon literature review. This review will analyze and focus upon the extent of which the process of teaching coordinates with the capabilities of imagination and application by the student from one side, and from another side the outcomes. This analysis will shed light upon the extent of which the tutor interferes to enhance the quality of the outcome. Afterwards, a design studio targeting first year students, led by the author at Cairo University is described and analyzed with reference to the previous discussion. The process of design is explained and evaluated according to the sequential sketches submitted by a group of students, and the level of interference of the tutor, followed by analysis of the outcomes of the design studio. This study will help in establishing a clear process for a design studio targeting first year students during a period of two semesters, with clear documentation of the process, which possibly can help other tutors and professors in the field of architecture education.

Keywords: Architecture education, Design studio, Process of design, Outcomes of studios.

1. Literature Review: The Design Studio Revealed

This part is concerned with exploring the main debates which emerged on the way of dealing with design studio for architecture students. The debate will be based on the different points of views and approaches. More attention will be given to the relation between the input of the tutor and the students' response, which will be the main focus of the analytical part afterwards.

According to (Nicol and Pilling, 2000), the Design Studio is the most important preparation for the future, thus, this studio precisely must enable students o acquire skills needed to deal with clients as well as to respond to society needs. However, other theorists argue that the design process itself is un-describable, and the designer cannot make the process explicit correctly, because it may lose its meaning and value (Lawson, 1997). This debate is considered one of the main limitations to the study field.Thus the next part will explore some approaches and theories which tried to concrete the idea of the design studio.

On one hand, the design studio, as the core of the architectural education's curriculum and as the backbone of architectural education, is a learning environment which could be described as an active and interactive learning setting, and an environment for "learning by doing which creates the possibility of an interactive relationship between student and studio tutor(s)", Bakarman (2002).

To ensure this, (Nicol and Pilling, 2000) provide the following five key principles to ensure higher quality for the preparation of the design studio. First is taking into consideration that "learning is an active rather than a passive process", and then paying attention that "reflection on learning develops wisdom or artistry in practice". As to the concept of interaction, they point out that "collaborative learning enhances individual learning" as well as that "self and peer assessment develop skills for lifelong learning". And finally, "authentic learning tasks develop professional competencies".

In accordance to the previous five points, Bakarman (2002), concludes that the main aspects that prevented students from developing their design practice in the design studio are primarily the lack of

interaction, for students to learn how to design and develop their design practice, they have to conduct design, and present it to others. Also another important defect is that students in design studios are passive participants, and the development of their design practice is under the control of the design tutor. Finally he asserts that architectural education is mimicking the real professional practice, yet, does not consider the reality of the educational setting.

As to the means and methods of modeling the design studio Cotton (1995) presents that there are two approaches; The Surface Approach and The Deep Approach. According to Cotton (1995) "the aim of the surface approach is to reproduce what other people said". So, through the surface approach, students act as a reflection board and reflect what other people deliver without any modification and contribution. On the other hand, Fry et al (1999) claim that surface approach "is typified as an intention to complete the task, memorize information, make no distinction between new idea and existing knowledge, and to treat the task as externally imposed". In general, through the surface approach students just, reproduce what other people said or what they read, as well as accept others ideas and information passively.

This approach leads to the observation that the students direct their attention to how others will assess their works, and concentrate on the assessment requirements. They also try to memories facts only without any modification and implication. And consequently, they deal with the learning activity in a superficial mode, without concentrating on the patterns. And they conduct the learning activity without reflecting on their knowledge and experience, (Cotton 1985).

As to the Deep Approach, which is the theoretical framework for the case study, it is the opposite of the previous one. Through such approach, students conduct their learning activities with the intention of acquiring the new knowledge or skills, and interact with them actively. Thus, for Cotton (1995) "The deep learning approach turns other people's ideas into [our] own structure of knowledge. This is a process of active transformation". So, the students own the information, and modify and integrate it with their own personal knowledge structure, and make it personally meaningful (Nicol 2000).

In addition, Fry et al (1999), claim that the deep approach reflects the student's intention to understand and seek meaning by conducting such action which directs him/her to relate new concepts to existing ones, and to distinguish the new experience from the existing experiences. With the deep approach, the leaner also critically understands the new concept in full details by determining and evaluating the key themes in it. Therefore, students aim to gain the most from their learning experience, and they acquire facts not as isolated entity, but in a meaningful context (Fry 1999).

