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The journal of an association of institutes concerned with the quality of built environment. The publishing framework is shaped around the forces which act on built environment, which maintain, change and transform it. The content consists of articles which deal with these issues and in particular with responsive, self-sustaining and re-usable environments which have the capacity to respond to change, provide user choice and value for money.

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The Open House International Association (OHIA) aims to communicate, disseminate and exchange housing and planning information. The focus of this exchange is on tools, methods and processes which enable the various professional disciplines to understand the dynamics of housing and so contribute more effectively to it. To achieve its aims, the OHIA organizes and co-ordinates a number of activities which include the publication of a quarterly journal, and, in the near future, an international seminar and an annual competition. The Association has the more general aim of seeking to improve the quality of built environment through encouraging a greater sharing of decision-making by ordinary people and to help develop the necessary institutional frameworks which will support the local initiatives of people in the building process.

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Editorial

UNSPOKEN ISSUES IN ARCHITECTURAL EDUCATION

The international conference on Architectural Education, was held at the Faculty of Architecture, Eastern Mediterranean University (EMU) in Famagusta, North Cyprus, on April 3-4, 2014. This conference has been organized in collaboration with the European Association for Architectural Education (EAAE), under the title of "Unspoken Issues in Architectural Education (UIAE)".

The main aim of UIAE-2014 conference was to bring a wide range of people who are involved in architectural education together to discuss architectural education from various perspectives. Providing such an international scholarly platform was expected to open new horizons for the future of architectural education. Thus, under the title of the conference, discussions were carried on within the main themes of "Diversified Mediums", "Dynamic Philosophy", and "Contradictory Education".

The conference was conducted by the presentation of 50 papers from 15 countries offering a variety of theoretical perspectives, approaches, experiences, and methodologies from interdisciplinary scholars, practitioners and students from all around the world working in the disciplines of design, architecture, art and architectural history, engineering, urban studies, cultural studies, sociology, environmental studies, or pedagogical studies.

The presented papers by the participation of more than hundred scholars, discussed and investigated key challenges of architectural education in present time such as; the (ir)relevance of architectural education to the real world, the effects of media, working or designing for poor, disaster management, climate change, fuel poverty, the price of energy, conflicts and wars, number of architects and architectural schools questioning the methodology of teaching in architecture, accreditation for architectural schools and many other thought-provoking issues.

Amongst the presented papers, 10 best papers were selected by the session chairs and referees to be published in this special issue of Open House International Journal with the theme of Unspoken Issues in Architectural Education. At this point we would like to acknowledge our distinguished colleagues Ayfer Aytuğ, Neslihan Dostoğlu, Karin Hofert, Yonca Hürol, Şahin Keynoush, Sevgi Lökçe, Stephan Maeder, Louis Nelson, Çiğdem Polatoğlu, Güven Arif Sargın and Ayşe Sentürer for their invaluable contribution to this special issue throughout the selection and editorial process.

The papers presented and the discussions conducted during the conference and thus in this special issue, opened new prospects to the future of architecture education in the coming years. In view of that, it is expected to see more investigations and development on those unspoken issues that addresses in this conference in other scholarly activities. It is hoped to realize the continuation of such an important intellectual event in the region in the format of upcoming international conferences with the main theme of "Unspoken Issues in Architectural Education".

The authors in this special issue represent a number of countries including Belgium, Denmark, Iran, Malaysia, The Netherlands and Turkey. Almost all published papers have supported their major theoretical discussion points by case studies of their own institutional curricula.

It is expected that, this special issue would serve as a useful guide to researchers working in the field of architectural education to understand some of the contemporary, yet 'unspoken issues' in the field.

It is hoped that, what remains 'unspoken' will be the core of the next Unspoken Issues in Architectural Education Conference.

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DISCUSSION UPON THE CONSTRUCTED LIMITS OF DESIGN STUDIOS.

Yiğit Acar

Abstract

We can define architectural design studios as environments of simulation. Within this simulation limitations of real life architectural problems are constructed, yet the constructed reality is far from the reality of existing practice.

In *Architecture: Story of Practice*, Dana Cuff, makes a sociological study of the architectural design practice and in the volume she discusses design studios as limited versions of the actual design practice. As compared to the actual practice in the studio the students are alone, there isn't a multiplicity of actors involved in the process, and the design problems are clearly defined. Cuff points out to these shortcomings and provides guidelines to overcome them.

One of the shortcomings mentioned in Cuff's study is that: design studios do not represent the variety of actors that are present in a real life situation. Cuff suggests to include representatives of different actors in the studio practice to overcome this. If the studio fails to support itself with a variety of actors, to compensate the short coming of actors, the instructors start taking the role of many possible participants of a design process. The instructors simulate: the user, the owner, the engineer, the contractor and so on so forth. This type of an approach in the design studios leads to a certain result: the ideological construct of the instructors becomes the foundation of the constructed reality of the studio.

This study explores the ideological construction of the design studio through active involvements with undergraduate students. Through the findings of two discussion sessions, students' own ideological positions, their relationship with the external realities and limits imposed on such relations by the studio instructor's own ideological stances are explored.

Keywords: Design Education, Ideology, Studio, Limits of Education, Constructed Truth.

1. INTRODUCTION

This study is the outcome of two discussion sessions organized under the common title: *Architecture and Ideology* in 08.01.2013 and 20.02.2014. The initial idea and formulation of the discussions is a product of Arch 526 Course in METU¹. The sessions were organized with the contribution of *m?* Which is an undergraduate student initiative active in METU Department of Architecture.

The meetings were inspired by one of the readings of Arch 526: the introductory chapter of *Commodification and Spectacle* (Saunders, 2005), *The Work of Architecture in the Age of Commodification* by Kenneth Frampton (Frampton, 2005: ix-xviii). Frampton's chapter develops a critical standpoint on commodification of architecture and how the relationship of commodification and architectural production is reproduced to form a complete closure seemingly inescapable. In the end of the chapter Frampton points out that a strong tool for breaking the closure is: architectural education itself. With his own words:

"How one may offset this globalized closure becomes a question not only for architectural practice but also for all the multifarious schools of architecture and urbanism. At this juncture one can hardly emphasize

enough how the substance of political process needs to be articulated within the field, both pedagogically and otherwise, not only in relation to the big politics of the large scale environmental policy, to be argued agnostically in the public realm, but also in the small politics of psychosocial well-being and sustainability, as these factors may be incorporated at a micro scale into environmental design. On the one hand, then, political consciousness, in the broadest sense, ought to be as much part of design education as any other component in an architectural curriculum: on the other hand it is necessary to maintain an ethical dimension in the culture of design itself." (Frampton, 2005:xviii).

Frampton's suggestion clearly refers to the definition of ideology in the line of Marxist thought: "Ideology as a false consciousness". The role of education in this respect is: to develop the consciousness of the students towards production relations and the inner workings of society and in turn how they affect it with their own architectural practice. This statement produces outline of the main question of the discussion: how the studio environment relates to the external reality? method: discursive mapping

¹Arch 526: Politics and Space, METU, Department of Architecture, Prof. Dr. Güven Arif Sargın, Parts of this paper were produced within the context of Arch 526 by the author

2. METHOD: DISCURSIVE MAPPING

The method of this study is based on open ended student meetings that explore how the design studio practice is organized with reference to the external reality. Since the meetings are structured to be open ended as the discussions progressed new questions were asked by the participants, which are still open to further discussion. This paper presents the outcomes of the first two open discussion sessions held in METU in 08.01.2013 and 20.02.2014.

Audial recordings of the discussions were made and contents of the discussions were analyzed to produce a conceptual map. Since including the whole script of the discussions is impossible within the limits of the paper, a simplified method to demonstrate the development of the discussions during the meetings has been adopted.

The time coordinates of the discussion sessions are represented with two bold lines. For each segment of the discussion, the main concepts in discussion are marked on the line. The progress of the discussion sessions are not linear, at certain points of time, a topic discussed earlier can be mentioned, or related with the current concept in discussion. The earlier discussion session or a totally different external discussion can also be referred in the course of discussion. Such links are represented in the maps with oblique lines that intersect the main timeline at the beginnings of such referential speech and goes back to the point or external concept that has been developed.

Before the beginning of the first discussion session a preliminary presentation was made by the author and presented to the participants to define the course of the discussion. In the second meeting the outcomes of the first meeting were briefly explained and the major questions that were asked in the end of the first meeting were introduced to the participants. The second meeting, like the first one, ended by leaving a series of insights into the current practices of the design studios and further questions to be asked in the upcoming meetings, turning the study into a continuous series.

The first step of the initial formulation has been to define clear discussion fields within the broad practice of architectural design. These discussion fields has been defined as: tectonics, configurational theory of spaces, and social theory of spaces, to cover the material, spatial and social aspects of architectural design. This tripartite grouping covered a wide array of discussion topics within architectural design: from the level of constructional logic and environmental aspects to the level of design of singular buildings to the political construction of the urban space. At the end of the first discussion session the concept of limit developed as the fourth theme, and it determined the course of the second discussion sessions.

A short introductory speech was made before the discussion sessions. After the introductory speech each student presented a studio project he/she produced with reference to the main concepts of the discussion. In the first discussion session, a total of five projects were presented, in the second session a total of three projects were presented. The first session took four hours and the second session took three hours to conclude. Both sessions had approximately fifteen

participants: undergraduate and graduate students from METU and Gazi University. Together with the concepts introduced in the beginning of the discussion sessions, each project presentation acted as a base for further discussions.

3. THE PRE-DISCUSSION FORMULATION:

As noted earlier some concepts were developed prior to the discussion sessions to provide guidelines for the discussions. Throughout the course of the first discussion session the concept of limit started to develop which later became the main concept of the second discussion session. The following accounts explain the outlines of the major concepts as introduced by the author to the discussion groups prior to open discussions.

IDEOLOGY

Ideology is an ambiguous term. From the more neutral definition: "ideology as a worldview" to the rather critical definition: "ideology is a false consciousness that governs societies" the term carries meanings within a wide spectrum. Within the scope of this paper, the students' conscious relation with the external reality has been the definition of the term. How the students understand real life situations and where do they situate their own studio works, and the contributions/limitations of their instructors has been the central issue of the discussion sessions.

ARCHITECTURE

Architecture is a broad discipline with various extra-disciplinary connections. The type of architectural practice that the students are most accustomed with has been chosen as the main focus: the studio practice. The majority of the studio practices in Turkey follow the method of defining an architectural design problem suited for the level of technical expertise of the students and expecting the student to design a building². This is also the case for METU and Gazi University, where the design studios throughout the undergraduate level develop with problems of building designs with increasing levels of complexity.

Here a distinction should also be made, "studio" as an educational model covers a wider area than the "architectural design studio". The studio model suggests a one to one correspondence with the students as opposed to a tutor in a one way interaction with the student. The studio practice is characterized with the practice in the center. The definition of the problem and production of the end products are central parts of the operation of "the studio". In the case of architectural design studios, as the name suggests the problem space is limited to: architectural design. Students are expected to produce design solutions to architectural problems designed by the instructors.

In the common education practice in Turkey architectural design studios are operated as simulations of real life architectural design processes. The student is

²The term "design a building" has been deliberately chosen since, despite the widespread claims such as: "the studios are problem solving environments", "the product is defined as a spatial construct", or "what is important is the process" design of a building is what is produced in the end in most cases. This issue will be further investigated in the conclusion chapter of this paper

given a defined design problem and as the student develops responses to the problem the instructors, simulate the external factors directing a real life architectural design problem. However there are exceptions to this approach as well, in some cases instructors, instead of defining a simulative full scale architectural design problem, isolate an aspect of the real life architectural design problems or define totally independent problems that would develop a certain skill of the students, one at a time.

"Architecture" as used within the scope of this paper is the simulated architectural practice of the students, which is common to many schools of architecture. The architectural practice as covered in the education practices focus on three major parts of the real life architectural practice: material, spatial and social aspects. Which were introduced to the participants by the author with reference to Kenneth Frampton, Bill Hillier and Henri Lefebvre in the form of a short open discussion prior to the presentations by participants. Bill Hillier's *Space is the Machine* (Hillier, 1996) and Henri Lefebvre's *Production of Space* (Lefebvre, 1991) were introduced to the students to be able to have the grounds for discussion on; "the configurational space" as based on Hillier's conceptualization and "the social space" as based on Lefebvre's concepts.

LIMITS

In *Architecture: Story of Practice* (Cuff, 1992), Dana Cuff, makes a sociological study of the architectural design practice and in the volume she discusses design studios as limited versions of the actual design practice. As compared to the actual practice in the studio the students are alone, there isn't a multiplicity of actors involved in the process, and the design problems are clearly defined. Cuff points out to these shortcomings and provides guidelines to overcome them.

One of the shortcomings mentioned in Cuff's study is that: design studios do not represent the variety of actors that are present in a real life situation. Cuff suggests to include representatives of different actors in the studio practice to overcome this. If the studio fails to support itself with a variety of actors, to compensate the short coming of actors, the instructors start taking the role of many possible participants of a design process. The instructors simulate: the user, the owner, the engineer, the contractor and so on so forth. This type of an approach in the design studios lead to a certain result: the ideological construct of the instructors becomes the foundation of the constructed reality of the studio.

Cuff defines a series of problems related with the limits of the design studio in six headings. These headings are: Design as a Master Value, Solo or Duet, Clear Problems, Curtailed Process, Uncertain Solutions, and Singular Stakes.

Without going into detail of each item we can summarize Cuff's findings as follows. Studio environment produces a type of simulation where design is the master practice over other components of architectural practice. Student is most of the time isolated from his/her colleagues as opposed to the real-life situation. Design problems are isolated and clear-cut as opposed to the complex problem formulation processes of the practice. The design process is simplified with reference to the standards of the academic conduct. Solutions that the students produce are most of the time left at formal level. Finally there is nothing at stake other than the student's

grade. The design is not related to any real life trial. (Cuff, 1992)

In the beginning of the second meeting of *Architecture and Ideology*, a conceptualization of the studio environment has been made with reference to Cuff's study. In the initial framework, introduced by the author in the opening speech, the limits of the studio was distinguished into two broad areas: limits imposed by the instructors and the limits that are produced by the student him/herself. Afterwards the discussion was left to the presentations and discussions.

4. THE DISCUSSION SESSIONS

As noted earlier in the beginning of each discussion session small introductory speeches were made by the author and then the willing participants presented their studio projects which was followed by an open ended discussion session.

Each session is presented within this paper by its discursive map where the concepts that developed throughout the discussions are represented and interrelated. Following each map is a short account of the important highlights of the discussion sessions.

Details of the projects presented, and names of the discussants are not included in the paper, but concepts and outlines of discussions are presented.

ARCHITECTURE AND IDEOLOGY

Figure 1. The poster of the first *Architecture and Ideology* Meeting.

The first Architecture and Ideology meeting was held in 08.01.2013 in METU with approximately 15 participants and five project presentations. The whole activity took four hours.

Following the introductory speech, which was explained earlier in this paper, the first project presentation, which was a mid-scale social housing project initiated a discussion on standard and non-standard elements in architectural design. The project suggested a building layout distinct from the common social housing project patterns yet it failed to propose any new solution for the interior spaces. This project has been discussed with reference to configurational theory as the main design idea laid in the relation of spaces. One of the comments on the project was as follows:

"We keep discussing on multiplicities of public space, heterotopias and so on, however we forget the inside of the house where patterns of life are produced in the first place, the design of the smaller unit should also be where we develop new solutions".

Micro-politics and how the students develop their consciousness on the effects of the small scale decisions has been the first discussion point. With the presentation of the second project which was again a social housing project, the focus of the discussion shifted towards to the public spaces and territoriality.

"The problem here is that nobody owns the public space, spaces left by the housing blocks are left as meaningless areas, nobody appropriates these spaces, and your proposal opens the way for new uses for such so called leftover spaces".

After the two project presentations and related discussions on public space and users, the topic of design studio as a simulation started to develop. Since there is no real user of the projects or no community which the designer (student) is directly in relation with, then: **"what represents the inputs of the society or the users within the studio project?"** Developed as an important question.

The third presentation was from a studio project where students were asked to design an Artist's Habitat in one of the important urban transformation areas in Turkey (Kağıthane). The presenter explained that he personally wished to stand against such a project, since he was against to move the current residents of the district and build a project for a higher income group. However the instructors' stance didn't change and the student had to design the project. This presentation brought into discussion the possibility of **ideological conflict between the student and the instructor.**

The fourth presentation was an urban hybrid mega block. The presenter explained that she proposed a kinetic structure for a large scale dense hybrid urban block, and also proposed a social and functional hybridization. Her aim was to propose an alternative to the already existing social segregation working on horizontal level within the city. The presenter explained that even though the experimental structural system proposal (which was hardly detailed) received approval from the instructors, the idea of the social mix was disproved. The fourth presentation started a discussion on the criteria of validation in studio design processes: **"what is possible and what is not possible?"**

The fifth presentation was a project where the architectural program and the position of the building in a given urban context were left to the student's decision. The presenter explained that he enjoyed a great degree of liberty for the first time in his undergraduate projects. However he also added that a degree of limitation could be necessary for the student to feel challenged.

With the last presentation the conclusion of the session focused on the limits of the design studio. For most aspects of an architectural problem like: economy, and administrative issues are neglected, in undergraduate projects, the rest like: society, user preferences, statics, infrastructural needs and environ-

Figure 2. The discursive map of the first Architecture and Ideology meeting.

Figure 3. The discursive map of the second Architecture and Ideology meeting.

mental aspects are in a way simulated within the studio **"How the reality of the studio is defined? What are the ideological limits of the design studio?"** were defined as the major questions for the second meeting.

IDEOLOGY AND ARCHITECTURE 2: LIMITS

The second Architecture and Ideology meeting was held in 20.02.2014 in METU with approximately 15 participants and three project presentations. The whole activity took three hours.

The meeting, like the first one began with a short introductory speech. The theme of the introductory speech was limits of architectural design studios, with reference to Dana Cuff's *Architecture: Story of Practice*, an introduction on the limits of the design studios was made. The two major limiting factors were grouped as: limits set by the instructors and the limits resulting from student's background or abilities.

The first project presentation was a first year studio project. The presenter explained that, even though there exists a liberal sense in the first year studio, that is not the case most of the time, there are limits but they are not yet pronounced clearly by the instructors. One participant made an important remark at this point:

"First year students barely know what design is, we are not coming from rich backgrounds, the envi-

ronments we are familiar with are poorly designed. A new student doesn't know, "what design means"."