In general, through the deep approach, students could aim to understand the materials for the sake of understanding. They are able to interact with the provided materials as well as connect the learning activity to the prior experiences. They can create and utilise patterns to integrate the new idea and information. They can connect and relate different elements from the learning activities to each other. And finally they can deal with argument not as fact, but try to understand the logic behind it, (Cotton 1995).This approach enables students to experiment more, regardless of the final product.

Important for our literature review is the reflection upon Kolb's theory, which is built upon the works of other experiential learning researchers, such as Dewey, Lewin, and Piaget. The essence of Kolb's theory lies in the learning definition, in which Kolb argues, "learning is the process whereby knowledge is created through the transformation of experience" (Kolb 1984, p. 38).

The main features of the experiential learning approach are being concerned with the process more than the product. Also, the nature of knowledge, from the experiential learning perspective, is not an independent entity ready for transmission, but is able to be transformed and modified. The learning activities affect the experience in its subjective and objective forms. Kolb's theory argues that in order to understand learning we have to understand the nature of knowledge and vice versa (Kolb 1984). The model which concretizes Kolb's theory is based upon four stages as described hereafter.

The first stage is the "Concrete Experience", in which the learner conducts or is involved in an active experience, and starts to use his/her existing knowledge, and at the same time additional knowledge may feed in during the process to fulfill the new experience requirements. The second stage is the "Reflective Observation", at which, and after the completion of the experience, the student has to reflect upon what has happened and look back to the nature of experience he/she went through. This reflective observation could be conducted by one, and is considered as unique opportunities for the learner to extract a useful part from this experience, and integrate the new experience and understanding with the existing knowledge, (Kolb 1984).

As to the third stage, "Abstract Conceptualisation", the learner tries to build the "theory", which represents the outcome of the previous stages. This theory can be built by consulting different resources such as: books for abstract data, a more experienced person for advice, or "consult general roles" (Cotton

1985 b). So, through this stage the learner combines and puts together others' ideas. In general, it is the stage in which the learner tries to collect new information and compare it with others.

Finally, the fourth stage, "Active Experimentation" is the last stage of Kolb's learning cycle, in which the learner starts with active experience, followed by reflective observation, followed by building the theory, and ending with the planning stage: what to do next. So, at the new experience, the students could improve their behavior and attitude based on the outcome(s) of the last experience. Therefore, this is the stage of "the practical planning or pragmatic stage" (Cotton 1995 b, p 132).

In general, Architectural Education is understood to be "active, iterative, and project-based. It is developed through close relationship between students and studio's tutor, often on one to one basis" (Fisher 2000, p.5). This type of environment is considered by the educational modern theorists as "learner-centered" (Fisher 2000). The learner-centered approach considers students as active participants during the learning processes, in which they have to be active in devoting or proposing new knowledge, and adding it to the provided information in order to solve the design problem.

2. Case Study Description

The selected case for analysis is the experience of a design studio which took place during the academic year 2013-2014. The venue was Cairo University, Faculty of Engineering, Architecture and Environmental Technology department. The group upon which the targeted studio was applied was students of first year. The number of students was 58.

Due to the fact that the students have not experienced any previous architectural education, the studio divided upon two semesters aimed to introduce basic architectural knowledge to the students, introduce the concept of how to think architecturally, enhance the graphic skills of the students and finally enable them to design a dream home to correlate all the previous mental and physical skills.

This was achieved through a group of short term assignments in the first semester, whose duration was a single week for each one. Those assignments were distributed among a period of two months, leaving the last month of the academic term to a simple introductory conceptual project. The main goal of the assignments was to enable the student to explore knowledge on one side, while some assignments merely focused on increasing the manual architectural skills through drawing, rendering and model making. The final assignment aimed to introduce the students to the issue of context and how to generate ideas based on a set of potentials and limitations.

The second term was totally dedicated to a design project which was a dream home, individually designed by each student. The impact of the site was one of the main problems of the project, besides the fulfillment of each young architect's dream. Thus, three different sites were selected by the tutor, and left for each student to select the one which matched their dream.

Taking into consideration the large number of students, they were divided into five groups, which held parallel studios with one of the teaching assistants, with the tutor having an overall critique at the start of each studio. The challenge was that after a period of one month, during which each student individually made the necessary studies, and generated the concept which reflects their dreams, the tutor made a layer of design elaboration for the plans of the entire group. This experimental step aimed to first, give a push to the students to develop their architectural formulation of the initial idea from one hand, and from the other hand to examine the impact of that push on the development of their projects afterwards.

The result was that 85% of the students elaborated their designs in a different way than the implied sketch by the tutor, however, with more mature application of interior solutions than their original sketches. Only 15% imitated the given solution, yet, with more efforts exerted in the design of other elements of the project (elevations, sketches, 3d). The end result of all 58 projects was a completely unique project for each student, which reflected to a great extent their current dreams as young architects, as well as the mental efforts they were able to receive and send.

3. Phase One- First Semester: Gaining Skills

During the first term, the course consisted of three inter-connected strands, sometimes addressed in series, others addressed in parallel. These strands are:

3.1. Basic Architectural Craftsmanship Skills
    i.   Getting familiar with drafting & model-making tools
    ii.   Getting familiar with Architectural Graphic Language:

- Understanding Orthogonal Projections (Plan, Elevation, Section, Layout)

- Understanding Scale & used scales
- Understanding fundamental graphic vocabulary (Stairs, Doors, Windows, dotted lines, cutting lines, line weight, material indications, basic fixtures)

iii.   Acquiring Manual Architectural Drafting Skills:
- Precision
- Neatness
- Elaboration

iv.   Acquiring Basic Model-Making Skills:
- Correct use of tools
- Correct choice of materials
- Model Rendering Techniques
- Safety measures and precautions

3.2. Introduction to Pre-Design Operations:
i.   Introduction to Data Gathering and Investigation
ii.   Introduction to Program Analysis
iii.   Introduction to Site Analysis
iv.   Introduction to Conceptualization

3.3. Ability to Transform Pre-Design Operations into a simple Architectural Design :
i.   Transforming Spatial Program into Bubble Diagram
ii.   Transforming Site Analysis into Activity Map
iii.   Integrating Bubble Diagram & Activity Map into Zoning
iv.   Transforming Zoning into Defined Spaces & Forms

3.4. Explaining Architectural Design-Related Fundamental Topics:
i.   Understanding the Essence of the term "Design"
ii.   Understanding the difference in objectives between "Building & Architecture"
iii.   Understanding the role of Logical Thinking throughout the design process
iv.   Understanding the value of Legitimacy in Architecture
v.   Understanding the basic Intellectual and Professional Ethics in Architecture