This remark started a discussion on the "invisible limits" of the design practice. Many of the participant agreed that the definition of the design activity is an empty one when the student first enters the school, and in some cases it may **take up to three years to understand what the design operation is**. One of the participants described this situation as: "trying to avoid the invisible walls".

The second presentation was a fourth year project, similar to the fourth year presentation in the first Architecture and Ideology meeting, again the program and location of the project was left to the students within a defined urban context. The presenter explained that: the extensive freedom of the project made it his favorite studio experience. The presentation was further developed by the following remark:

"When the limits of a studio project is left open, the only important factor becomes the internal consistency of the project."

This remark was found relevant by the participants and the discussion was furthered. It was pointed out by the presenter that: when the freedom of choice is extensive, **one of the commonly used decision criteria of the students to make decisions is: image**. Students tend to refer to earlier projects made in the school and received good grades to reproduce the same architectural image. This way by following an earlier example the student raises his/her chance of

Figure 4. The poster of the second Architecture and Ideology Meeting.

receiving a good grade, which sometimes has life effecting consequences (especially if the student is on scholarship).

The discussion on the reproduction of the image extended to include the studios magazines of schools of architecture most of which are yearly publications that include examples from studio projects, such magazines constitute long term memory of the studio projects produced in universities. With the discussion on the studio magazines the concept of **institutional memory** started to develop.

It was pointed out by the discussants that each institution develops its own set of rules, a form of **"uniformity" of design projects**. The uniformity starts to be one of the strongest of the limits of the studio. One comment from the participants suggested that, since the knowledgebase presented in non-studio based courses belong to a certain paradigm, getting out of the limits of the paradigm gets harder.

"I'm aware that a different architecture is developing. The world is changing, but somewhat we cannot catch it. When we want to try in the studio we don't have the tools to defend our stance"

The idea of paradigmatic fixation, and the uniformity it produces was further discussed with reference to the technical courses given by the departments and also the recruitment policies of the departments, where within a semi-autonomous system recruitment decisions are mostly made by the academic staff, resulting in a self-similar development throughout the years.

Following the discussion on the paradigmatic fix and the uniformity the final project presentation of the meeting was made. The presenter explained his second year design studio experience, where he wished to practice some formal experiments and faced resistance from the instructors. The presenter explained that after a hard studio term, he resisted the critiques

on the formal aspects of his proposal, and develop structural solutions to the form that he proposed and in the final jury he managed to get a good grade in the end.

The final presentation revealed the jury practices potential as a mean to break from the inner dynamics of the studio practice. As an addition to the established view that juries are limiting elements in studio practice, they may have some liberating function as well since juries are open environments where the studio practice is exposed to external factors. However this insight is yet to be explored and developed further, thus the second Architecture and Ideology meeting was dismissed by setting the theme for the third meeting as the: juries.

5. CONCLUSION

The method and the discussions presented within the limits of this paper suggest an open ended conclusion. Like the discussion sessions each of which ended with further questions to be investigated in further meetings this paper also ends with a series of questions and insights to be further explored.

The discussions in the first Architecture and Ideology meeting developed a discussion on: **the design studio as a simulation**. Since the problems posed in the studio are not real, and are independent from the limitations of the real life. There has to be system which simulates the factors of real life building what are not included in the studio practice. At this point the studio instructor gains a different aspect. The instructor plays the role of the stakeholder, the municipality, the users, the contractors, the engineers and so on. **The ideological formation of the instructor becomes the reality of the project simulation in the studio.**

This formation is not only limited to the studio instructor's formation, the non-studio courses where technic and theoretical information is thought tend to be formulized with a certain body of knowledge that is parallel to the conduct of the studios. This results in the formation of a **paradigmatic fix** within the department. The design principles and practices approved within the community of the department is reproduced continuously.

The paradigmatic fix, together with repeating images produced in the studios and stored in various mediums, can result in a self-imposed limit within the student him/herself, and breaking from this paradigmatic fix is a difficult task since the students are equipped with the concepts of the existing paradigm. Producing something outside the existing paradigm with the concepts of the same paradigm is a contradictory task for the student. At this point the student's relation with the external sources of information becomes important, the student should be able to develop him/herself from extra institutional sources to be able to develop his/her own position in the studio.

Returning back to the conceptualization of the studio as a simulation, with reference to the two presentations of fourth year studio projects in both of the meetings we can say that the epistemic base of the design simulation going on in the studio mostly depends on the internal consistency of the work. This is due to the fact that many components of the building practice have to be idealized and the end result of the design process is reduced to a visual study. One way to deal with this

problem is to design the studio practice in a way that the inputs are derived from real life problems and the results have a chance to be tested.

Even though the study is open to further development, with its current state we can develop a series of significant points. The first point to make is the need to re-organize the studio as a communicative medium with the contributions of all the actors involved. The major actors in this case is for sure the students and the instructors. With reference to the level of discussions held, the language the students used and the relevance of the comments we can say that: students of architecture are in relation with the diverse mediums of architectural practice and they have the self-consciousness to contribute to the work done in the studio. Such an involvement will surely help to overcome the exoteric language in most design studios which develops overtime by the shortcomings of the communication within the studio.

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UNCOVERING CREATIVITY :STRUCTURING EXPERIENCE IN ARCHITECTURAL DESIGN STUDIO.

Ece Kumkale Açıkgoz

Abstract

Structuring the outline for an architectural design studio experience has a significant role in students' meaningful design experiences. Meaningful experience is related with students' receptivity and idea generation for the ill-structured problems of architectural design. This identification influences the study, which investigates the application of a model for structuring the design studio experience, organized to occur in two phases; problem reception and problem solving. The model employs a combination of two different techniques with a special focus on reflexivity. It completes the extensions level required for the ICE Approach with the C-Sketch ideation technique by employing their adapted versions for architectural design studio practice. The common features of these techniques are their adaptability to any problem, explication centered and process oriented natures, focus on effective brainstorming and suitability on design teamwork studies. There is a remarkable potential to correlate the results of the two techniques.

The model was processed within a vertical design studio at Gazi University, Department of Architecture. It enabled getting use of diverse backgrounds within a design team by structuring the collective design process and optimizing the contribution rates of the team members. The method was employed to guide the design study of the experimental group of two teams with ten members in total. The control group was the randomly selected two teams from other teams that did not apply the model, with eleven members in total. The members of the two groups were applied a semi-structured questionnaire at the end of the semester, with a special focus on the internal consistency within the answers of the members of a single team. The results of the qualitative study indicated that the explication based structuring of the design studio experience has had a positive impact on achieving consistency and coherency in the design processes of the experimental groups.

Keywords: Architectural Design Studio, Ill-Structured Problems, Problem Reception, Explication, Ideation.

1. INTRODUCTION: THE PROBLEM OF DESIGN STUDIO EXPERIENCE.

As the core of architectural education, design studios undertake the mission to support students for further learning with the proper setting for learning how to learn. With this attribute they concord with constructivist educational theory, defending experience based learning instead of teaching specific course content (Kolb, Rubin, and McIntyre, 1979; Taber, 2011). According to this theory, learning is a learner centred operation (Hendry, Frommer, and Walker, 1999), the responsibility of which belongs to the learner him/herself (von Glasersfeld, 1989; Means and Olson, 1994). As Taber (2011: 48) explains, "... we are endowed with innate knowledge of how to construct a system of personal knowledge about the world". Accordingly, education is structuring the act of problem solving (Savery and Duffy, 1996), especially the problems that are ill-structured (Koschmann, Myers, Feltovich, and Barrows, 1994) as in the case of architectural education (Akin, 1986). The primary requirement of this is explicating the hidden, as the personally depicted problem, its components and extensions. Explication is experience and learning by experience operates through explications. This is valid especially when experience extends the constructed knowledge

through personal interpretation, creative suggestions, or novice proposals.

What von Glasersfeld (1989) states about students taking their personal responsibility for learning, and being eager to learn further, is possible by conducting personal experience in a level of consciousness achieved with explication. Regarding articulation in architectural education, Goldschmidt, (1997: 444) asserts that personal representation of problem space either visually or verbally is advantageous, specifically for avoiding uncontrolled relations between decisive instances.

The principles of instruction in problem based learning supports the explication of the personal motive for problem-solving activity. As Savery and Duffy (1996:138) state "The purpose of any learning activity should be clear to the learner". However, it is not enough. The learner must also internalize the actual reason to learn. According to Savery and Duffy (1996:139), "Learners must have ownership of the learning or problem-solving process as well as ownership of the problem itself."

The instructor who guides students' learning is responsible for their explication of design reasoning. In order to supervise and monitor the problem solving process, it is required to structure student articulations. Taber (2011) asserts that instructorship in constructivist

educational approach, includes "... potential for highly structured guidance, as well as more exploratory activities." Similarly, the learning activities in architectural design studio encompass problem depiction, idea specification, and exploring alternative connections for a novice solution. The personal depiction and specification of the whetting problem of a design activity, which Plowright (2014) terms as "starting bias" of the problem-solving process, ensures the meaning of the complete process, which Ausubel (2000) characterizes as "meaningful learning." As he puts it, personal interest that rationalizes the design decisions is not replaceable (Plowright, 2014: 8). Goldschmidt and Weil (1998: 85), focusing on design reasoning at the early stages of the process explain the structure of reasoning as "... consistent internal relationships and patterns that can be detected in the cognitive operations involved in design thinking".

Lack of structured reasoning is potential for the problem of the design studio experience. What is learned may differ dramatically from what is aimed to be learned. The risk should be acknowledged that the entire process might suffer from inconsistent steps taken according to changing obstacles and sacrifice the educative profits of a comprehensive design study. According to Akin (2002: 412), there are such "weaknesses in design instruction". He states: "The present form of design instruction does not support the teaching of process or design methods well enough". In 1987 Anthony has expressed her survey results on the effect of final juries on students' learning: "More often than not, however, what students claimed to have learned from design juries has more to do with presentation style, or how to 'play the game,' than with design" (Anthony, 1987: 6). On the other hand, structuring would integrate the assessment within the problem solving process (Fostaty Young and Wilson, 2000).

By expressing its application in a collaborative design studio experience, this paper introduces a model to guide and structure architectural design studio by which the students may explicate their design reasoning and explore novice solution ideas in order to increase their level of learning quality. The study is structured in two steps to make this medium comprehensive. The first step is designing the design studio to provide the proper setting for a rewarding experience. The second step is developing a model for structuring student articulations in their design experiences, which also functions for their self-assessment and consistency in design decisions. A qualitative survey is conducted after the application of this medium in the design studio, in order to compare structured and unstructured guidance in design team working over experimental and control groups.

2..THE STUDIO DESIGN

2.1. THE CURRENT CONDITIONS: POTENTIALS AND LIMITATIONS

The research study was conducted in *Atelier 6* at Gazi University, Department of Architecture in Ankara, Turkey. *Atelier 6* is one of the vertical studios in the department hosting students from different years in the same context. The tacit codes and customs of studio conduction at the department include individual table critics followed by other students who remain passive

in the process. Although there are alterations, the students are rather encouraged to follow tutors' critics during the course hours. It gives the opportunity to witness altering approaches to similar questions, to learn from others' consequences, and to connect with the distinguishable approaches of other students (White, 2000). However, this custom, and the characteristic features of studio assessment, which is more based on final juries than the design process, legitimizes the need to reconsider the assessment methods to provide a process oriented guidance in the design studio.

Team working is an unpopular approach in the ateliers, ironical as the idea of vertical studio has an ideal of collaborative learning with students from diverse backgrounds and skills (Potts, 2000; Kember, 2009). Instead, collaborative team working is advantageous in the solution processes of ill-structured problems, concordant with the ideals of constructivist educational theory (Edelson, Pea, and Gomez, 1996; von Glasersfeld, 1989). Associating personal differences and diversity of skills in team working is advantageous for the conception of coherence in department programs (Kember, 2009), which is potential to increase the quality of learning.

2.2. DESIGN OF THE 1013-2014 FALL SEMESTER DESIGN STUDIO.

In 2013-2014 Fall Semester, 40 students in total completed the semester satisfactorily in *Atelier 6*, 5 from 2nd, 20 from 3rd, and 15 from 4th years. The programming included phases for problem reception, heuristic reasoning and, satisfactory design outcomes that reflect the fundamentals of the design process. The selected theme was sustaining the social values and the sense of place in a historical settlement threatened by urban gentrification. The selected medium was the international student competition "Houses for Change" (IE University, 2013), that had parallel requirements with the semester theme and structure. The competition required a system to develop a housing solution and a site selection with the criteria of being in an urban context under risk.

In the studio, a total of 8 teams with varying student numbers from 4 to 6 from different years were grouped together intentionally, to promote diversity in ideas and skills. Two teams were assigned randomly for each of the four tutors of the design studio, one of whom was the author. Her teams would later become the experimental group of this study (Table 1).

Table 1: Student distribution among teams regarding gender and semester variations

Instructor A (Author)		Instructor B		Instructor C		Instructor D	
Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7	Team 8
F (301)	F (302)	M (202)	F (301)	M (202)	F (202)	F (302)	F (301)
F (301)	F (401)	F (202)	F (301)	M (301)	F (202)	F (302)	F (301)
F (301)	F (401)	F (301)	F (301)	M (301)	F (302)	F (401)	F (401)
F (401)	F (401)	M (301)	F (301)	M (301)	F (401)	F (401)	F (401)
F (401)		F (301)	F (401)		F (401)	F (401)	F (401)
F (401)		F (301)					F (401)

Table 1. Student distribution among teams regarding gender and semester variations.

The process begun with visiting the site in the historical town centre of Kocaeli in Turkey with a special focus on the degrading social characteristics of the study area. After returning to Ankara, the teams were assigned to articulate their distinctive reasoning for an architectural design proposal.

3. A MODEL FOR STRUCTURING THE TEAM-WORK EXPERIENCE IN ARCHITECTURAL DESIGN STUDIO.

3.1. MOTIVES:

Collaborative problem solving in ill-structured problems requires structuring the experience to increase its potential for further learning (Hendry et al., 1999). The motives for this attempt are identified according to the problems of working unstructured in collaborative problem solving experience. One of them is the problem of fair assessment among team members. Unstructured peer-review may lead to ineffective communication that would affect collective design decisions negatively. A methodical approach would provide a coherent process by integrating assessment into the problem solution by deriving the criteria from inside the process. Structuring helps time arrangement and creative ideation and provides collaborative inquiry of divergent ideas, which may lead to the recognition of the valuable but unspoken.

Reigeluth asserts the criteria for designing learning environments: "Learning-focused instructional-design theory must offer guidelines for the design of learning environments that provide appropriate combinations of challenge and guidance, empowerment and support, self-direction and structure" (Reigeluth, 1999:21).

3.2. COMPONENTS.

The model is a guide for structuring the design experience, which as Plowright states, organizes the sequence and application of more specific methods (Plowright, 2014). It is built up on a distinction of problem reception and problem solving processes in a comprehensive design experience. Regarding Salama's definition of the four stages of architectural design process programming, problem reception includes investigating and defining phases, and problem solving refers to generating and resolving phases (Salama, 1995). Problem reception includes major design decisions, as design reasoning and design concept. This distinction does not necessarily mean two sequential periods one starting after another. A reciprocal reflection series between decisions and actions is a natural component of the design process (Schön, 1984).

The model is composed of two complementary methods borrowed from different sources, but discovered to have a reasonable potential to work reflexively for problem reception and problem solving processes. The first one is The ICE Approach, generated for structuring and assessing ill-structured problems by Fostaty Young and Wilson (2000). The second one is the Collaborative Sketching (C-Sketch) method for idea generation primarily developed for engineering design that enforces graphical and verbal articulation in group work (Wood and Jensen, 2012; Shah,

Vargas-Hernandez, Summers, and Kulkarni, 2001). As Shah, Vargas-Hernandez, Summers, and Kulkarni state, "The method is suitable for use after the problem definition and clarification stage in the engineering design process." However, in architectural design process it is required to reflect on the pre-defined problem and reasoning, as it prospects a single but comprehensive idea that unites a large number of inputs rather than fulfilling a specific function. Therefore, reflexivity within these two techniques is the backbone of the proposed model.

3.2.1. THE ADAPTED ICE APPROACH.

Platanitis and Pop-Iliev (2007) explain the ICE Approach as a recently developed methodological tool for monitoring, structuring and assessing ill-defined and open-ended problems with qualitative descriptors that has room for students' behaviours and creativity. The method of the ICE Approach is constructing rubrics, which helps structuring specified decision making processes and employs the assessment function on this purpose (Fostaty Young and Wilson, 2000). This technique is potential to employ assessment as a means for student learning in process oriented architectural design studio experience.

Different than the think-maps, which display the interrelated knowledge bases of architectural design with a networking chart (Oxman, 2004), the ICE Approach provides space for all available data, all possible connections, and novice proposals. It also engenders this explication by encouraging shifts in learning levels. According to Fostaty Young and Wilson (2000) the portability of the ICE Approach makes it a suitable assessment tool for different disciplines and their varying requirements of creative behaviour. The most outstanding feature of the approach, as Wilson states, is the inclusion of students' individual characteristics in their assessment process (Wilson, 1996).

In the ICE approach, Ideas (I), Connections (C), and Extensions (E) represent improving levels of learning quality consecutively, which are also expressed as "Beginning" (I), "Competence" (C), "Expertise" (E) levels of learning by Fostaty Young and Wilson (2000). Therefore it operates within the process of learning as it occurs "on the run" and "... often it cannot be planned for in a formal way" (Fostaty Young and Wilson, 2000: 2). They explain the Ideas level as the collection of all the available data about a specific problem, and the connections level as the process of integrating the content of the ideas level within itself or together with the existing knowledge of the problem solver (Fostaty Young and Wilson, 2000). In the extensions level, the problem solver builds novice contents and proposes alterations for the initial problem to achieve a new meaning. Although this level of learning quality is described as exceptional, it is at the core of architectural experience, in which the meaning of a whole is comprehended with its integral parts (Kumkale Acikgoz, 2012).

The three levels of learning quality in the ICE Approach overlap with Goldschmidt's specification of the phases and components of ill-defined design problems (Goldschmidt, 1997). Ideas level is concordant with what she calls the "definition of the problem space"; connections level is the "operators of the problem space", within figural or verbal representa-

tions; and extensions level is “crossing the boundary of the problem space”, which she mentions to characterize the “innovative, insightful problem-solving” (Goldschmidt, 1997:451).