The aspects related to "Basic Architectural Craftsmanship Skills" were enhanced through a series of assignments, a sample of which are shown below in figures 1(a,b,c,d) and 2(a,b,c), while topics 2, 3 and 4 were materialized in the conceptual design project explained underneath.
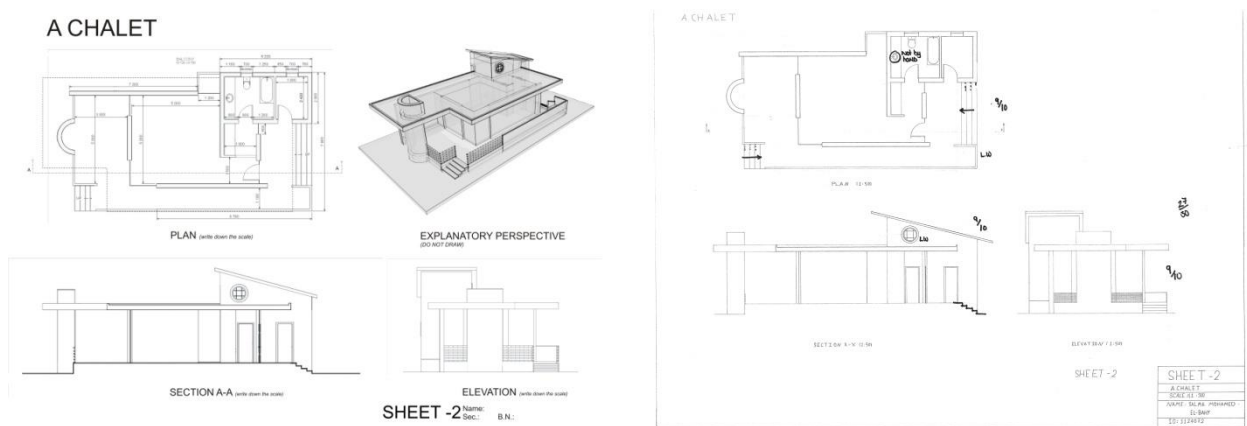
Fig-1. (a,b,c,d) Assignments related to enhancing graphical skills and model making, Author, 2013.
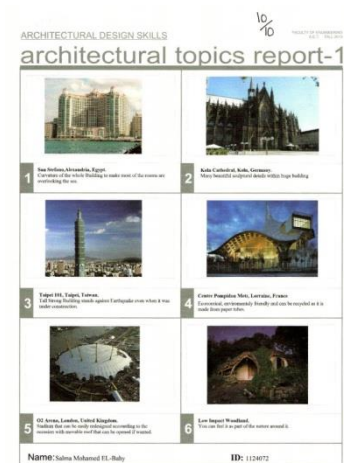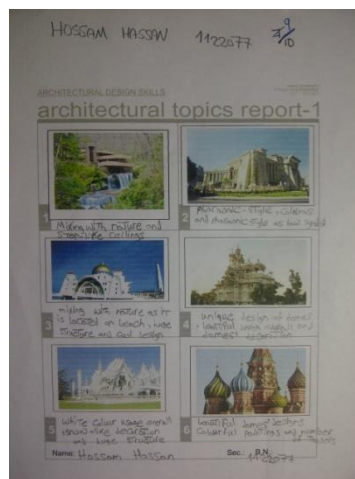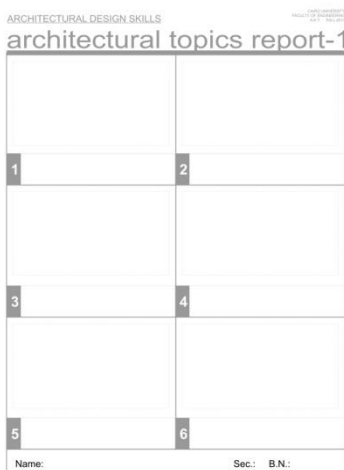

Fig-2. (a,b,c) Assignments related to pre-design operations Data Gathering and Investigation, Author, 2013.

The primary conceptual project introduced to the students aimed to cover aspects 2, 3 and 4 described above. The project was an "I-café: Information Technology Aided Cafeteria" located in their campus at Cairo University.

The project was introduced to the students as following. The term stands for Information Technology Aided Cafeteria which means that besides offering the standard cafeteria services it also offers many vital student technological related services, like internet coverage, online screen announcements, live broadcasts, host logged-in computers, and the possibility for future plug 'n' play devices. As for the notifications wall element, it is the revivalism of a traditional element found in many educational facilities for multi-use, such as grades announcements, various name-lists, distinctive student work show-stand, special offers, trips, etc.

No precedents were offered to the students, but they were encouraged to select their preferences. In addition to this, the following diagram in (fig. 3), was explained to the students as an aiding method to formalize their ideas and inputs. This was introduced to encourage them to present more studies and analyses to help them reach a concept suitable for their design problem.

Fig-3. Introduction offered to students as a means to aid in formulating the first design experience, Author, 2013.

In addition to this, the students were offered a template for organizing their means of analysis. This template and a sample of the results are shown in (fig.4, a, b, c, d, e). The students were asked to analyze the circulation inside and surrounding the selected site. As well as asked to study the patterns of activities and expected densities for their concept. Also an introduction to the environmental situation was presented and consequently, climatic and plantation studies were to be included.
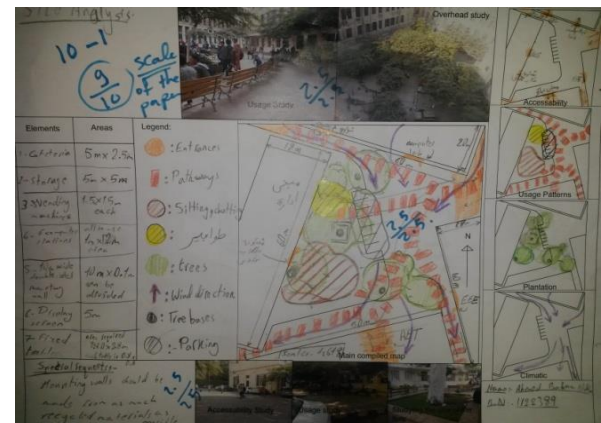

Fig-4. (a, b, c, d, e) Introduction offered to students as a means to aid in formulating the first design experience, Author, 2013.