3.2.2. THE ADAPTED C-SKETCH TECHNIQUE.

Shah explains the C-Sketch technique as an intuitive idea generation method, employed to approach a diversity of idea generation and increase possibility for creative outcomes (Shah, Vargas-Hernandez, Summers, and Kulkarni, 2001; Wood and Jensen, 2012). It is based on explication of ideas, and is employed in collaborative concept generation sessions of design teams. It starts with independent ideation sketches of each team member, who give their initial draft to the next team member in the first turn. Each team member produces further sketches on the received sketch, and passes all sketches to the next peer in each turn, until a sketch travels each team member. The technique is identified with the number of team members, number of ideas produced in each turn, and the number of turns. For example in Wood and Jensen (2012)'s case, the 6-3-5/C-Sketch technique covers teams of 6 members, applied with 5 turns, and 3 idea sketch productions in each turn (Shah, Vargas-Hernandez, Summers, and Kulkarni, 2001).

In architectural design studio, as Akin and Lin (1995)'s study on articulations of design decisions indicate, this process may work primarily for the major design decisions, after which a collective presentation session is required where note taking continues to record the components of the decision made. In the architectural design studio, producing as many ideas as possible is not a primary condition for guaranteeing creativity, because of the complexity level of the problem which requires one answer for many questions from a diversity of fields. This is the reason why the adaptation of the technique is fixed to '1' as the number of ideas to be generated in each turn, where the turns would function as critics on the received sketch as well as informing peers of other's ideas on the same design.

3.3. THE SYNTHESIS OF TWO TECHNIQUES:

The reflexivity criterion, through which the ICE Approach and the C-Sketch technique are connected, enforces involving the students in setting up their self-assessment criteria and structuring their design processes. It helps the instructor to monitor the entire process with every detail that the students note on rubrics. Table 2 displays the adopted ICE rubric developed for assessing the learning quality of team working of the experimental group. The problem with the architectural design studio is that the students may tend to act for the level of 'extensions' before fulfilling the requirements of the prior levels. The model enables making major decisions before starting with

ICE Rubric Contents	Ideas	Connections	Extensions
Problem reception	<ul style="list-style-type: none"> . Gathering information about the project site . Documenting the requirements of the given design problem . Collecting a sufficient number of example cases 	<ul style="list-style-type: none"> . Deciding on the preferred relations between collected design inputs . Depicts key design inputs and articulate their role in existence . Noting the similarities of case study projects in terms of the depicted key design inputs 	<ul style="list-style-type: none"> . Generating a framework to define the existent and to conduct the rest of the discussion . Coming up with an original design problem . Coming up with an idea to trigger the problem solving process
Problem solving process	<ul style="list-style-type: none"> . Trying proposed methods of diverse thinking and working synchronically with team members . Continuing to research on the subject domain and gather feedback from the previous steps of the process . Producing articulations of design ideas, proposals and decisions in a variety of verbal and visual representational medium 	<ul style="list-style-type: none"> . Systematizing the process of idea generation . Deciding on the agreements and differentiations in diverse proposals . Integrating diversity of perspectives into the process . Integrating the depicted problem to the requirements of faculty 	<ul style="list-style-type: none"> . Generating solution proposals that are not expectable but consistent with the case . Achieving an overall consistency of the final proposal . Clearly displaying the major design decisions and their consequences in the final proposal . Making effective representation of the consistent solution . Avoiding fabricated extensions
Team working	<ul style="list-style-type: none"> . Taking course hours as fully attended meetings of brainstorming . Note taking in meetings . Applying methods for producing diverse proposals . Balancing member contribution and individual studies . Encouraging others for free thinking 	<ul style="list-style-type: none"> . Contribution to others proposals . Deciding for the role distribution among team members . Collaborative classifications and evaluation of ideas and decisions 	<ul style="list-style-type: none"> . Achieving a total agreement about the stages of design thinking . Sharing the same design problem with peers . Displaying overall consistency in expressing team decisions individually . Avoiding internal controversies (in between team members and presentation outcomes)
reflexivity	Recording every decision in action	<ul style="list-style-type: none"> . Connecting new decisions with former ones . Self-assessment by testing diverse proposals with the agreed problem definition 	Arriving at a solution that is consistent with the entire set of design decisions (internal consistency of the design process)

Table 2. The ICE rubric as the studio assessment tool developed for the 2013-2014 fall .

the problem solution. Therefore, it is a method to develop and maintain internal concordance and consistency.

Fostaty Young and Wilson, (2000: 47) assert that “ICE provides a framework for understanding, structuring, and assessing learning development”. The ICE Approach is more convenient for verbal representation, while the C-Sketch technique is appropriate for visual representations (Shah, Vargas-Hernandez, Summers, and Kulkarni, 2001). Moreover, the C-Sketch technique is convenient to proceed into the 'extensions' level of the ICE Approach, which requires creative proposals.

3.4. THE EXPERIENCE WITH THE MODEL:

At the beginning of the semester, the students of the

IDEAS	CONNECTIONS	EXTENSIONS
Contradictions Tensions Resistance Standing against existence The threats for the social values of the site: a. Rant and capital based pressure b. Preservation and Restoration based pressure The layers of the city: - History - Economy (land profits) - Society - Neighborhood - Culture - Industry	Pressures from every direction with changing characteristics. Unbalanced levels of pressure from the layers of the city, suppresses the historical, social, and neighborhood layers. Some layers ignore others	The need is to resist against the pressure The idea is to generate a counter pressure for the permanency of the ignored but valuable Balancing the permanent and temporary Giving space for integration of the temporary into the permanent to sustain the valuable

Table 3. An ICE rubric study of Team 2, developed preceding the first preliminary jury.

experimental group were introduced with the use and function of the model, as a structuring and self-assessment tool. The first application was with the 'problem reception' ICE rubric in Table 2. Table 3 is the study rubric of Team 2 applied preceding the first preliminary jury for deciding with the design concept. The rubric not only functioned for understanding the boundary between their depictions and proposals, but also for categorizing the detailed and unstructured discussions on the subject. This summative task enables a comprehensive look towards the entire process and self-evaluation.

Having decided with their particular design problems and design concepts, the students were stimulated to brainstorm for problem solution. This condition whetted the application of the C-Sketch technique to start with the problem solving process. Figure 1 dis-

plays a post-evaluation phase of the C-Sketch application of Team 1 for deciding on the site plan organization in accordance with the targets determined in the previous sessions. This phase resulted in a strengthened version of the commonly adopted proposal of a dominating pedestrian axis that connects two proposed foci. The technique was repeated by the students voluntarily to develop the proposal further (Figure 2).

The ICE rubrics were employed to depict both major and minor problems in the design process. Usually the problem of the ICE Approach was, not knowing how to complete the extensions part, for which the C-Sketch technique was applied. As the decisions could achieve consistency with their major design motive, with increasing efforts for further research, recording and with self-regulated C-Sketch sessions, what Fostaty Young and Wilson assert became agreeable: "After time and experience, students will begin to apply the principles of ICE, without construction of formal rubrics, to their own and others' work" (Fostaty Young and Wilson, 2000: 52).

4. THE SURVEY: A QUALITATIVE COMPARISON OF TWO GROUPS.

To provide equilibrium with the experimental group, two teams were randomly selected as the control group from within the teams 3, 4, 5, 6, 7, and 8, which were tutored by other instructors of Atelier 6, who did not apply a specific model for assessment and monitoring. The survey method was a semi-structured interview applied at the end of the semester to the students of the two groups, as 10 students of the experimental group and 11 students of the control group. Each interview took approximately 8 minutes and the entire process of interviewing took about three hours

Figure 1. Team 1 evaluation phase of a C-Sketch session on site plan idea proposals.

Figure 2. Team 1 evaluation phase of a C-Sketch session on developing the decided site idea.

in the first day, and about one hour in the second day including breaks and pauses. In order to maintain reliability, the interviews were made privately with each student, so that they might not be affected by the answers of their team members.

The interview questions were designed in accordance with the structure of an ICE rubric, which specifies levels of learning quality and let the questions be open-ended. The questions were on the major design decisions of the teams. They asked for the ideas level, their problem definition (PD), for the connections level, their design concept (DC), and for the extensions level, their solution idea (SI). The expected information from the two groups was about the contents of the extensions level of the ICE rubric in Table 2.

The questions were domain specific; however, during the interviews how the interviewees understood the questions were not corrected by the interviewer, in order to trace priorities of the students. It was also expectable that data could be shared among different question domains as they have ephemeral boundaries.

Team 1	PD	<ul style="list-style-type: none"> social and cultural alienation detachment profit oriented planning risk multi-storey apartment blocks blocking single housing neighbourhood 	<ul style="list-style-type: none"> degrading neighbouring relations loss of architectural identity lack of social space limited and inadequate green area security problem
	DC	<ul style="list-style-type: none"> Sense of belonging Common spaces and activities Family centred communal spaces 	
	SI	<ul style="list-style-type: none"> Two focal points with multiple functions Pedestrian axis 	
Team 2	PD	<ul style="list-style-type: none"> Chaos Layers of the city that suppress each other Pressure Layers that ignore each other 	
	DC	<ul style="list-style-type: none"> Terminating the ignore Developing counter pressure 	
	SI	<ul style="list-style-type: none"> Counter pressure Uncut social network 	

Table 4. Tags from the answers of the experimental group.

Team 3	PD	. inefficient neighbouring relations . need to distribute equal vista to each resident . strengthening social bounds . economic problems	. loss of historical fabric . sloped land . inefficient landscape organization
	DC	. modular study . uniting and using in-between courtyards . organization of unit relations . reconstructing social relations	. protecting vista and gardens . catching harmony with historical fabric, between past and future . socio-cultural axis
	SI	. prefabricated construction system . connecting units to common spaces . converting courtyards into a street to unite social activities (Living-expanding courtyard)	. decreasing building height to rebuild neighbouring relations . landscape design to provide garden to every house . efficient transportation
Team 8	PD	. cheap, strong, prefabricated . recovering the urban environment of the poor and under risk . continuity of social life	. threat of land profit . degrading neighbourhood
	DC	. drawer-like system . prefabricated building system . low-rise housing	. reproducible (adaptable) system . Relation of social spaces with units . street configuration
	SI	. drawer-like system . steel structure . adaptable housing	. bridges . agricultural facilities . prefabricated construction system

Table 5. Tags from the answers of the control group.

Table 6. Frequency rates for PD tags of the experimental group.

Table 7. Frequency rates of the DC tags of the experimental group.

Table 8. Frequency rates of the SI tags of the experimental group.

Table 9. Frequency rates for PD tags of the control group.

Table 10. Frequency rates of the DC tags of the control group.

Table 11. Frequency rates of the SI tags of the control group.

5. DISCUSSION.

The evaluation of the qualitative data is arranged in percentage scale to constitute a comparative ground in-between experimental and control groups. The frequency levels of expressions from within the pool of selected tags are displayed in figures 3 and 4. Since the major criteria of the 'extensions' level of the assessment rubric in Table 2 is 'consistency', the team members' rate of mutual agreement on tags is the primary focus of the survey study. This rate would also indicate how sure they were about their major design decisions at the end of the process.

According to the results, team 1 was 85% and team 2 was 100% sure of their problem definitions (Table 6), while the rate of mutual agreement is 33% for Team 3 and 60% for team 8 (Table 9). Team 1 was 80% and Team 2 was 75% sure of their design concept (Table 7), while the rates were 50% and 40% for the Teams 3 and 8 (Table 10). Lastly, both Team 1 and Team 2 were 100% sure of their solution ideas (Table 8), but the rate falls to 16,6% in Team 3 and 40% in Team 8 (Table 11).

Moreover, the number of design decisions of the experimental group is notably smaller than that of the control group, which might be an indicator of indeterminacy. While the experimental group teams express more precise and focused decisions that have an integral relation within the whole system, in Table 4 we see Team 3 has five, and Team 8 has six independent statements about the design project most of which are parts of the solution but not the comprehensive idea of the entire solution.

6. CONCLUSION:

The results of the study indicated that structuring the design process has a significant impact on achieving the overall consistency in between design reasoning, solution ideas and the proposed solution. Consistency is the consequence of explication and critical reflection in all decisive instances of the process. Therefore, it remains as a major criteria for achieving the desired learning quality of the students of architecture in their design experiences. It fulfils the requirement for a progressive motivation to achieve a meaningful experience.

The teams in both the experimental and the control groups had a relevant approach and worked with great effort throughout the process. In the experimental group, structuring and ideation techniques enabled students to grasp alternative decisions with their probable consequences, giving the opportunity to prefer one to another according to design priorities. That these techniques were employed voluntarily after realizing their function for explication, ideation and critical reflection, makes it apparent that the students have a tendency to explicate. This is a great potential to increase learning quality that needs to be operated with convenient structuring that integrates assessment into the process. Structuring builds connections within rich amount of information, systematize it and not lose time on delaying major design decisions. It provides confidence in the control of the entire pool of design inputs and functions for informing students about their levels of learning.

However, the depicted inconsistency in the unstructured work of the control group requires atten-

tion, since it may indicate a leak in the meaning making process and devalue the learning quality. The problem of not knowing how to explicate and integrate personal ideas into the design process is pregnant to contingencies. This is risky especially when the experience is going to construct knowledge for further architectural design practice.

Regarding the studio assessment, the experience with the model also provides a critical perspective on design juries which are attempts to seek for the clues of students' design processes within end products. The decisive moments, their determiners, the consistency within sequential moves, the leading ideas and their questions, and other strikingly important moments of the students design processes may well remain tacit or limited with students' verbal expressions, unluckily hidden under the tick curtains of representative efforts of the students in the last stance, within the jury assessments (Anthony, 1987). If architectural design studio is a process oriented learning environment, then its assessment method should also be process oriented and not detached from its structure.

Consequently, the model combining the ICE Approach and the C-Sketch constitute a valuable contribution to architectural education. However, for an increased level of learning quality, answering the need to provide a consistent design experience with structured explication, responsible ownership of design reasoning, and reflective thinking may also borrow from a variety of methods for problem solving, assessment, and ideation, which requires further research for and experiment in architectural design education.

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CULTIVATION OF A PROBLEM FIELD.

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Abstract

A problem is typically defined prior to an architectural process and the result is seen as a solution. The process as a whole is conceived as problem solving. However, the artistic element of the process is inseparable from constructing the problem. From the artistic point of view the solution is merely a derivative.

Conventional understanding of artistic creation is sometimes coloured by the misconception that invention first and foremost takes place in the mind of the artist parallel or prior to the actual process. However, as far as the artistic element in an architectural process is concerned the problem cannot be abstracted from the specificity of the material, the drawings, models etc., which constitutes the project under development. The problem is an immanent relational field and invention is triggered by the difference between maker and architectural media.

The aim of the paper is to portray the artistic practice as a learning process different from communication of knowledge. It proposes a kind of leaning not about improvement of skills and competences but rather concerned with the dynamics of a material field. It emphasises the role of technique and presents architectural media as the prime material field investigated by the process.

The discussion uses examples of assignments and student projects developed under my supervision to demonstrate how a problem field is framed by the ordering of techniques.

Keywords: Pedagogy, Process, Creation.

INTRODUCTION

The traditional relationship between a teacher possessing a privileged understanding of a particular problem and a number of students trying to solve a given assignment to the best of their ability is inseparable from the illusion that invention lies in finding an original solution to an already existing problem. The problem is defined by the teacher prior to the process why the process is problem solving. The result can be evaluated with respect to the initial requirements laid down in the brief. The problem is seen as a negative condition to be dissolved by the result and freedom lies in finding a new way of making the problem disappear. This kind of process is often supported by a traditional pedagogy according to which the learning process takes place in the mind of the student and the role of the teacher is to communicate knowledge. Of course this description is simplified intended to make a different kind of learning process stand all the clearer in comparison. It conflates a variety of pedagogical methods into a somewhat old-fashioned notion on learning. The many forms of communicating existing knowledge are fundamental to any place of learning and criticism of the above relation between teacher and student easily falls under the danger of romanticising the opposite. However, a pedagogy intended to communicate knowledge from the teacher to the student does have one fundamental difficulty in an art academy because it cannot account for the creation of the new. It has a blind angle in which the entire artistic process takes place. Creation lies in constructing

the problem (Deleuze, 2006: 15). The solution is merely secondary.

VIOLENCE OF MATERIAL SIGNS

It is important to distinguish the new from the event. In its most radical sense the event is pure immanent difference and can only be approached indirectly. We suppose it is there because things change. The new is rather the changes of established discourses instigated by an opening in knowledge made by pure difference. Once it enters the known it is immediately transformed into the new. In that sense the new can be said to cover the event or rephrased: Pure difference is clothed by the discourses on the new.

Creation cannot be premeditated but is dependent on a chance encounter with the event staged by a temporary loss of ability (Paul Klee, 1990:4). That is why artistic methods often have a destructive element turned against conventions that prevent the maker from encountering the event. Dealing with an artistic process teaching cannot employ a traditional pedagogy directed at the student with the intent of increasing skills and competences. From an artistic perspective it is an amateurish notion that a process should be directed at the skills of the maker. The artistic process is only concerned with the consistency of the work. It might very well leave the maker in a lesser condition – for instance he or she might have exhausted their capacity to create (Blanchot, 1994).

The artistic process as a learning process is not reception of stable knowledge but a temporal process inseparable from the investigation of a particular matter. To learn something means to deal with a given matter as if it emitted signs to be interpreted (Deleuze, 2003:12-13). Therefore, an important point in an artistic process occurs when you develop the right technique in relation to a specific problematic. Technique is an important catalyst because it is not a subjugation of material differences by intent but rather an investigation of material differences. It is engaged in the exploration of the frictions and intensities of material impurity. The development of a specific technique is really a way of cultivating the problem field at hand. Technique is an act of revealing something about things that lie outside of our intentions and possible usage (Heidegger, 1957).

Material has a double nature of virtual relations and actual manifestations. The virtual is formless and must be actualised in order to emerge as an extensive form (Deleuze, 2006: 96-97). Before it is actualised, it exists as a free difference not yet combined with other free differences in the production of a prominent form. Virtual difference is immanent. It cannot be abstracted from that in which it works. It is a difference in intensity encountered indirectly through the way it affects the actual forms and measurable parameters. The material in its actual concreteness is a frontier negotiated by the maker. You can only experiment with the relational field by manipulating the external appearance. Consequently, the term material defines the actualisation field comprised of all the different media the maker employs in the course of a process.