As to the final presentation of each student's conceptual project, not a full project was expected, yet, more emphasis was given to the process of analysis and how this was reflected on the outcome of the concept. The students had the freedom to express their ideas through any means, 3d models, sketches, precedents or scenarios for patterns of uses. A sample of the outcome is presented in (fig. 5 a, b).

Fig-5. (a, b) Introduction offered to students as a means to aid in formulating the first design experience, Author, 2013.

4. Phase Two: Second Semester Outline: Income Versus Outcome, The Dream Home of the Student

The second term was designed for the same group of students and directed by the same tutor. The course this time was meant to direct the students throughout the process of design starting from deriving the concept and reaching to fully developed multi-layered design allowing students to understand the different aspects incorporated with the design process covering utilitarian, structural, socio-cultural, environmental and economic aspects. Also the course aimed to train the students to effectively use various illustration media to show their work including manual, digital, and mixed media. The Media of Interaction was through Lectures, Studio-work, Drafting Sheets, Projects and Field Trips.

This course consists of one basic strand and two secondary complementary topics, sometimes addressed in series, others addressed in parallel as follows:

4.1. Architectural Design Projects: *(Basic Strand)*
    i.   Main Project, which is a single dwelling unit
    ii.   Secondary Project, which is a small scale public-use project
    iii.   One day project, twice throughout the term for small sized service buildings

4.2. Introduction to Systematic Design:
    i.   Compilation of Pre-Design Operations
    ii.   Explaining Activity Mapping
    iii.   Explaining the process of reaching the correct Zoning
    iv.   Introduction to decision-making matrices

4.3.Explaining Architectural Design-Related Fundamental Topics:
    i.   Further understanding of the Essence of the term "Design"
    ii.   Basic understanding of the Environmental Impact of the context
    iii.   Basic understanding of the main Architectural Movements
    iv.   Learning by heart the value of persistence in Architectural design

The project which the students were asked for was to design a single house unit, with an annexed design studio, for a financially capable owner, who is supposed to be themselves; hence, it must achieve the target of designing a Custom Home not a standard House. The house will be located at the student's selection from within three given site alternatives (fig. 6 a,b,c), the look, structure and spatial configuration is left to the student's choice within the main given spatial program.

An important remark here should be highlighted, that creating different levels based on the site contours, or even just as a design vision is not considered multiple storey, and is favored as it increases the design potentials. The House and Annexed Studio although seeming distinct, and should be kept like that to a certain degree, they should however keep a successful level of harmony and integrity. It was made clear to the students the means of evaluation of the project as follows:

A. Acceptable Project
1. Acceptable Area Distribution
2. Acceptable Zoning
3. Functionally suitable dimensions and forms for spaces
4. Achieve Structural Stability
5. Complete all quantitative delivery requirements throughout the sketches and the final project

B. Good Project
1. Achieving direct & simple flow between spaces
2. Ability to achieve discrete zoning levels depending on usage patterns
3. Designing furniture layout in accordance with the space (openings, view angles, circulation, etc..)
4. Making good use of site potentials (Contours, View angles, Prevailing wind directions, etc...)
5. Ability to express an overall project character
6. Achieving good level of expressive presentation throughout the sketches and final project

C. Excellent Project
1. Successfully reaching the student's own personalized Custom Home (injecting your own Genes into the project)
2. Ability to translate usage patterns on the spaces form and dimensions
3. Achieving impressive, clear and properly assigned level of presentation throughout the project

Cliff-Edge at AL-Muqattam hill   Island-Tip at AL-Dahab island   Desert-Skirt at Cairo-Alexandria Highway

Fig-6. (a, b, c) The three sites from which the students are asked to select one for their projects, Author, 2014.

As explained earlier in the case study description, after the students finalized their primarily analyses, and formalized a concept, there was a problem in their transition from the concept to a primarily plan with proper internal spatial relations. At this point, the tutor explained to each student one possible design development which would be a possible materialization for the concept. In order to make the case of development equal to all students this applied to each student individually, as presented in (fig.7,a:i).
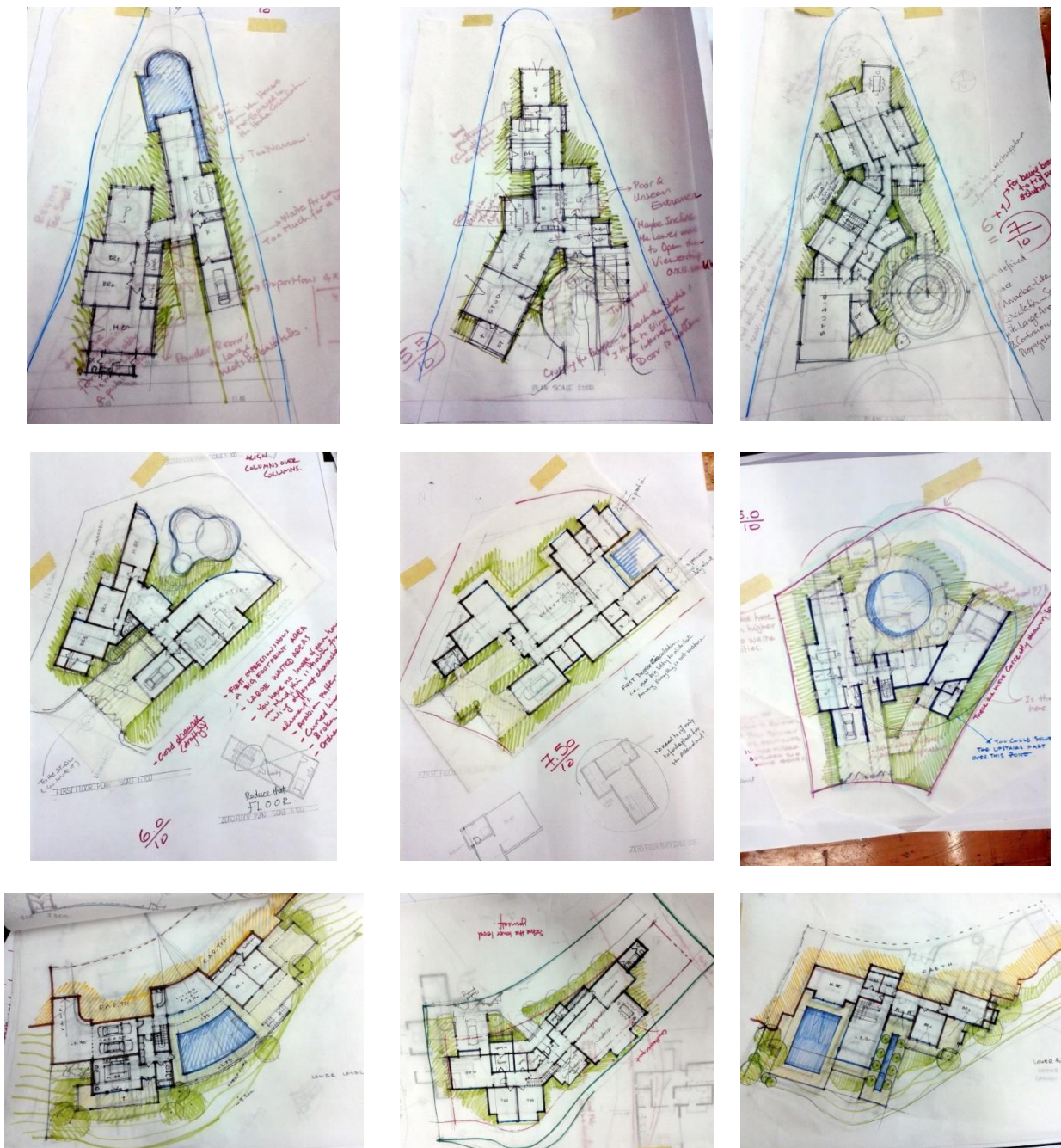
Fig-7 (a: i), Samples from the tutors contribution in the design development for the three given sites, Author, 2014.