The craftsman perceives material as if it was sending out signs telling him or her something about its nature. The development of carpentry is a learning process through which wood is treated as a collection of material signs. In a similar way the maker of an architectural drawing treats it as if it was sending out signs to be interpreted only he is not working on a natural material. The materials of architectural media are artificial and media are used to create measurements for a space to be. The architect works with the double nature of the media simultaneously singular artefacts and representations. He or she oscillates between treating the drawing as a mysterious transmitter of signs and an emerging scheme of something yet to be.

The architect explores the relational field of the medium material using techniques at his or her disposal. Techniques explore differences in the drawings and models and actualise them in various ways in the course of the process. The medium material is the only thing the architect can manipulate in order to gain insights in the problem field. It is the total collection of drawings, models, photographs, diagrams, texts, tables and so on, developed and manipulated through a process. It is seldom restricted to a single medium but constitute a kind of technical environment.

AN ORDER OF TECHNIQUES.

The intention of the following is not to propose a pedagogical model but to exemplify the discussion of the artistic process as a learning process and discuss the methodological role of concepts and written language together with the technical investigation of architectural

media. The visual material shown in this section was produced under my supervision at the Royal Danish Academy of Fine Arts, School of Architecture. The brief presented a problem field and a set of techniques as modes of inquiry.

The assignment was informed by the text *Of Other Spaces* by the French philosopher Michel Foucault. According to Foucault *Heterotopias* are carefully ordered spaces with a clearly defined border to the society they are part of. They take on a variety of forms, but all have a mirror function to the everyday spaces we inhabit. Foucault presents a list of examples such as cemeteries, cinemas, theatres, insane asylums, prisons etc., all strongly dependent on their program but he also mentions two emblematic heterotopias: the mirror and the vessel (Foucault, 1984). Many commentators have read the text as a description of a critical dimension in public space. The assignment rather focused on the imaginary or fictitious space of architecture created parallel or prior to programs. Foucault suggested this fundamental condition by stating the mirror surface and the vessel as emblematic heterotopias. It encapsulates the idea that architecture contains a narrative or fiction not reducible to program.

On one hand the role played by Foucault's text was to define a field of investigation by offering a conceptual frame. The text addresses a range of architectural questions and mentions two emblematic heterotopias that could be read as architectural media: the mirror (drawing) and the ship/vessel (model). On the other hand the aim of the text was to create a kind of homelessness offering a distance to the students' habitual modes of thinking. Perhaps this is the true potential of conceptual reflection in an artistic process: it opens a space of interrogation between maker and material. It does not offer an explanation. In other words: theory does not illuminate the work to the maker. It is transformed into a kind of poetics, a register from which the composition at hand is judged and new developments are considered. In this sense it has a methodological role not aimed directly at the production of a specific result but indirectly at something that lies beyond what is already known by the student. It is really the difference or perhaps distance between theoretical texts and the architectural practice of the students that are productive in an artistic sense of the word. It frames a segment of the world and alienates the student from his or her habits thus enabling a more radical and open investigation.

The aim of the assignment was to strengthen awareness that architecture does not only respond to external requirements and solve programmatic tasks but also creates a fiction of its own. I'm referring to the idea that the work of architecture attains an independent logic and coherence that creates a possible world (Grosz, 2008:10-11). Therefore, the students were not asked to develop new programs but operate on the threshold of a program. Emphasis was placed on the development of individual architectural languages in the hope of creating a plateau from which programs could be rewritten. I will return to the meaning of the ambiguous term language later.

As for now I will show a selection of their projects to exemplify the nature of their work. Figure 1 shows two glass models produced by the students at a glass workshop early in the assignment. The one on the left are rearranged sections of a cast tube like glass model and the one on the right is a blown spher-

Figure 1. Projections of Glass Models on a White Ground.

Figure 3. Shadows Projected on Transparent Landscapes.

Figure 2. Glass Models as Imaginary Landscapes.

ical shape. They are placed upon a glass pane and a spotlight is projected from above. The spotlight, the glass pane and the white ground were an instrument made for the occasion. The project on the left was part of an examination of rituals and religious spaces and was later incorporated in a sketch for a monastery.

Figure 2 shows a series of imaginary landscapes. Each fragment is a section of a larger cast glass model. From the same project figure 3 shows a series of framed glass upon which a black figure is printed. The project investigated the nature of a transient space in which the spatial matrix was influenced and to some degree produced by the change of light and shadow during the course of a single day. It developed from the idea of architecture as a cosmological model under the heading observatory. Figure 4 shows an interior space from the same project. The shell is cast in plaster leaving the outside raw and unmanufactured. The space is treated as an inside with no relation to the outside. It is informed by the idea of architecture as world making.

Figure 5, 6 and 7 show a project that investigated the incorporation of sight through a series of instruments intended for an installation. A fundamental heterotopian mechanism lies in its ability to create awareness of the everyday spaces we inhabit in a state of distraction. The intention was to investigate this condition through the medium of an installation. The project consisted of a series of moveable instruments able to be installed in different sites. On the right figure 5 shows a hollow concave black sphere mounted on a wooden tripod. On the left is a sound picture gener-

Figure 4. Plaster Cast.

ated by projecting white noise on the inverted sphere and recording the sound reflection. Figure 6 shows a series of lenses mounted on tripods. As the series progress the dark spots grow in size and the lenses change from bending the rays to reflecting them. Figure 7 shows a blown glass spherical model half of which is painted black. The perception of the spherical shape oscillates between mirror, spatial volume and opaque object. Together the models in figures 5, 6

Figure 5. Sound Picture and Concave Black Sphere.

Figure 6. Lens Array.

Figure 7. Spherical Glass.

and 7 investigate various interactions between visual and audible impressions and disturb the distinction between eye and body.

Figure 8 shows a folded space produced by a layering of printed glass. Figure 9 shows fragments of the same space as cast plaster models. The project investi-

gated dwelling and the creation of a discrete interior space. It included a complex series of folds developed in close relation to the context in which it was placed. As such it attempted to develop an alternative to a normal typology defined across specific situations.

Figure 8. Glass Envelope.

Figure 9. Fragments of Interior Spaces.

Figure 10. Fragments of an Archive.

Figures 10, 11 and 12 show different models of the same project under the heading archive. The project explored the notions of memory and transformation. It developed into an archive of models shown in figure 12. The archive is an emblematic heterotopia in the sense that different compartments refer to different spaces outside the confines of the archive only it rearranges them and suggests other distribution. The idea of memory as a continuous transformation and rearrangement was pursued through the development of different model series and hybrid fragments. The fragment has a double nature. It can simultaneously be seen as a fragment of a lost whole and a part of a possible whole not yet in existence. In other words, it is suggestive. Together, the different series and the

investigations of their possible combinations constituted a personal vocabulary.

The projects all depart from the same conceptual frame. They are developed through a sequence of prescribed techniques primarily presented in the format of two workshops. The first workshop took place in a glass workshop and introduced the students to different techniques of casting and blowing glass. It related to the first of the two emblematic heterotopias: the mirror. The second workshop later in the process revolved around a specific way of casting large shells around spatial volumes. The idea was to create a completely secluded interior with no connection to the outside. It related to the second emblematic heterotopia: the vessel.

Figure 11. Model archive.

Figure 12. *Fragments in the Process of Making.*

The conceptual frame developed alongside the drawings and models. The conceptual part and the architectural media acted as separate articulations (Deleuze, 2006 (*Foucault*): 61). It was not the intention that they should correspond directly in such a way that one might express the other. Rather the relationship between them was that of productive difference. Although the conceptual side developed during the process it served as a support for the other regarded as the main language created by the architect. As the individual processes developed they appropriated the given techniques and in doing so cultivated their independent problems. They did not respond to the core of the assignment rather they furnished a compartment of their own within the larger territory of the problem field initially framed by the assignment.

SEPERATE LANGUAGES.

The term language refers to written language and the concepts presented above. However, I also refer to architectural media as languages. Architectural media might be regarded as languages but they are impure with no stable and coherent system of translating and transmitting information. They display an ambiguous mixture of abstract symbols belonging to a notation system and mimetic elements representing scaled down images of buildings. The notation system function because of an established set of conventions and

complies better with the normal understanding of a language. On the other hand, the drawing as artefact is subject to manipulations that can only be executed and understood considering its singular composition. Although notation system and singular composition are different aspects of the media they cannot be separated and do not function apart. If the notation system is digital because it operates with a system of well defined discrete digits the media as composition is analogue. The term analogy should be understood as relation of exteriority not as a visual resemblance. It means that elements are defined through their capacity to influence and be influenced (Deleuze, 2003:116). In opposition similarity in visual appearance tend to suggest a shared identity. The notation system governing translation constitutes digital language whereas the rhythms and compositional regularities constitute analogue language. Analogue language is a mode of distribution inseparable from the particular mode of drawing. Consequently, the material presence of the media and the wrestle of different languages turn the drawing into an object interrogated for possible emissions of signs. The interrogation alternates between evaluating the represented space of the building and loosing overview through the act of drawing.

As mentioned earlier the aim of the paper is not to present a pedagogical model but to discuss certain fundamental conditions for the artistic process. It is a different way of learning engaged in a particular material field. It may sound as practical knowledge but only to the degree the term is divorced from connotations of know how. The artistic learning process is intimately involved in the simultaneous investigation and cultivation of a problem field. Learning is never a question of imitation. It is an amorous and intimate relation where the body of the student is immersed in a dynamic material field. Here, a sign is not communication but an encounter with the other (Deleuze, 1994: 22-23).

Artistic learning is concerned with the composition at hand. The maker learns how to make the composition tighter. The maker investigates the material field and gradually understands its singular dynamics. It is a matter of intensifying resonance and reducing noise. However, It is fundamental to the architectural process that the material field, the composition, is simultaneously related to a dynamic field elsewhere. The composition is a map of relations of a contextual field in a broad sense of the word. You always address a whole set of different social, economical, tectonic etc., issues simultaneously. In other words, one should distinguish between the artistic part of the architectural process and the process as a whole. In the artistic process one learns something about the composition but because it related to a contextual field elsewhere the composition becomes a map of relations not bound to the context by similitude but by agency. The artistic process invents a problem but because the problem field is simultaneously related to a contextual field the possible reconfiguration suggested by the composition becomes a probe into a whole set of different issues. It makes sense to talk about different problem fields linked to each other in

a productive inquiry. The problem of the composition might resonate a problem in a context outside its boundary.

How does a student of architecture learn? Not by imitating a teacher but by participating in the investigation of a problem field together with a teacher. Therefore the teacher should not aspire to offer a model for reproduction. He or she should rather endeavour to frame a problem field by the choice of a conceptual framework and simultaneously offer the techniques by which the navigation of the problem is instigated. From that point on the students develop their own impure architectural languages through the appropriation of the initial techniques. To cultivate a problem is really to frame a segment of the infinite chaotic possibilities that presents itself in the beginning and invent a technique to probe the selected field.

CONCLUSION.

We're not accustomed to think of pedagogy as a practice with the aim of suspending people's abilities and dismantling their knowledge. However, this is to some extent what I propose as a necessary component of pedagogy in an art academy.

It does away with the idea that written language should establish a privileged plateau from which architectural practice of the media can be surveyed, planned and executed. Because concepts are different from architectural media they offer a critical distance. They abstract, not the essence of the work, but the maker/student. They create a gap that must be filled by an act of drawing.

Secondly, it conceives teaching as a staging of techniques. Technique is a mode of manipulating the composition thereby investigating the immanent relations that constitute the problem field. Different techniques offer different possibilities of cultivation because they address and trigger different relational constellations. The findings of techniques are not necessarily in accordance with skills and competences that might hover somewhere as inescapable parameters of an institution. They are involved in a different learning process not oriented against the acquisition of already existing knowledge. Together concepts and techniques frame a problem field and offer the modes of cultivating it.

Learning is not instigated by good will on behalf of the teacher or the student. On the contrary, thought is provoked by the violence of an unpremeditated sign (Deleuze, 2003:14). Singularity is born in the wrestle between student and material.

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USING METAPHOR AND ANALOGY FOR UNDERSTANDING STRUCTURAL CONCEPTS IN ARCHITECTURAL EDUCATION; AN IRANIAN PERSPECTIVE

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Abstract

By using two cognitive tools, metaphors and analogies, structural concepts can be made more observable and touchable for architects. These tools can help architects and designers to physically demonstrate structural concepts for better understanding. Since familiarity with the structural concepts is imperative for architects, it is important to determine the extent in which architects sharpen and solidify their understanding of structural concept using two very valuable cognitive tools, metaphors and analogies. Although in recent years, the number of studies focusing on the usage of metaphor and analogy was on the rise, very few works have included views and opinions of correspondent users in the architectural domain. Furthermore, having both metaphor and analogy under one investigation could help the researcher to see which one, metaphor or analogy, professional architects prefer to use more and which one of them architects use in various stages in their design process. In this regard, purposive sampling was applied to collect the data from ten professional Iranian architects who had the experience of working in this domain for more than 10 years. The participants of this study went through a semi-structured interview and their reports were analysed qualitatively. The findings reveal that while designing, Iranian professional architects do not have any preferences because they can equally apply both metaphors and analogies, but when dealing with their students in academic setting, using metaphor as a cognitive tool can lead to better results. Furthermore, Iranian architects use metaphor more in the initial stages of the architectural design process because according to them this physiognomic perception enhance understanding of a design situation and stimulate creative solutions to the problem at hand. Conversely, analogy is mainly used in the concept generation phase.

Keywords: Metaphor, Analogy, Design Process, Architectural Education, Structural Concepts.

1. INTRODUCTION

The design process in an architectural domain can be significantly influenced by structural aspects of buildings such as shear walls, vertical bracing, rigid frames, and cable supports to name a few. Structural concepts transcend solutions to common structural problems and embrace a broad range from addressing structural forces to symbolizing aesthetic values. According to Ji and Bell (2008), "the understanding of structural concepts is a key element for students to learn, [and] for lecturers to teach...". This is crucial in enhancing students' awareness of structural limits and effects on design process of architecture (Phillips and O'hara, 2003). However, since structural concepts are abstract and not something, that can be seen or touched, students sometimes find them hard to understand. On top of that, since textbooks used at university level tend not to provide more tangible examples of structural concepts, students' understanding of structural concepts is limited by merely solving coursework questions (Ji and Bell, 2008: Xii).

One of the ways in which these structural concepts can be made more observable and touchable for architects is the use of two cognitive tools, metaphors and analogies. These tools can help architects and designers to physically demonstrate structural

concepts for better understanding. Indeed, metaphors and analogies in the process of conceptual design are considered as key elements in which we understand the design process itself (Hey and Agogino, 2007). It has been argued that metaphors and analogies do not only affect our reasoning process in everyday life concepts in general, but they also help the designers to identify the design problem(s) in specific (Hey, Linsey, Agogino and Wood, 2007). Since metaphors and analogies can map out users' understanding and needs, they can assist a designer to anticipate users' reactions to the product, hence make a product more meaningful to the user by recognizing the design's thematic relations (Nagai and Taura, 2006). Unlike metaphor that is used in the surface features of designs, analogy engages the structural features by recognizing the relationship between two things which is similar to the relationship between two other things. However, it is important that both, metaphor and analogy can make an inference of similarity and identify the correspondence between the source and the target (the problem at hand) based on shared characteristics (Wormeli, 2009). Therefore, by using metaphoric and analogical reasoning we can have a better understanding of structural concepts in conceptual thinking.

Although in recent years, the number of stud-

ies focusing on the usage of metaphor and analogy was on the rise, very few works have included views and opinions of correspondent users in the architectural domain. Furthermore, having both metaphor and analogy under one investigation could help the researcher to see 1) which ones, metaphor or analogy, professional architects prefer to use more and 2) which one of them architects use in various stages in their design process.

2. METAPHOR AND COGNITIVE METAPHOR THEORY

Traditionally metaphor was just a decorative language that was merely used as a poetic linguistic expression. This line of thinking; however, expanded when metaphor perceived as not only something that refers to something else, but as something that describes some aspects of something else. This can be seen as how Master Tropes described metaphor in 1945: "To consider A from the point of view of B is, of course, to use B as a perspective upon A". The revolutionary line of thinking about metaphor started in late 1970s when cross-domain mapping by metaphor was considered as extremely common in all domains and not only in linguistics and what is about language. Current view of metaphor allows us to understand the unfamiliar and abstract concepts by re-casting them to familiar and concrete objects.

Developed by Lakoff and Johnson (1980), cognitive metaphor theory, also known as conceptual mapping theory, concerns with how conceptual metaphors are learned, processed and operated at the level of thinking. Based on this theory, metaphors link the source domain consists of literal entities, metaphoric attributes and relationships with the target domain. A major tenet of conceptual metaphor theory is that metaphors are not merely ornaments of language but are matter of basic cognitive processes that produce meaning and thought (Lakoff and Johnson, 1980). In other words, "metaphors are not merely embellishment in language, rhetoric, or poetry, but rather, the capacity to use metaphors in expressing concepts is a fundamental aspect of human cognition" (Hashemian, 2007: 43). This can be seen in Shakespeare's *All the world's a stage* metaphor which in conceptual metaphor theory is a comparison between the world and a stage to convey the message of *Life is Theatre*. Figure 1 shows the figurative model.

Figure 1. Shakespeare's Cross-domain mapping based on conceptual metaphor theory (Cited in Neo, 2010).

3. ANALOGY AND STRUCTURE-MAPPING THEORY

On the other hand, analogy is defined as a cognitive process of transferring shared features between two things in the analogue and the target that are otherwise dissimilar (Verbrugge and McCarrell, 1977). In analogical reasoning 'A is to B as C is to D' (Do and Gross, 1995) which means the illustration of an unfamiliar idea by means of another familiar idea that is similar or parallel to it in some significant features (The New Oxford Dictionary of English, 2003). This can be illustrated by "Flurries" is to "blizzard" as "candlelight" is to "klieg light" [increasing intensity] (Wormeli, 2009; 147). As it could be seen in the previous example, some attributes from the source domain correspond with attributes from the target domain which this correspondence can be both at the surface level (surface analogies) or deep level (structural analogies). The former concerns with the physical appearance of object properties that can be easily accessible while the latter concerns with deep structural or functional relations and are difficult to create (Casakin, 2003). Analogy is going to be better understood when it is compared with metaphor in the following.

Structure-mapping theory is a theory of the cognitive structures and mechanisms behind analogical reasoning rather than an account of how and why we use metaphorical language. Structure-mapping theory refers to the time when the major structural relations, are hold between a source object and the target object, "regardless of whether or not the objects themselves are intrinsically similar", so when A is related to B like C is related to D, the mapping is analogical (Gentner et al., 2001: 200). Gentner (1988) as well as Genter and Markman (1997) argue that mapping by analogy, is a process of establishing a structural similarity between two given situations and then projecting inferences. In general, structure-mapping theory assumes "the existence of structured representations made up of objects and their properties, relations between objects, and higher order relations between relations" (Gentner et al., 2001: 200). High-order relations in analogical reasoning to nature has been illustrated in Figure 2 which shows how the distribution and dispersion of the fluid over its surface in bipolar fuel cell plate is inspired from the distribution pattern of fluid between the dorsal and ventral surfaces of the leaf.

4. METAPHORS AND ANALOGIES IN DESIGN PROBLEM SOLVING

The key element in design problem-solving is creative skills. A major reason is that design is normally a complex and ill-structured activity, where problems cannot be solved through the application of algorithms or operators (Goel, 1995). In addition to the need for qualitative knowledge and experience, the exploration of unfamiliar and unconventional design solutions requires creativity skills (Cross, 1997; Hsiao and Chou, 2004; Gero, 2000). When dealing with design problems, metaphors and analogies as problem-solving aids facilitate the understanding of an unfamiliar situation in terms of a known situation (Ortony, 1991).

The relevance of metaphor to problem-solving design is categorized to three fundamental steps (Gentner, Bowdle, Wolff, and Boronat, 2001). The first

Figure 2. Structural relations between a leaf and a bipolar plate (cited in Hey et al. 2007, p. 284).

step consists of extracting a variety of unfamiliar concepts from remote domains, where possible relationships with the problem at hand are not always evident. The second involves establishing a mapping of deep or high level relationships between the metaphorical concept and the problem. The last step deals with transferring and applying structural correspondences associated with the metaphorical source to the problem at hand, which at the end generally leads to a novel solution.

It is argued that in the analogical reasoning, the process consists of two stages namely: (a) identification and retrieval and (b) mapping and transference (Casakin, 2004). Identification refers to identifying the potential source analogy which one has learned previously and can represent the target situation and solve a new problem. Provided with memory retrieval hints then, the designer can start establishing correspondences between the source and the target domain (mapping) which may successfully lead to transference of appropriate analogical principles (Casakin, 2004). Goldschmidt (1995: 68) broke the process into three steps which starts from retrieval and representation of an image and goes to "diagrammatic representation that is sufficiently abstract to accommodate any number of images" and finally finishes with borrowing a known form from the context of the task to the same diagram. The power of the diagram in Goldschmidt's second stage is crucial in order to represent abstractions. She justifies her point in the example of Le Ronchamp Chapel which its design inspired by a horseshoe crab shell by saying that "the abstraction that Le Corbusier saw in his mind's eye ... are none other than diagrams of both crab shell and the roof" Goldschmidt (1994: 510). In this step, it is totally up to the designer on how he or

she alters the visual reference by fragmenting, stretching or even squeezing the reference in order to tailor it to the needs of the design (Do and Gross, 1995).

5. METHODOLOGY

The data for this study was obtained from professional Iranian architects who had the experience of working in this domain for more than 10 years. This study tended to use mainly the architect-instructors at the universities who dealt with metaphors and analogies on their daily basis in order to communicate ideas and concepts with their architectural students in the class. The decision in this regard was made based on Mansilla's (2003) finding that when the architects were asked to whom they use metaphor with more, they claimed that they use metaphors more with other architects rather than a client, a builder or an artist to communicate and to get the message through. Accordingly, since architect-instructors at universities deal with architectural students on their daily basis, it was assumed that many metaphors as well as analogies are exchanged between them in order to communicate their thoughts "...based on a similar or common shared cognitive map" (Mansilla, 2003: 43).

The sampling that the researcher used for this study is called purposive sampling. This sampling was chosen because in this study the participants were carefully chosen based on their essential characteristics that they had and were needed for this study (Creswell, 2005). In order to see which one, metaphor or analogy, professional architects prefer to use more and 2) which one of them they use in various stages in their design process, qualitative semi-structured interviews were used. The questions that the researcher

asked from professional architects were partially inspired by Mansilla's (2003) qualitative section of his questionnaire.

Finally, we can turn to data analysis. A qualitative research paradigm was used to investigate the professional architects' data which were derived from the interviews that the researcher had with them. According to Hatch (2002), it is through interpretative analysis that researchers can see the patterns, identify the themes, discover relationships and finally make interpretations. Since researcher's intention was to investigate the links between the participants' experiences and the usage of metaphors and analogies in design, coding helped the researcher to reduce the data into categories (Creswell, 2007). The codes naturally addressed the topics of metaphor, and analogy and the design stages preferences of these two cognitive tools. After entire data were coded, all code words were listed and similar codes were grouped which then enabled the researcher to search for meaningful themes.

6. RESULTS AND DISCUSSION

1) Which ones, metaphor or analogy, do Iranian professional architects prefer to use more?

The findings revealed that all architects (100%) use analogies and metaphors equally in their daily basis because they believe that these two cognitive tools have improved not only the quality of their design in general but also the communication they have with their architectural students in specific. However, interestingly, professional architects believe that the usage of either metaphor or analogy depends very much to whom they are using them with. 8 out of 10 architects (80%) claim that when dealing with planning and designing, they come across many ill-defined problems in which they use many metaphors and many deep analogs (both between-domain and within-domain analogies) and retrieve deep principles in order to enhance the quality of their design. Conversely, while instructing either students or novice architects, professional architects believe that using analogies is not as helpful as using metaphors because although novice architectural students can understand and apply analogical reasoning at some point, they reportedly struggle to establish high-order deep analogs and in many instances misinterpret and misuse analogical references despite being given enough instructions. Nevertheless, when professional architects use metaphors to communicate their ideas with their students, they can easily make the concepts more manageable and viable for students after which they are able to share metaphors consciously or unconsciously in order to make sense out of design itself. The problem professional architects reportedly have with using analogies in their communication with their students is probably justifiable by the emphasis Hey et al. (2007) give to kinds of metaphors and analogies passed down to students in instructional settings. He argues that educators should be conscious about what metaphors and analogies they use to communicate ideas with students because as effectively they can be to be used for communication, they can as well be confusing if they are not used properly. Another justification for Iranian professional architects' reluctance of using analogies with their students is that

according to Casakin (2003) the quality of analogy can be very much influenced by the use of within-domain and between-domain visual displays. Although both kinds of visual displays might lead to analogical reasoning, how remote or close is the source embedded from the target domain plays a great role in the level of difficulty in accessing analogy. Since within-domain analogies are basically based on surface similarities (Gentner, 1989; Holyoak and Thagard, 1989), they enable the designer to understand the target problem based on the relevant and well-structured knowledge; hence they are easier to establish (Casakin, 2003). When an unsuccessful retrieval happens or when the mapping is based on inappropriate design solution, the effects are not only negative, but also hinder problem-solver's creativity to come up with a potential creative solution (Goldschmidt and Smolkov, 2004; 2006). The negative effect of analogy over creativity is called fixation effect of analogy (Eckert, Stacey and Christopher, 2005). Similarly, metaphors can sometimes be unhelpful and misleading (Cameron, 2002) if they are misunderstood in design. Baumer, Sinclair, and Tomlinson (2009) argues that sometimes design students themselves choose the wrong source for the target problem at hand, and sometimes even if they are provided with the right sources, they are not cognitively developed enough to correctly map the right aspects of the source to the target. Like analogies, metaphors can limit creativity and lead to faulty thinking and ill-quality design product (Saffer, 2005).

2) Which ones, metaphor or analogy, do Iranian professional architects use in various stages in their design process?

Based on the coding system that this study utilized two main themes emerged from this qualitative analysis, namely: problem stage and solution stage. 90% of Iranian professional architects reveal that they use analogies more in solution stage of their design process because according to them this stage is a crucial stage which mainly involves decision making between two alternatives, developing a specific solution and determining the specifications. Another 10% of the architects believed that they equally use metaphors and analogies during the design process. At the time of defining the design concept, gathering the required data for the problem at hand and identifying the constraints, and framing the design situation at the initial stages of the design process, almost all professional architects claimed that metaphor is the better mental representation to be used because it can have an influence on restructuring and reformation of design problems. This finding is in line with the findings of Hey et al. (2007) who revealed that metaphor use is primarily employed in the early problem framing stages of design to enhance understanding of a design situation. According to their results, analogy is mostly used in the concept generation phase of design to map the causal structure between a source idea in one domain to the target design problem being solved. The result of this study somehow indirectly supports Casakin's (2007) and Lawson's (2004) claim that novices tend to use more metaphors at early stages of design process to generate innovative design solutions due to their lack of experience and developed cognitive schemas. Supported by other empirical studies, Casakin, (2006a and 2006b), and Hey et al., (2007)

reported that the aid provided by metaphors to develop unconventional solutions was seen to be more fruitful in the initial stages of the design process, known as conceptual design.

7. CONCLUSION

This study mainly focused on the preference of Iranian professional architects on the usage of both metaphors and analogies as the most important cognitive tools in design process. The findings reveal that when dealing with their own projects, Iranian professional architects prefer to use more analogies than metaphors while using analogies with their novice architects and architectural students created many problems for professional architects that they preferred to use metaphors instead. This finding which contradicts many major studies in literature (see Casakin and Goldschmidt, 1999) which reported that novices can use analogies specially visual ones in order to enhance the quality of their design, doesn't have any other justifications except the fact that the analogies that Iranian professional architects use with their students in an academic settings probably are not well-used or are not explicitly structured. Many studies (e.g. Casakin, 2003; Cubukcu and Dundar, 2008) emphasized on the explicit guidance to use analogy because without it novice architectural students, although were able to apply analogical reasoning at some point, reportedly struggled to establish deep analogs and retrieve deep principles. Finally, the only concluding remark the researcher can give at this point is that while using analogies specially visual analogies with students, the number of visual displays and the type of emphasis these visual references display (figurative emphasis versus schematic emphasis) can make a huge difference on the use and misuse of analogy in design process. Therefore, in future studies, it would be interesting to ask professional architects first what type of visual reference they use while teaching and second how many visual references they usually get help from when they try to establish high-level relations between the source and the problem at hand.

Some studies (like Casakin, 2006a, 2006b, and Hey et al., 2008) reported that metaphors are used mainly at initial stages of design problem solving stage to clarify and understand the design problem while other studies (like Cakaskin, 2007) reported that metaphors are used at final stages of design process to generate innovative design solutions. This paradoxical finding was questioned in Iranian setting (question 2) to see the preference of usage of metaphor and analogy during the design process on behalf of Iranian professional architects. Clearly, the findings of this study revealed that Iranian architects use metaphor more in the initial stages of the architectural design process because according to them this physiognomic perception enhance understanding of a design situation and stimulate creative solutions to the problem at hand. Conversely, analogy is mainly used in the concept generation phase. Indeed, by connecting their memory retrieval hints and geometric-technical qualities of the problem, architects can map the correspondences between the source domain and the target domain, irrespective of whether or not the two objects belong to the similar domains. This geometric-technical perception is very helpful for the architects

because through which they can successfully reach to analogical reasoning.

As final remark, this study claims that metaphors in design domain play a key role in easing the communication in a particular socio-professional group, and they are used to structure design students' understanding of important design concepts in design textbooks. Findings of this study can be useful for those who are interested in more in-depth research about the relation between structural concepts and architecture. Furthermore, this study can also motivate architects to develop a general and realistic understanding of the uniform structural behavior (without a need for rigorous structural calculations).

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DESIGN STUDIO PEDAGOGY: HORIZONS FOR THE FUTURE

**ASHRAF M. SALAMA
NICHOLAS WILKINSON**
Editors

DESIGN STUDIO PEDAGOGY: Horizons for the Future Ashraf M. Salama & Nicholas Wilkinson (editors).

This groundbreaking book is a new comprehensive round of debate developed in response to the lack of research on design pedagogy. It provides thoughts, ideas, and experiments of design educators of different generations, different academic backgrounds, who are teaching and conducting research in different cultural contexts. It probes future universal visions within which the needs of future shapers of the built environment can be conceptualized and the design pedagogy that satisfies those needs can be debated.

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TRANSPARENT ASSESSMENT MODEL IN ARCHITECTURE DESIGN STUDIO: EASTERN MEDITERRANEAN UNIVERSITY AS CASE STUDY

Badiossadat Hassanpour, Adi Irfan Che Ani

Abstract

Art and architecture are multidisciplinary fields with complicated assessments that, similar to the teaching and the learning process, are inconsistent with common assessment models. During submission, the presence of jurors, who have different approaches and standards for evaluating design projects, makes this issue more complicated. Numerous assessment and grading models are being used in architecture departments around the world. Some of these methods are based on the experiences of instructors from their lives as students, whereas some are based on university systems. Grading policies seem to be clear in most fields, but when the object of grading is an artistic product with different levels to be assessed and graded, the issue becomes more complex. This observation is especially true in the case in which quality is given a numerical grade.

The nature of skills that students are expected to develop and that are going to be assessed is often subjective. Such skills include invention, problem solving, and presentation. Problems of reliability, personal criterion, and unique perceptions lend difficulty in assessing such skills using traditional methods.

This research suggests that a criteria-based assessment and grading model is a more effective model in promoting student learning, making assessment and grading less complex and more explicit. The effectiveness and reliability of the proposed and implemented criteria-based grading system has been tested at Eastern Mediterranean University using distributed questionnaires and a Rasch measurement system.

Keywords: Architecture Design Studio, Grading and Assessment, Criteria, Rasch System.

1. INTRODUCTION

Assessment is a known as indistinct part of the education process. Assessments have been recognized to have an important influence on learning and should thus be aligned with learning objectives (Gijbels, D., 2005). To improve education and student learning, assessments should be appropriately designed and implemented. However, assessment design is often a complicated task, especially in non-traditional academic disciplines, such as the teaching of professional skills, which demands experiential testing (Biggs, J., 1999).

One significant problem is the nature of skills that art and architecture students are expected to develop. These skills are often difficult to assess by using traditional methods. Moreover, some of the forms of assessment that are arguably best designed to assess such skills (invention, solving problem, oral presentation, and portfolios) are often subjective in nature or suffer from problems of reliability and validity (Crooks, T.J., Kane, M., & Cohen, S.A. 1996). Such measurements often involve subjective assessments of performance in a context in which a multitude of estimated appropriate outcomes, rather than one correct answer, legitimately exists.

Skill assessment is also complicated because the performance of a particular skill should be extracted from the substantive context in which it is per-

formed. A well-designed assessment can serve an important function in the learning process, but not all forms of assessment will fulfill this function. In particular, no common understanding of the grading process exists in architecture, and instructors often base their assessment on their own experiences and on the assessments given by their own professors (Lawson, B. 1980). Therefore, the past and current implemented grading systems in architecture faculties should be investigated to identify the characteristics of an ideal grading system.

Different assessment and grading models have been designed and implemented by pioneer universities in architecture and later followed by other universities around the world. These models have been gradually improved by enhancing the definition of education and assessments. One of these systems is the comparative method. Jurors or the related tutors that give marks on submission days first judge the quality of projects holistically and then rank the projects. Grades follow in descending form from the best to the worst project (Utaberta, N., Hassanpour, B., & Sirjani, R., 2011).

Students deserve to be graded only on the basis of the quality of their work and without reference to the performance of other students on the same or equivalent tasks (Sadler, D.R., 2005). In a comparative system, the holistic attitude to the judgment of a project results in disregard for student creativity and

abilities in some contexts. Moreover, students are unaware of their weaknesses and strengths and would not know how to increase their marks. Only those who are skillful in graphic design are able to influence jurors to obtain better grades.

Meanwhile, making pair-wise comparisons are only possible among a small set of students submissions is possible. Such process will be very difficult to implement in a large set.

Universities have recently made explicit overtures toward criteria-based grading and reporting. Under these models, grades are required to evaluate student achievement in fulfilling juror expectations. These expectations can be explained in different forms. We call these expectations as course objectives. These objectives provide the basis for the criteria, but the exact essence of criteria is left undefined (Sadler, D.R., 2005). These objectives should be known by instructors, students, and especially external jurors because invited jurors each have their distinct tendencies and assumed objectives that would be the bases of their grading. This incoherence may result in variations in the marks given by different instructors and thus cause student dissatisfaction.

Another commonly used grading model is marking forms. These forms include scoring rubrics that show some tasks and their mark portions. These tasks outline some of the knowledge and skills students should ideally exhibit in any stage. For instance, in an oral presentation of a 3D model and its executive details, the oral presentation would be a task for which up to five marks are given. The given mark is based on the quality of the presented document. This holistic method cannot explain the expected details in each task and will leave the doors open for personal opinions and subjective decisions in evaluation.

An underlying difficulty is that the quality of performance in a course, judged holistically on the basis of the quality of the work submitted, may fail to be completely determined through the attainment of course objectives. Universities implement at least three criteria-based grading models (Biggs, J., 1999), namely, (1) verbal grade description, (2) objective achievement, and (3) qualitative criteria. In a verbal grade description, grades are based on student achievement of the course objectives, and grades are given on the basis of interpretations that clarify the level of attainment. This kind of grading method is based on holistic attitudes in evaluations (Hewitt, A. 2007). In objective achievements, the course objectives will be portioned into major and minor, and the achievement of each objective will be computed. In a qualitative criterion system, teachers specify the qualitative properties as criteria to be closer to teaching and learning and assessment grading. In this method, teachers are obliged to make a judgment about the quality of student responses to each assessment task and objective. In this model, grades are given in a simple verbal scale, including such levels as poor, acceptable, good, and excellent, for each task.