Interesting enough, the final projects by the students revealed that the aided design they were offered helped them visualize the elaboration of their concepts, yet, did not force them to copy exactly the design offered. This helped them to understand how different forms generated due to their analyses can be solved as to spatial relations, circulation and zoning, but their urge to maintain their own "genes" in each individual project led to the production of 58 different projects for the same design problem (fig. 8 a:f). In addition to this, the students were encouraged to generate according elevations, sections and 3d forms which further enrich the individuality of their projects.
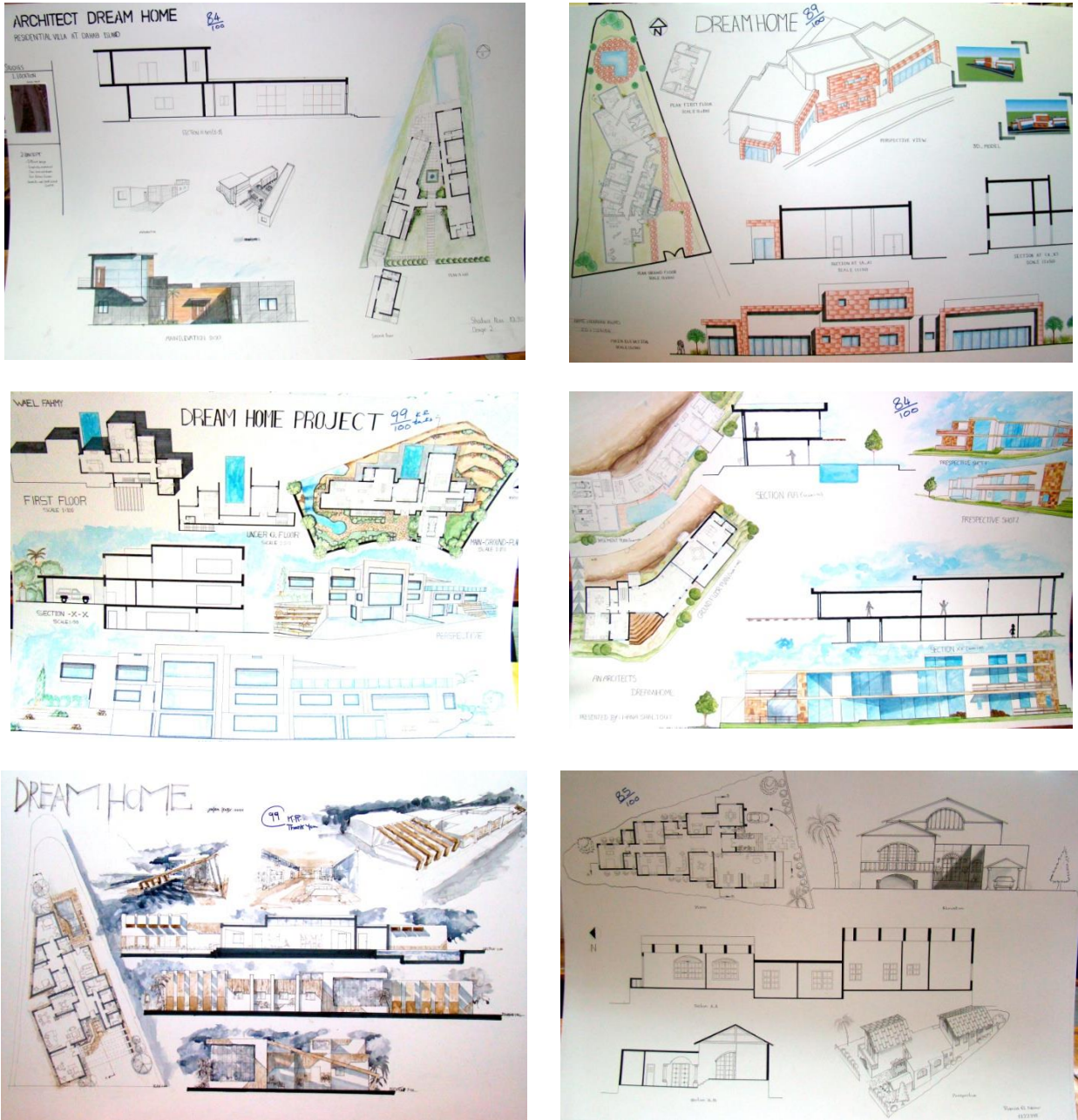
Fig-8. (a: f), Samples from the students final presentation boards, Author, 2014.