However, given that student works are imperfect reality and with the different descriptions of these verbal scales, some teachers believe that an "excellent" or an "A" are is a grade that no one deserves; thus, the distribution of grades and marks become inappropriate (Sadler, D.R., 2005). In this model, scores in different assessment tasks are summed. Finally, the 100-point scale may be divided into segments according to the number of grades. The first

model tries to avoid the dispersion of grade interpretations among different assessors, which can affect the given marks. However, no room exists for expected objectives and their definitions in the design process and final projects. Thus, doors remain open for subjective judgment. The second model is based on a division of the expected objectives into major and minor ones, and the evaluation is completely related to student achievement of these objectives. Nevertheless, most educational outcomes and attainments cannot be assessed as dichotomous states, using yes and no or zero and one, because learning is a continuous process. Both of these objective-based models make clear connections between course objectives and the grade awarded, but students cannot easily see the close connection between the course objectives and assessment items and are thus not in a strong position to judge their level of achievement of the objectives. Therefore, these models have little prospective value for students (Rayment, T., 2007). In addition, no indications are given on whether given grades are for the attainment of objectives in a special task or of all objectives and on whether an objective will be assessed on its own or in combination with other objectives. A third grading form that introduces tasks as criteria for grading and verbal definitions for student achievements amount has improved two previous models but objectives and importance amount of them are still unclear for students and external assessors.

Hassanpour (2013) tried to hybridize these systems and specifications and proposed a reliable, practical evaluation sheet that is aligned with the learning objectives of a design studio. In her model, primary goals that serve as the bases of the problem-solving process and submitted documents, such as sheets that include plans, elevations, sections, and a 3D model, are considered as the criteria for grading. According to her studies on different jury sessions, four main rubric criteria were considered: Critical Explanation, Logical Development, Proposal and Recommendation, and Oral and Graphic Presentation. She explained that each criteria should be explained in different tasks according to practical necessity and personal standards and should be aligned with course objectives when creating policies for assessors to consider during judgment.

Segregating evaluation extent to detailed tasks will increase student opportunities to show their capabilities and sufficiency, as well as to gain a greater chance to obtain better marks. By contrast, when more objectives are expressed for each task, these tasks will more likely operate in isolation and will recede from the overall configuration as a unit. In addition, this process will restrict assessors between these defined borders and will confine their authority and experiences in cognition and analyzing the hidden intent of students in their design. Thus, the characteristics, rather than the number, of objectives are more effective in defining flexible evaluation borders. In fact, these tasks are subtitles that students are expected to do to elaborate the borders of course objectives for assessors.

Meanwhile, according to the main focus of the education process for a certain period, different priorities with different attention portions should be dedicated to each objective. Therefore, each task has dedicated percentages to show the major and minor objectives and grade amount. Figure 1 illustrates this

	Fail	Poor	Average	Good	Excellent	
	Little or no evidence	Beginning	Developing	Accomplish	Exemplary	grade
Graphic presentation						10%
• Composition	_____	_____	_____	_____	_____	
• Focus and explanation	_____	_____	_____	_____	_____	
• How clear is the information	_____	_____	_____	_____	_____	_____
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
Critical explanation						40%
• Process and idea development	_____	_____	_____	_____	_____	
• Detail explanation	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	_____
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
Logical Development						30%
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	_____
•	_____	_____	_____	_____	_____	
Proposal and recommendation						20%
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	_____
•	_____	_____	_____	_____	_____	
•	_____	_____	_____	_____	_____	
Final Grade						100

Figure 1. Evaluation sheet designed by Hassanpour 2013.

type of grading model.

Moreover, Hassanpour asserted that assessment and grading in this system has some conceptual parallels with the behavioral objective movements. She added that a behavioral objective is not properly formulated unless it includes a statement of intent, descriptions of the final behavior desired, and the minimum acceptable level of performance that signifies attainment of a certain objective.

She also mentioned that students perform in a continuous path. The result of their performance can only be revealed in a continuum that can be divided between satisfactory and dissatisfactory. The locus of students in this vector derives from the quality of their work in response to the tasks defined in each criterion.

Therefore, some qualitative levels should be defined for application as a norm for the assessment. Examples of such levels are little or no evidence, beginning, developing, accomplished, and exemplary. Descriptions should have the best overall fit with the characteristics of the submitted projects. Under this condition, assessors do not have to make separate decisions on a number of discrete criteria, as is usual. She stated that the use of grading systems, such as

(1–100) or (A, B,...) are inappropriate ways to import a criteria-based assessment model because after transmitting students work to numerical grades, the connection between course objectives and grades will be completely broken.

Assessment and grading do not occur in a vacuum. The quality of a student's work, along with interpretations of such judgments, can be known as a comprehensive model in judgments. Alternatively, a simple verbal scale, including such levels as Fail, Poor, Average, Good, and Excellent, could be used for each criterion. However, this type of verbal grade description applies to a given assessment task with a separate description for each grade level. One of the interesting and practical characteristics of this model is its capability to be transmitted into numerical grades as a simple and operational system (Hassanpour, B., 2013). As shown in Figure 2, the introduced model contains most of the strong points of other criteria-based and non-criteria-based models.

In this research, the method introduced by Hassanpour (2013) has been used as a methodology to design a specific assessment sheet for a third-year architecture design studio at Eastern Mediterranean

Figure 2. Traits of model proposed by Hassanpour 2013.

University. The designed evaluation sheet was used by six jurors as a grading tool for final work submissions. To test the implemented model, a questionnaire was distributed among juries at end of a jury session, and Rasch measurement was used as an evaluation tool to test the quality and reliability of designed model.

2. MATERIAL AND METHODS

In first the semester of the third-year design studio (2013-2014) at EMU, students were asked to work on the urban context and design an art center complex in Nicosia. The course was presented by three different groups with their own assigned tutor and teacher assistants.

The total number of students was 43, with six tutors and assistants. One associate professor served as the coordinator, one assistant professor and one senior instructor served as tutors, and three PhD students served as assistants.

Students were supposed to attend the studio twice a week at four hours each time to obtain a desk critique from a tutor. Students had interim submissions in intervals, as well as midterm and final submissions for which external juries would be part of the evaluation. In the final submission, 50 percent of the total

mark was given by studio instructors and 50 percent by the external jury members.

Based on the course objectives and the prepared outline for the course according to NAAB requirements, juries attended the midterm submission and criticized student designs and outcomes before giving marks. In this stage, the given marking system was holistic, and each tutor was free to use his or her own method. Each jury member was given a list containing student names on which they were supposed to enter letter grades.

Interestingly, jury members defined their own symbolic icons that represented specific criteria from their own perspective, for which student satisfaction was gained. This finding indicates that students understood these codes. Recorded comments given by juries and the questions they asked showed an obvious consensus among them.

At midterms, 37 students submitted their projects, and six jurors attended. Grades of up to 20 points were given. Figure 3 reveals the standard deviation of the given grades.

Table 1 shows different grading styles. According to grade changes from A- to B+, B+ to B, and other letter grades, changing the range in letter format is equal to 5 over 100 or 1 unit over 20 in a numerical system. Thus, a deviation that is more than 1.5 is undesirable. Figure 3 shows this fluctuation for students, especially for student numbers 23, 24, 27, 29 and 36. The average of total standard deviations is 1.62, which is greater than 1.5.

Hassanpour (2013) asserted that most architecture schools and instructors use a self-defined criteria-based grading system driven by their experiences through time and based on direct observations. During midterms, the current study supported the criteria tendency among jurors, and an evaluation sheet was designed accordingly. Figure 4 defines four types of criteria and relative tasks that are supposed to be fulfilled by third-year design students. These criteria

Figure 3. Total average standard deviation for midterm grading (maximum SD limit found 1.5).

Letter Grading	Numerical Grading over 100	Numerical Grading over 20
A	85-100	20
A-	80-84	16.8
B+	75-79	15.8
B	70-74	14.8

Table 1. Different grading styles.

Project: performing arts center in Nicosia
 Student Name student No Jury name

	Fail	poor	Average	Good	Excellent	
	Little or no evidence	Beginning	developing	accomplish	exemplary	Grade
Presentation						10%
• Oral Presentation						
• Graphic presentation						
• Completeness of submitted documents						
Design Process						30%
• Design Idea and Approach						
• Clarity of Design Process						
• Universal Design Approach						
Overall planning and Context						40%
• Overall massing and context						
• Spatial Integration layout						
• Community Activities Integration						
• Pedestrian & Traffic circulation pattern						
Technical issues and Model making						20%
• Buildability & construction consideration						
• Model quality and detail						
Final Grade						100

Figure 4. Proposed and implemented evaluation sheet at EMU first semester of the third-year design studio for 2013 to 2014.

include oral and graphic presentation and completeness of drawings submitted to the final jury.

The given portion of the mark was 10 percent of the total. The second criterion and relative tasks were defined as the design process, including design idea approach, clarity of design process, and consideration of universal design rules. This second criterion comprised 30 percent. The third criterion and its tasks were about overall planning and context, including overall massing, spatial integration layout, and community activities integration, comprising 40 percent of the total. Finally, the importance of technicality, build ability, and quality of the model and its details comprised 20 percent. The portion of each criterion was determined by related instructors according to student level and project scale.

The designed evaluation sheet has some differences with the discussed model proposed in 2013. In the 2013 system, the scholar tries to define fixed criteria and tasks to be used as guidelines for all architecture design submissions. However, in the present study, the designed evaluation sheet is defined according to specific course objective for the said university, the scale and title project, and the unique stu-

dents to avoid the use of repetitive criteria and complicated tasks with excessive overlaps. This feature minimizes the subjectivity and idiosyncrasy in perception and evaluation of each task. Before submission, students were informed about the requirements for submission, defined criteria, and percentage of each. A total of 41 students submitted their projects at the final stage, and the corresponding 41 evaluation sheets were given to jurors with a brief about the way the assessment works.

Each student was given 10 to 15 minutes to explain his or her ideas, the development process, and planning details. Jurors were then given time to ask questions and give comments. At the end of the evaluation, forms were collected from all jurors and then used as bases for the total marks.

The results from the final submission were tabulated and run in Mini facet software to obtain the logit values. The Rasch system uses item response theory, which does not require assumptions about sampling or normal distributions and is thus ideal for performance assessment with different item structures. Item response theory enables users to create an interval scale of scores for both the difficulty of items and

the capability of the tested individuals (Abdul Aziz, A. & Masodi, S. 2008).

Logits can be added, subtracted, multiplied, and divided comparisons. Statistical studies can be made and are useful for educational gains, displays of strengths and weaknesses, and comparisons of demographic groups.

The Rasch model has been used because it can provide evidence of both the validity and reliability of the test or scale. The key in data have a tabulated base for each student with different juries. A total of 3198 digits had been keyed in to the software.

3. FINDINGS

At end of jury session, a questionnaire containing five questions using a five-point Likert measurement scale (1: not at all, 2: slightly, 3: moderately, 4: quite and 5: very) was distributed. The questionnaire asked about juror preference in using a criteria-based grading system, the time consumption level of used method, the accuracy of a given mark in this model, and the adequacy level of a defined criterion. Moreover, the questionnaire has extra lines for the comments. One of the jury members mentioned that she thought of preparing an objective list for their own design studio to be used by external examiners but never thought about using them as a grading method. She added that this method is quite new to her and that she needs more explanation to be familiar with it.

Another examiner asserted that a new method of marking student work is difficult to trust. She enjoyed evaluating students using the proposed system but she preferred to design her own schemata according to the given criteria list and work with it. Another juror asserted that he bravely decided to work with the new method and was surprised that it did what he expected. He accurately transferred the marks through the system to a numerical grade and then to a letter grade. Although he found the system interesting, another jury member disagreed and mentioned he found difficulty in finding a proper satisfaction level for each criterion.

As shown in Table 2, most tutors agreed about the necessity of using a criteria-based grading system in their grading methods in studios. Interestingly, approximately half of the tutors believed that becoming familiar with the designed evaluation sheet was difficult, whereas the other half disagreed. Moreover, 66 percent of juries believed that this method will help students obtain a more accurate grade than other systems, whereas one jury member totally disagreed.

To monitor and evaluate the quality and efficiency of the proposed evaluation model, which is grounded on criteria-based assessment rules and

N	Question	1 Not at all	2 Slightly	3 Moderately	4 Quite	5 Very
1	Do you prefer criteria based evaluation system	-	-	-	66.7%	33.7%
2	The evaluation sheet was difficult to get familiar	16.7%	33.3%	-	33.3%	16.7%
3	The evaluation sheet was time consuming.	16.7%	16.7%	50%	-	16.7%
4	The number of criteria was appropriate.	-	-	16.7%	66.7%	16.7%
5	This evaluation sheet helps to give more accurate grade compare to other systems.	16.7%	-	16.7%	50%	16.7%

Table 2. Results obtained from distributed questionnaire among jury members in percentage.

Total Score	Total Count	Observed Average	Fair-M	Model S.E.	Infit S.E.	Outfit S.E.	(Estim.)	Correlation	FitMea	PCExp	No STUDENTS
84.0	31.2	2.7	2.51	.00	.32	.43	-.31	.56			
32.9	8.4	.6	.70	1.96	.05	.44	1.8	.42	1.6	.30	S.D. (Population)
33.6	8.6	.6	.72	2.01	.05	.45	1.8	.43	1.6	.31	S.D. (Sample)
Model, Population: RMSE .33 Adj (True) S.D. 1.97 Separation 5.88 Strata 8.17 Reliability .97											
Model, Sample: RMSE .33 Adj (True) S.D. 1.98 Separation 6.02 Strata 8.36 Reliability .97											
Model, Fixed (all same) chi-square: 822.2 d.f.: 21 significance (probability): .00											
Model, Random (normal) chi-square: 20.5 d.f.: 20 significance (probability): .43											
Model, Population: RMSE .25 Adj (True) S.D. 1.22 Separation 4.87 Strata 6.82 Reliability .96											
Model, Sample: RMSE .25 Adj (True) S.D. 1.27 Separation 5.06 Strata 7.08 Reliability .96											
Model, Fixed (all same) chi-square: 308.5 d.f.: 13 significance (probability): .00											
Model, Random (normal) chi-square: 12.5 d.f.: 12 significance (probability): .40											

Figure 5. Rasch analysis report on items and students.

Figure 6. Probabilities of grades.

traits, the Rasch analyzing system was implemented. Figure 5 shows the reliability report for students and defined items to indicate the reproducibility of the measures.

Reliability is the ratio of the "True" variance of the measures to the observed variance. As shown in Figure 5, student reliability is at 0.97, which is above 0.7, indicating that the student sample has a good spread of student ability. Thus, students can be divided into approximately six groups.

Item reliability is 0.96, which is >0.7 . This finding indicates that the items have a good spread of item difficulties to measure the design progress of student projects. The difficulty level ranges from the maximum logit of 2.43 to the minimum logit of -1.18 , with a standard deviation of (S.D.) 1.22.

The raw variance data value measured by the Rasch system was 71.27%, which is higher than expected level (40%). This finding indicates that the used instrument is measuring what it is supposed to measure.

The obtained data and analysis have shown that the defined criteria for the specific sample fit properly. Figure 6 shows that in any probability and any student measurement, all marks fall within the range. On the basis of this curve, we can expect that even for a large sample of students and teachers, the criteria would work and marks can be easily predicted.

The standard deviations of grades given by different jurors to each student before and after using the proposed model are compared in Figure 7.

The values of standard deviations obviously decreased in the final exam. Moreover, the grades

Figure 7. Standard deviations of grades given to each student before and after using the proposed model.

Items	Before	After	Percentage Improvement
Average	1.62	0.73	54.9%
No. of Student with standard deviation more than 1.5	17	5	70.6%

Table 3. Improved items after using designed evaluation sheet.

given by different jurors to each student became closer to one another, and differences between grades decreased. For most students, the standard deviation of grades was less than 1.5, which was our critical level.

For further clarification, the average values of the standard deviations given by different jurors to each student before and after values using the proposed model are compared in Table 3. With the use of the proposed model, the average is improved by up to 54.9%. The number of students with grade standard deviations of more than 1.5 decreased to 5, with a significant improvement of up to 70.6%.

All analyses stipulate that the designed grading system works properly and measures what it is expected to measure. In terms of the required time for grading, given that tutors need not calculate the total mark or transfer the chosen level of satisfaction between fail to excellent, the allocated time for grading is decreased, and the maximum time allotted to measure the satisfaction level of each task and criteria. However, several issues need to be discussed, and training workshops should be conducted to capture user attention and trust for them to implement this system confidently in their jury sessions.

4. CONCLUSION

Assessment and grading models in architecture design studios are crucial and should consider the uniqueness of the product and multilayered factors. The transient process from artifact to grade is a one-way path that is often widened by subjectivity or holistic mediums. To overcome complications and make grading more explicit, the characteristics of the criteria-based

assessment model have been introduced. Many institutions may employ related models without necessarily calling them criteria-based. Nevertheless, when no discussion and contribution about the designed and implemented examples is made available, no one would learn from the successes and failures of these attempts to determine the most effective methods of fostering interdisciplinary work within a course syllabus. This study is a good beginning for more detailed discussion about the criteria-based assessment model in architecture design studios.

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ARCHITECTURAL DRAWING - AN ANIMATE FIELD

Anna Katrine Hougaard

Abstract

Architectural drawing is changing because architects today draw with computers. Due to this change digital diagrams employed by computational architectural practices are often emphasized as powerful structures of control and organisation in the design process. But there are also diagrams, which do not follow computational logic worth paying attention to. In the following I will investigate one such other kind of diagram, a sketch diagram, which has a play-like capacity where rules can be invented and changed as you go. In that way, sketch diagrams are related to steered indeterminacy and authorial ways of directing behaviour of artefacts and living things without controlling this behaviour completely. I analyse a musical composition by John Cage as an example of a sketch diagram, and then hypothesize that orthogonal, architectural drawing can work in similar ways. Thereby I hope to point out important affordance of architectural drawing as a hybrid between the openness of hand-sketching and the rule-basedness of diagramming, an affordance which might be useful in the migrational zone of current architectural drawing where traditional hand drawing techniques and computer drawing techniques are being combined with each other.

Keywords: Architectural Drawing, Diagram, Animation, Freedom and Control.

INTRODUCTION

This paper takes its starting point with two different understandings architectural drawing; one where it is considered to be a way of keeping complete authorial control over building, as we find it in Mario Carpo's reading of Alberti (Carpo, 2011), and one where it is seen as a non-neutral filter of translation from drawing to building, as we find it in many of Robin Evans' essays (Evans, 1989, 1995, 1997). I will pick up Robin Evans' thread and develop it into a discussion of what I believe are the affordances of architectural drawing in the digital habitat today. These affordances are related to cultivating indeterminacy in the design process and making it productive, to sketching and diagramming as ways of visualizing thoughts and sensations while aiming at producing new architectural qualities.

There are at least three ways in which architectural drawing asserts itself in the digital habitat today. There is the hand sketch, quick and rough, which can render ambiguous notions, early thoughts and sensations visible. Then there is a widespread practice of drawing by software, somewhat like a zone of migration between traditional architectural drawing techniques and computer techniques such as lofting, blending, unrolling, tweening etc., operations which computers makes easily available in the design process. In this migrational zone drawing-hybrids between hand and computer techniques are emerging (see for instance Spiller, N. (ed.), 2013). Then there is the drawing as diagram, that is, drawing with notational structures and rules, open and yet systematic (Leeb, 2011: 31). With the idea of the sketch diagram which runs through all these three categories I propose that the possibility of saying "perhaps" not only distin-

guishes a human diagram from a computational one (Grobman & Neuman, 2012: 102-103, quoted by Riiber, J., 2013:105), but offers a valuable way of cultivating indeterminacy in the architectural design process, indeterminacy that leads to generativity (Boehm, 2009: 219-229). The idea is less to revalue architectural drawing than to point out the differences between imagination and execution and to thematise what happens "inside" architectural representation, which is inherently occupied with orchestrating another space than that of the representation itself, said differently, the drawing is employed by architects to orchestrate the space of building, but the drawing cannot help being a site in itself at the same time.

FREEDOM AND CONTROL

The alteration of the profession of architecture that happened during the Italian Renaissance caused architects to stop being on-site builders, and start being draughtsmen instead (Carpo, 2011b). The shared conventions of orthogonal and perspective drawing, which was discovered/invented by Alberti and various other Renaissance painter-architects made it possible for architects to draw buildings very exact by way of drawing with measurements to scale in plans, sections, elevations etc.. These shared conventions of architectural drawing could all in all be considered to be a kind of communication that is allographic and digital in Nelson Goodman's sense of the term, much like a musical score which is used to pass on instructions for a performance. According to Goodman, music is an allographic, digital and notational art form; because a musical score is a shared symbol system used by an author to orchestrate a

space that is different from the space of the musical score itself. Painting, on the other hand, is an autographic, analogue and non-notational art form, which does not work by a system of shared conventions and coded instructions (Goodman, 1976).

In Mario Carpo's idea of and gesture against what he calls the "Albertian paradigm" he sees architectural drawing as an inherently allographic and digital symbol system which is used to keep complete control over building (Carpo, 2011). To him it seems that the wish for complete control that Alberti strongly propagated has finally come through with modern computers and their notational systems: the code and the algorithm. Carpo therefore encourages all architects to change the traditional working tool, the iconic drawing, for more powerful computer and 3D printing technologies. However, he thinks that such a trade-off is connected to a loss of authorial control the control being taken over by software. Therefore only an architect who masters the creation of software is a real author (Carpo, 2011:126-127). With this situation Carpo suggests that the notational system of architecture has finally reached full allographic status in Goodman's sense; a status that the traditional drawing could not grant architecture. The problem with traditional drawing was (and is) that there is a "dangerous" gap between the drawing and the building, a gap where all sorts of noise can enter and obscure the plan. Now, when architects can communicate directly with machines through software, this gap is eliminated, so Carpo. To him this suggests that architects are yet again becoming builders rather than draughtsmen like they were before the Renaissance (Carpo, 2011:44-48). In a sense it is true because the feedback loop between computer software and printed artefact is very dynamic and precise. Architects can quite easily get their design plotted in a two or three dimensional material form. But I think Carpo overlooks that we are still working through a representational space and not on a material artefact, as the pre-Renaissance architects did, and this representational space does not make up a neutral chain of translation. A computer's representational space can be just as co-producing and condition results just as much as orthogonal drawing, although each representational environment may be suggestive in different ways (Bertram, 2014). I think Carpo overlooks that the representational space co-produces forms together with imagination, as I will return to below.

But it is not only the use of software and 3D printing machines that is key to the new authorial situation of architects according to Carpo. He thinks that only architects that write their own software are real authors, whereas those who use other people's software are agents (Carpo, 2011, 126-127). Carpo draws on Janet Murray's idea of agency that she conceived in relation to computer games when he claims this (Murray, 1997). Murray's idea is roughly that those who design a game and a gameplay are authors, where as those who perform the game are agents. The level of agency can be high, as in chess, where the player has a rich palette of opportunities, but is still different from inventing the game and its rules. Carpo uses this idea to make the claim that if architects use other people's software then they are agents and not authors. But then what about the orthographic drawing system? That is a shared authorial environment which conditions results but do not determine them. It is, so to speak, the system of an

architectural game conceived by Alberti and his fellow painter architects during the Italian Renaissance, as Carpo rightly points out. But the important question then becomes, have all architects since then and before the computer been agents? I do not think so. At least, then, the degree of agency has been so high that it was possible to produce singular architectural works, although they were made with the same drawing system. It becomes almost impossible to distinguish who is author and who is agent when the rules of a system are so open and we even have the authority to change the rules of the drawing system we are working with. A drawing system is a representational environment that only determines what you draw to a certain degree; the architecture drawn makes up a working nexus with authors and situated, cultural and social desires. And of course, as Carpo emphasizes, architects today have more authorial environments at their disposal than the orthogonal drawing system, but one environment is not inherently better than another, but of course it conditions results in different ways. To think of one tool/medium as essential more ethically right than another as Carpo does when he gives more value to digital affordances than to drawing affordances (Carpo, 2011, p. 126-127) it could be compared to encouraging architects to see the world through one map only, where it would really be good to see the same world through different maps with different viewpoints and projections (Wood, Kaiser, Abrams, 2001). In relation to the representational space of architecture this would be to consider what the different tools/media can do and how they co-shape what we design with them. To *not* consider this is to *not* take the delicate balance between the affordances of a tool/medium and an authorial motivation into consideration, that is, to *not* pay detailed attention to what happens in the space of representation; in the gap between the architect and the artefact, where thoughts and sensation are cultivated and invented. Authors and tools/media compound in different ways and mark the outcome, as Robin Evans has coined it in relation to traditional architectural drawing.

THE POWER OF REPRESENTATION

Despite the fact that drawing can be used as a technical facilitator to control building down to the smallest detail as Carpo's idea of architectural drawing emphasizes, there is more to architectural drawing than that. Take for instance the anecdote of Ernst the elder, the father of the German artist Max Ernst, who painted a picture of his garden, only to find out that he did not after all like the composition. Therefore he removed a tree from the painting which made him like the composition better. The consequence of this, however, was that he removed the tree from the garden. This anecdote makes Robin Evans suggest the following.

"... is there not, in fact, a constant interplay between the passive portrayal and the active remodeling of reality? ... If the activating imagination is permanently removed from consideration, drawing very easily slips into the category of a mere technical facilitator, and this results in two illusions: first, that it makes no difference to what is drawn (unless done incorrectly); second, that drawing can propagate things, but never generate them. These illusions will persist as long as we regard good drawing as a simple truth-con-

veyor. As much can happen in the drawing as out of it." (Evans, 1989: 20).

This is another idea of the drawing's representational power. It is to acknowledge the suggestiveness of representation and that imagination is connected to representation. An architectural plan is usually used to remodel reality in one way or another, as a test of a new situation which we can imagine as it is rendered in drawing. This is a valuable feedback that architects get from their working media, a feedback which may distort an initial idea as it is visualized. In the process of visualisation, we see our idea through the representation, and we can change it so it corresponds to our aims. Sometimes we may not have an idea at all when we start out, but it emerges as we draw it. This is why architects sometimes say that the drawing is smarter than they are, because it shows things that could not be seen in the mind only. This does not only go for drawing but for other kinds of representational spaces as well, for instance, artistic computer coding ("Code allows me to see the things I imagine", Abe Pazos, <http://www.hamoid.com/>, accessed 30.12.2014). This means that representation feeds visualized information back to us which we can change through the representational system we use until we have reached what we want. When we then pass it on to the next link in the chain of design and eventually have an output at hand, then that output has been influenced by us and our tool/media of choice. As an example of this, Evans suggests that perspective and orthographic drawing techniques co-shaped the rectangular and orthogonal form of classical architecture (Evans, 1995:119). In part this happened because the drawing tools at the drawing table are suggestive of this; these building forms are, so to speak, what the tools want. But, importantly, the tools are not deciding everything (Evans, 1995: 339). The rectangular, classical architecture was also socially and culturally desired at the time. So the properties of orthogonal drawing were allowed to control the game because they entered into a successful, temporary "working nexus" (Evans, 1997:200) with social, cultural and aesthetic desires. So, we are dealing with tools and media that are indeed suggestive of specific forms, and at the same time architects push against this suggestiveness with their own, situated wishes and desires. This causes Evans to say that we are dealing with working nexuses between situated, social and cultural desires, along with the properties of the tools, and, not least, building technologies. According to Evans there is an almost biological reciprocity at stake when it comes to these working nexuses. When a drawing technique becomes an obstacle to life and does not facilitate life's desires, it will usually go out of use (Evans, 1997: 195-233). On the other hand, architectural desires can also push the techniques and thereby make new things possible. Take, for instance, Hans Scharoun's *Berliner Philharmonie* (1964), which as opposed to classical architecture, corresponds to other spatial desires which were difficult to handle with orthographic means, so Scharoun developed the building in model and series of sections, because the forms of the space was not in congruence with what the orthogonal drawing could facilitate (Evans, 1995:94-10).

This is a quite different way of understanding architectural drawing and representation than as a noiseless chain of command between architect and building. I think it is to acknowledge that there is a gap

"filled" with representation, no matter how seamless a chain of translation may seem. As Evans has argued the gap of representation is also filled with different projections and, we could add, noise which all together co-produce architecture as an almost undefinable parameter. I am interested to follow architectural drawing via this route and further, since it tells us something about how the affordances of drawing as a medium that conveys instructions but is also used to cultivate aesthetic choices as a site in itself. So in the following I will investigate a co-producing gap of representation as a kind of authorial milieu where indeterminacy can be steered through.

DIAGRAMS

My understanding of Evans is that orthogonal, architectural drawing can be like an open set of rules. If we consider plan-drawing as being a drawing technique, then it makes use of shared conventions so everybody who knows the conventions can understand what it means. These conventions are the shared rule-set, but they are open because we can draw a plan in any way we would like it to be. We can even use the conventions to draw utopian architectures, which cannot actually be built, but which can inspire us. A plan drawing is prescribing and systematic but yet open; the technique gives the drawing a common stamp, but does not for that reason determine the drawing completely (Evans, 1995: 123-177, 339).

We could therefore understand orthogonal drawing as being a diagram, the most common architectural diagram indeed. With computers architects have got access to more different diagrams, the diagram is, so to speak, a much broader and diverse category of rule-sets with orthogonal drawing being just one diagram amongst others. A diagram does not follow one overarching set of shared conventions, but you can always change the rules of a diagram as you are making it, and as it is making things visible for you. Diagrams are invisible control panels, relational systems for orchestrating artefacts or other systems (Kwinter, 2010:250) that only show themselves indirectly dressed in a two or three dimensional, material guise. They are powerful vessels for negotiating thoughts and sensations through material artefacts (Bertram, 2014).

This also goes for the orthographic diagram where the invisible parallel projectors only show indirectly when an artefact is actually drawn. We can draw any artefact in orthographic projection but we can scarcely draw the projection itself without the artefact. Orthogonal projection is just a bunch of invisible projectors running from all imaginable points orthogonally crossing each other. The projectors operate in our minds and on the drawing plane but are only seen indirectly when something is drawn. Nonetheless, the orthogonal diagram can co-shape artefacts in the form of orthogonal projection, as Evans has argued. The extent to which this happens is negotiated by the culturally situated and motivated architect, who always has the freedom to change the conventions of the representation, the authorial environment.

STEERING INDETERMINACY THROUGH REPRESENTATION

In Nelson Goodman's analysis of this musical

Figure 1. This is an origami folding of the typical orthogonal drawing layout, plan and two elevations. It was an attempt to fold the orthogonal drawing system as an origami tessellation; to fold one system with another; but the system only stands out due to the motif; the house. Otherwise the system can only be folded as a grid. Made by the author.

Figure 2. The composition "BB" by John Cage, Concert for Piano and Orchestra, Solo for Piano, redrawn by the author.

notation by John Cage, Goodman cannot determine which of his two categories, autographic art forms or allographic art forms, the composition belongs to (Goodman, 1976: 187-190). Therefore he ends up calling it an "autograph diagram"; a hybrid between Goodman's two own categories. Goodman considers the composition to be similar to a sketch that comes before an event (Ibid.: 190).

"... dots, for single sounds, are placed within a rectangle; across the rectangle, at varying angles and perhaps intersecting, run five straight lines for (severally) frequency, duration, timbre, amplitude, and succession. The significant factors determining the sounds indicated by a dot are the perpendicular distances from the dot to these lines. ..." (Ibid.: 187-189).

This explanation together with the dots, the oblique lines, the letters function like a legend of a map, and are allographic elements. These elements make up the rule-set which tells us how the composition is to be read and performed. This makes the composition different from a painting, which works without a legend, because it does not intend to give instructions for events to be carried out outside the painting's own space. However, this legend does not contain clear, coherent rules for the enactment of the composition. Rather, they are fragmented and unclear, and the performer literally has to draw the composition further in order to dismantle some of its meaning (fig. 3).

But the composition does not have a scale, so there is no measure which can tell us what the distance of any of the orthogonal line from a dot to an oblique line means exactly. Therefore the musician must interpret meaning into the composition in order to make up for its inconsistencies, for instance, choose a scale and choose a meaning linked to that scale. Because of the inconsistencies in the rules, Goodman thinks that any performance of this composition will never be similar; there are too many ways to interpret it, so therefore it is not allographic, despite the allographic elements it has. The only clear instruction in the performance is that 12 tones (12 dots) should be

Figure 3. . My interpretation of the instructions applied to the composition.

played. This gives all performances stemming from this composition a common feature; but exactly which tones and how they are played will always differ depending on the performer.

I find this interesting because it is similar to what we find in a digital diagram for a parametric, architectural design the rule-set of which must a coherent code. So what is the difference between a digital diagram and Cage's sketch diagram? There is of course its iconicity, which makes it different from being a musical "code". It represents all information in one image at once and not as a linear sequence to be executed. But, most importantly, in Cage's notation the algorithmic variability is caused by the human imagination that can fill in gaps in the rules, where as in a digital computer diagram the variability is caused by rules can handle complexity beyond human ability. Both ways can create great artistic results. Cage's diagram is thematising indeterminacy because it relies on a human to execute the algorithm and who also has to invent the missing links. It makes up a potential, a lack, so to speak, which can be productive in a creative process (Boehm, 2009: 219-220), because the imagination seeks to fill in the holes and solve the puzzle thereby producing new diagrams and ideas. But for the same reason it can also become redundant; we can look and look for answers that we will by definition never find, because they are deliberately not in the composition's diagram. Therefore we must approach such a diagram - never quite graspable and yet very precise - with our own agenda and make it work. It is a system of partial control on the side of the author and partial freedom on the side of the performer/agent. Although author and performer/agent are not on equal terms, because the performer has to accept the premises of the authorial environment, the performer has a larger degree of freedom than in a usual, linear musical score. There is a high degree of agency in the composition, so high that the only precise common feature is to play 12 tones.

Cage's composition thematises authorship and agency, freedom and control mechanisms and points at the difference between imagination and execution. More than a finished composition it becomes a game or a play, where the rules can be made and

changed as you go. This is an ability of sketching, as Goodman points out too, and when the sketch is combined with the precision and systematics of the diagram, as here, the composition addresses the human faculty of imagination and interpretation and the ability of saying "perhaps" and "what if" as we follow some rules and make up others.

I think that John Cage's composition is a good example of a sketch diagram, and that the affordance that is has to steer indeterminacy, is also an affordance that is related to architectural drawing. We could think of this affordance as being the drawing's diagrammatic flexibility or animation. In that case, the animation arises in the meetings between different entities, for instance, the author, the drawing and the drawing system; the drawing and the performer; the performer and the

output; the output and the receiver. This way of sketching by diagrams can be followed up by both a computer and a human performer. But why is this important? Because Cage's composition thematises the space of representation as the cultivation of a gap; a gap that should not be overlooked. In Cage's composition it is a deliberate cultivation of indeterminacy and openness, which is transmitted further through the representational space towards the world we live in, and eventually will leave a mark on the world. I think that this way of diagramming in architecture would be a hybrid between loose, opening sketching and precise, systematic diagramming, and that it indicates that neither orthogonal drawing nor any other space of representation is a neutral, technical facilitator.

ORTHOGONAL ANIMATION

As a paraphrase to the argument presented above, I will show a series of my own drawings which are inspired by Robin Evans' essay *The Developed Surface – The Brief Life and Death of an 18th Century Drawing Technique* (Evans, 1997: 195-233). To develop a surface in descriptive geometry is both to fold a two-dimensional plane into a three-dimensional object, and to fold the adjoining faces of a three-dimensional object out so all faces lie flat (Ibid.: 202), as when folding an origami figure and folding it out again. In the essay Evans describes how the developed surface drawing technique took part in a working nexus with a special kind of wall-mounted interior style and a hierarchically determined social practice where the centre of a room was left empty and behavioural patterns were ordered along the walls. Moreover, this way of drawing a plan with adjoining elevations does not show the connections between neighbouring rooms, a feature which also was in sync with the time's idea of a room as being a closed world in itself.

The developed surface drawing technique made it easy for architects to draw this desired kind of interior architecture, but when the way of life changed, the drawings mutated, as Evans calls it, and strayed from the strict orthogonal set up by letting furniture inhabit the floor; furniture which was drawn with other kinds of projections (fig. 5). And eventually, the interior style and the drawing technique went out of use,

Figure 4. A developed surface interior drawing by Thomas Sheraton, 1793.

Figure 5. A mutated developed surface interior drawing by Gillows and co., 1822.

and usual plan and perspective drawing was reemployed.

The developed surface interior was a material instantiation of a working nexus between a representational technique, socio-cultural practice and architectural desire. Did the technique determine the interior style or was the interior style simply facilitated by the technique? It is hard to say, but there was a relationship where each part animated the other. To this abstract kind of animation adds that if we think of the technique as kind of origami folding, then we have

a sort of animation between two states, a flat and a folded state. I have played with that idea in the following drawings, where I used different kinds of software, for instance, Tomohiro Tachi's *Origamizer*

Figure 6. My working room as developed surface drawing.