## 5. Analysis: Percentages of Process Based Innovations

The following table and diagram reveals the grades evaluation for the design studio held on two terms. Since the first one was a series of assignments, each one was evaluated separately to give an indication of the average grades and to what extent the student achieved the goals of the course (table 1).

Table-1. Average Grades for the Assignments in the First Term, Author, 2014.

Source of Evaluation	Average Grade	Evaluation Based on Performance Criteria (Average Grade > 60%)
Assignment #1 Drafting Sheet One	85%	Satisfies criteria
Assignment #2 Drafting Sheet Two	75%	Satisfies criteria
Mid Term Exam*	85%	Satisfies criteria
Assignment #3: Home Furnishing	60%	Satisfies criteria
Assignment #4: Criticism Report	90%	Satisfies criteria
Assignment #5: Axonometric	75%	Satisfies criteria
Assignment #6: Model Making	75%	Satisfies criteria
Assignment #7: Advanced Rendering	85%	Satisfies criteria
Assignment #8: Advanced Drafting	70%	Satisfies criteria
Assignment #9: Site Analysis	70%	Satisfies criteria
Assignment #8: Conceptualization	65%	Satisfies criteria
Assignment #8: Advanced Analysis and Conceptualization	67%	Satisfies criteria

As to the project of the second term, it was regarded as the overall accomplishment for the accumulative grades, since it was a single design problem regarded in a totalitarian way. As in the chart in (fig. 9), the average grade was the B, meaning the good project which presented some sort of uniqueness, while the A, meaning an excellent project with the students "own genes" was lesser, and finally the C and below were the least, meaning they could not reach a properly designed and coherent project.
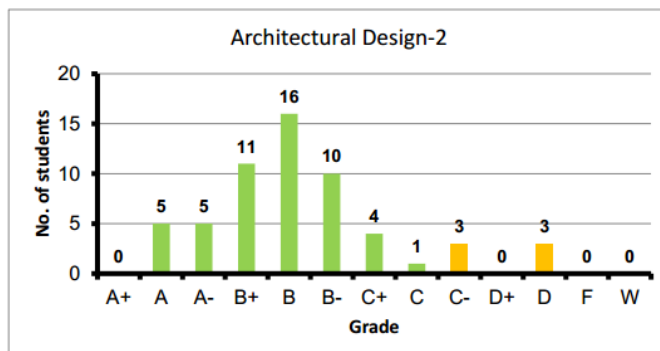
Fig-9. Final Evaluation Chart for the Project, Author, 2014.

6. Conclusion

The paper aimed to explore different methods for dealing with Design studios. The focus of the paper was the design studio for first year architectural students. The means and methods which the author applied were described, with special reference to the way students were encouraged to formulate their own designs, and at the same time, give them tips on how to materialize their concepts architecturally.

The explained method presents a blend of the deep approach and the surface approach explained in the literature review. And according to the final students' grades evaluation, it proved to enable the student to present creative solutions, however, mature and possible to apply at the same time. The reason this blend was used was the need to give the students skills to help them in further design studios, but at the same time present more floor for creativity than given in regular design studios.

The study can be further applied to the different studios this group of students are exposed to, in order to evaluate the accumulative experience and their future design capabilities as future architects.

References

Bakarman, A., (2002), Architectural Learning Tool, PhD Thesis, School of Architectural Studies, The University of Sheffield, UK.

Cotton, J. (1995). The Theory of Learners: An Introduction. London, Kogan Page.

Fisher, A. (2000). Retrospective Perception of Architectural Education. York, UK: 4 1.

Fry, H. a. K., Steve and Marshall, Stephanie, (ed.) A Handbook For Teaching and Learning In Higher Education: Enhancing Academic Practice. London, Kogan Oage Limited.

Kolb, D. (1984). Experiential Learning: Experience as The Source of Leaming and Development. New Jersy, Prentice-Hall

Lawson, B. (1990). How designers think: the design process demystified. Oxford, Butterworth Architecture.

Nicol, D. and Pilling S., (2000), (ed.) Changing Architectural Education: Towards a New Professionalism, Spon Press, USA.