Figure 7. Imagined folded structure in my working room.

Figure 8. The folded structure in plan view.

Figure 9. A folding pattern of the structure made with Tomohiro Tachi's Origamizer (<http://www.tsg.ne.jp/TT/software/>).

Figure 10. Working room with the structure and folding pattern.

Figure 11. Another folding pattern of the same structure made with Rhino.

Figure 12. A new design with furniture like, wall mounted elements. Hand sketch.

Figure 13. Several adjustable layers on top of each other, paper model.

Figure 14. Laser cut adjustable model of the room.

Figure 15. The model unfolded, plan.

Figure 16. The adjustable model in elevation.

Figure 17. More copies of one room placed next to each other. All possible movements are animated in 3D Studio Max.

Figure 18. Stills from the animation, elevation.

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Figure 19. Computer animation next to "hand animation".

Figure 20. Hands playing with the model.

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PREPARING STUDENTS TOWARDS THE COMPLEXITY OF TODAY'S PRACTICE: START-UP IN A MULTIDISCIPLINARY ASSIGNMENT.

Faas Moonen, Tom Veeger

Abstract

Education in the Department of the Built Environment (Eindhoven University of Technology) aims to prepare students for multidisciplinary design teams. The Bachelor program offers a broad range incorporating essentials of urbanism, architecture, structure, building physics, real estate, construction, services et cetera. This broad BSc program lays a foundation for students and is followed by a Master program that focuses on specialization. There are six specializations: Architecture, Urban Design & Planning, Structural Design, Building Physics & Services, Real Estate Management & Development and Construction Management & Engineering.

Multidisciplinary in the BSc is more than offering a variety of knowledge in courses and lectures. The Department also puts a lot of effort to train students to gain experiences in integral design teams. This takes shape in studios but is best expressed in the Multi-project (a semester assignment in the last year of the Bachelor). This assignment is organized by 9 coaches (from all specializations in the Master). The assessment is always a practice-based issue, and students have to cooperate as a design team during one semester. Developing the Multi-project has been a long route that took place over many years with several adjustments according to experiences and information gathered by student inquiries.

This paper gives a very global overview of the present setup to contextualize this assignment. After that, the main part of this paper focuses on the kickoff (first 2-3 weeks). Here students start in parallel studios, meant to put them on track for integral design. Each studio combines two disciplines and compels students to precede design by analyzing all kind of issues in the light of the specific assignment.

Because of the complexity of this assignment we frequently ask students to fill in an enquiry. Because of this we are now able to draw conclusions from major changes during the last 10-14 assignments (2007 – 2013).

Keywords: Multidisciplinary Education, Case Study, Integral Design, Organization Of Studio; Coaching.

1. INTRODUCTION

Today's building demands become more and more complex which necessitates academia to prepare students for a practice in which they are ready to cooperate in design teams in close interaction with all disciplines. To gain the most from this interaction requires an education of team workers who can put themselves in the position of other domains. A study of already a decade ago pointed at that time a great demand in building practice of broad educated engineers who have thorough knowledge of a specific discipline, but who are able to cooperate in a team (Clough, 2004). Ten years later this finding acquires additional significance.

Preparing a student to work in a design team requires more than providing knowledge of adjacent subjects and different disciplines. Book knowledge is yet essential, however enabling a student to gain actively experience in collaboration in an integral design team is considered a key to cooperation, as the proverb says: the proof of the pudding is in the eating (Swagten, 2010).

To school engineers in the built environment to become broad educated engineers with a thorough

knowledge in a specific discipline, the Department of the Built Environment of Eindhoven University of Technology (TU/e) offers a BSc program with a broad range of courses incorporating essentials of urbanism, architecture, structure, building physics, real estate, construction, services et cetera (as indicated in Figure 1).

Each square in the scheme of Figure 1 stands for a course of 5 EC (European Credits) and equals a course load of 140 hour. A course lasts for one quartile (with 8 weeks of lectures / assignments plus 2 examination weeks). So a student attends 3 coinciding courses per quartile (commonly 2 lecture-based courses and 1 studio-based course). To enable more complex studio assignments most studio-based courses combine two contiguous blocks to enable semester assignments.

Squares in the scheme of Figure 1 with a solid frame represent common courses, while a square with a dotted frame represents that a student has an option. As can be seen 56% of the BSc-courses are compulsory courses of all kind of building disciplines, most to be found in the 1st year. 33% of the courses are studio-based.

In the 2nd year, students choose from three

Figure 1. Overview of courses in the Bachelor Architecture Building and Planning (TU/e 2013).

different studio assignments: Technical (emphasizing on structure and building physics in a spatial design), Design (emphasizing on urbanism and architecture in a spatial design), and Management (emphasizing on management and real estate in a spatial design). Here a student gets in lane for a later discipline, yet always in the context of the total building scheme. In the 3rd year, students work together in the Multi-project, which is explicated in the next paragraph. After that, the last studio assignment in the final semester offers 6 choices, to prepare students for one of the six specializations in the Master Architecture, Building & Planning (ABP): Architecture, Urban Design & Planning, Structural Design, Building Physics & Services, Real Estate Management & Development and Construction Management & Engineering

In this set-up TU/e offers a broad BSc program to lay a foundation for students, followed by a specialization in the Master.

2. MULTIDISCIPLINARY ASSIGNMENT IN THE CURRICULUM OF BSC-ABP

The position of the multidisciplinary assignment (Multi-project) in the curriculum of the BSc ABP is shown in Figure 1. Learning goals, way of organization, supervising and coaching, and assessment procedures are described in (Moonen 2013a and 2013b).

The aim of this studio assignment is to train students with knowledge and experiences in integral design on practice-based design projects using Design-Based Learning (DBL). Design-Based Learning is developed to learn students to integrate and apply knowledge (Wijnen, 2000). Design-Based Learning elaborates on educational principles of Problem-Based Learning (PBL) (Graaff, 2003). Problem-Based Learning is based on the principle that essential knowledge will be acquired in courses, lectures, and small

exercises and that this knowledge is used in studio assignments by using realistic problems. Problem-Based Learning supposes that students develop skills and integrate knowledge by solving ill-defined problems (Kolodner 2003). Academia commonly use Problem-Based Learning in engineering education, however there are significant variations between different engineering domains, particularly in the characteristics of projects, the role of teachers and coaches, and in design elements (Gómez Puente 2013). Most of the architectural education is based on studio assignments (Goldschmidt, 2010). In a design studio, desk critics are given by a tutor and this is the major pedagogical method: Criticism is the act of making judgments and evaluations from tutors to students (Graham, 2003:18) to communicate design knowledge, and to bridge the gap from theory to practice (Salama, 1995:70).

The multidisciplinary assignment is always a practical assignment to train students in solving problems with the complexity of today's practice. Another major point of particular interest is to learn students to cooperate in a team in which every student takes responsibility for a specific domain.

2.1 STRUCTURE OF THE MULTIDISCIPLINARY ASSIGNMENT

Figure 2 shows a schematic timetable (developed for sem. 2, 2008-2009, and still into use). This timetable follows the educational agenda of TU/e with 4 quartiles: 7 weeks with lectures, assignments, and studios followed by 1 week without lessons (enabling students to prepare for exams) and rounded off by 2 weeks with examinations. The Multi-project is a semester project, so there is always a break in the middle. This break disturbs the progress in design teams in some perspectives. However others also regard it beneficial to

Figure 2. Scheme of timetable of the Multi-project with different phases and assessment deadlines (since 2009).

have a forced moment of contemplation at $2/3^{\text{rd}}$ of the process. Yet having to split a complex process emphasizes an even stricter planning in addition to the complexity of team work and the complexity of students facing different interacting task and responsibilities.

Figure 2 shows the sequence of Multi: team design – individual elaboration on different disciplines – team presentation. This sequence has always been the backbone of the Multi-project right from the start in 2002. The intermission by discipline weeks enables a student to work on a specific part of the team design in detail, elaborated from the perspective of the students' disciplinary responsibility. This helps tutors to mark individual results as well as team collaboration.

Workshop weeks at the outset of the scheme in Figure 2 are introduced in 2009. Before that, from 2002-2009, the studio started in the very first week with students in design teams. In those years there were quite a lot of complaints at the end of the semester. Most of the complaints came from students in technical disciplines (structure, building physics, building technology, and construction) and could somehow be traced back to the start of the project. Here students of technical and managerial disciplines put pressure on

urban and architectural designers, since the other students had the idea that their work could only start after the outline of a plan was set. This often resulted in urban and architectural designers who were not allowed to start with a proper analysis by other team members. A corresponding effect was also noticed that technical students weren't all that involved in the early design decisions (due to the time pressure) or didn't yet have the adequate understanding to take in consequences of early decisions.

In many design teams the technical consequences just reveal at the end of a semester, leaving little time to elaborate on solutions. Other complaints affected students of technical disciplines who assisted the urban and architectural students to speed up the design. This resulted in students who were largely involved in urban and architectural designing, leaving not enough time to pass requirements in their own domain. To withstand these negative effects, we introduced workshop weeks from 2009 on to enable *all* students to start with a good analysis in their domain, and to enable tutors to prepare students to stay involved directly from the start. How these workshop weeks are organized is described in the paragraph 3.

projects:		number of students who gave response to the inquiry (< participating students)						
Academic year	semester	total inquiries	urbanism	real estate	architecture	structural design	building physics services	construction & building technology
2007-2008: 2	sem. 2	45	9	12	9	2	1	12
2008-2009: 1	sem. 1	-	No inquiry in this semester					
2008-2009: 2	sem. 2	54	8	9	13	6	4	14
2009-2010: 1	sem. 1	51	4	16	20	4	1	6
2009-2010: 2	sem. 2	52	6	12	21	5	5	3
2010-2011: 1	sem. 1	45	5	6	19	5	3	7
2010-2011: 2	sem. 2	41	4	4	17	4	8	4
2011-2012: 1	sem. 1	44	1	14	17	3	4	5
2011-2012: 2	sem. 2	62	4	10	29	8	5	6
2012-2013: 1	sem. 1	42	2	8	22	4	3	2
2012-2013: 2	sem. 2	55	6	13	23	5	6	2
2013-2014: 1	sem. 1	28	2	3	11	5	3	2

Table 1. Number of students that answered the inquiry (not all participating students have given a response).

2.2 STUDENT INQUIRIES TO KEEP A FINGER ON THE PULSE OF THIS MULTIDISCIPLINARY ASSIGNMENT

Because of the many complaints in the period before 2009 and the complexity of the studio, we have performed student inquiries in all semesters from 2009 (semester 2) until now. Unfortunately we don't have many inquiries in the years before 2009. In all these years we were able to keep the questionnaire quite commensurable, which enables analyses of the effects of the measures taken over the years. Apart from the formal inquiries there are many informal interactions of students and tutors to keep grip on the effects and to keep improving the concept of this studio. One of the informal interactions is a feedback session of all tutors with the different design teams, where students are encouraged to suggest propositions to improve the studio.

The number of students that replied to the inquiry is shown in Table 1. Of course more students were involved in the different semesters because not all students have given a response to the inquiry.

Table 1: Number of students that answered the inquiry (not all participating students have given a response)

One item in the inquiry refers to the time table shown in Figure 2 with a question "Do you think the project has a clear planning?". Results are shown in Figure 3 with a remarkable change at the start of academic year 2011-2012. Here the project description was improved and a detailed script was made to streamline the project organization, as well as a scenario for dates and requirements that need to be arranged including necessary reservations. This script is used ever since, and reflects in the score of students.

2.3 A PROJECT WITH MANY ASSIGNMENTS

A requirement to exercise supervision over a complex process is to offer a strict time table (shown in Figure

Figure 3. Result of the question regarding the planning in the student inquiries of 11 semesters.

2), a clear program for all assignments (Figure 4), and of course explicit instructions. The different assessment components, mentioned in Figure 4 are described in (Moonen 2013b) and also in (Proveniers 2009). The method of individual marking that takes into account the participation in team process and also team results (with different pieces to be assessed and many assessors from different disciplines) is described in (Moonen 2013a).

The photo in Figure 4 provides an impression of the most important pieces of work of a design team that is presented at the end of the semester in an exhibition. Apart from this there are disciplinary reports from individual team members (about 30 pages not including appendices) and a final oral presentation (Figure 6).

This large number of pieces of work that can be evaluated provide the assessors of this project a more detailed idea of the result of an individual student (particular for the technical and managerial disciplines). And because many assessors work together

Figure 4. Flowchart of the multidisciplinary project indicating the assessment components.

Figure 5. Exhibition of the design from one of the design teams, including 3 models, reports, posters, et cetera.

Figure 6. Final presentation of one of the design teams of the Multi-project.

Figure 7. Response of students in different semesters regarding assessments.

(in this course up to 9 assessors for 60-120 students), the marking is less subjective due to the number of marked subjects and the consideration among assessors.

Figure 7 gives the results of a question in the inquiry regarding the assessment segmentation. The question that was asked read as follows: "Do you think that the different assessment moments had a positive effect on the way the design team progressed?". The score over the many semesters is quite constant and acceptable (especially when one considers that the answer is in the perspective of imbalanced workload of team members due to the different disciplines involved).

3. WORKSHOP WEEKS

Figure 4 shows the place of workshops and Table 2 shows 6 themes with different combinations of disciplines with corresponding topics in a specific semester. As the figure and table displays, the theme of a workshop is always an interdisciplinary combination of two areas of interest. To provide every team with the relevant information that is gathered in one of the workshops, we ask each design team to point two delegates to attend a workshop. A design team in the Multi-project is in general made up with six students (covering the disciplines, urbanism, real estate, architecture, structural design, building physics & services, and construction & building technology). However we also accept that students pick a discipline they prefer. Because there are more students who are interested in architecture (and less students who are interested in structure or building physics) a students' design team often does not incorporate all of the six disciplines. Also the total number of students in a semester hardly ever equals a multiple of 6, so the set-up of design teams differs quite widely. As a result, a workaround had to be developed for the Multi-project. Therefore, independent of the preference of students in a design team we expect that all six fields are taken into account in the integral result of a team (even though one or more disciplines are missing). However we do not expect a thorough study by calculations or other means of underpinning of disciplines that aren't covered in a team. However, we do ask every design team to participate with two students in each workshop. With about six students per design team, this comes to an organization based on 3 parallel workshops.

When workshops were organized for the first time in the Multi-project (2009) there were 3 sessions of 3 parallel workshops and workshop weeks took 4

Workshop nr.	Workshop participants and topics	
	Participating delegates	main topics
1	Real estate / Urbanism	Function, markets, genius loci
2	Technique / Building physics	Room conditions, climatic concepts
3	Architecture / Architecture	Architectural concepts
4	Architecture / Urbanism	Historical and morphological analysis
5	Real estate / Architecture	Typological analysis
6	Construction / Structure	Site conditions, building systems

Table 2. Example of workshops with topics (in 2013-2014, semester 1).

weeks in total. This worked quite well in the beginning (Figure 8), but after a while students started to object that the issues in the workshops were quite laborious and that workshop weeks took a too large part of the semester (leaving too little time for design weeks and disciplinary weeks). As a result we reduced the number of workshops from 3 sessions of 3 parallel workshops into 2 sessions of 3 parallel workshops for the 2nd semester of 2010/2011. And in the 2nd semester of 2012/2013 we further reduced the workload caused by workshops by reducing it to 2 weeks.

3.1 WORKSHOP WEEKS: FORCED DELAY TO BRING ABOUT TIME TO START WITH ANALYSES BY ALL DISCIPLINES

The main reason to start a Multi-project with workshop weeks was to force students to start in analyzing the problem before jumping into solutions. And also to take away the pressure from students with a technical or managerial scope towards students who were responsible for urban and architectural interventions. However, another important aspect of introducing workshops at that time in 2009 was to provide students with comprehensive information in respect to the specific problem of the assignment and the explicit context of the assignment. Therefore a system with workshops was developed to render a vast amount of information and knowledge. This takes place in a set-up with 20-40 students per workshop (depending on the number of students in a semester). The supervisors of a workshop (always a combination of two teachers with different backgrounds) prepare 10-20 issues that relate to the specific problem of that semester; to the appointed situation for the design; or to gain more detailed knowledge on relevant items. Each issue is worked out by two students and presented to the whole group in the workshop. After that, the results of the elaborated issues are projected on maximal 2 A-4. The supervisors insist that all documents are uploaded in a SharePoint (to give all student access to all summaries of results). The uploaded pages of an issue always carry the names of the investing students on it, to enable other students to get additional information in a later stage, if required. In this set-up the 20-40 students acquire a lot of information in the short period of 2-4 weeks that makes an ideal starting point in the design teams.

An additional advantage of starting an integral design process by workshops instead of starting with discussions in a design team, is that supervisors can emphasize technical and managerial students to participate in the early stages of a design. This is important because most decisions that are considered in an early stage have far-reaching consequences

Figure 8. Response of students regarding the workshops.

(when technical and managerial experts in a traditional process are hardly interested). From the moment that a common engineer is confronted with consequences of a decision (in a later stage) it is very difficult or even impossible to change this for the better. While a proper interaction in the early design phase can prevent negative effects (and often leads to better overall solutions). An engineer who wasn't involved in the early phase has no other choice than to make complex interventions, often with a negative effect on the technical discipline as well as on the overall design. Supervisors in workshops can point students on aspects taken in the early stage that strongly influences one's discipline. And also to come up with alternatives for this (which is difficult for inexperienced designers to do by themselves).

Figure 8 expresses the appreciation of students in respect to the workshops. Here students answered the question "Do you consider a Multi-project with workshop weeks an adequate way to start?". The result of the inquiry is interesting because in the beginning of 2009 students really appreciated this. From the additional remarks to this question it can be concluded that the high score is for a large part caused by the fact that these students knew the situation before 2009 (from other students who took part in the old set-up). They appreciated the change to the start with workshops. After about a year the reference of the previous situation faded. From the remarks in the inquiry in semester 1, 2010-2011 can be concluded that students knew that there was a lot of work to be done in the design phase and that they preferred to have more time in design weeks. The Multi-organization responded to this and reduced the number of workshops from 9 to 6 in semester 2, 2010-2011. The appreciation increased, however the effect didn't last for long. We tried to improve issues in the workshops in later years, but the result in the inquiry was marginal. In semester 2, 2012-2013 we reduced the number of workshop weeks (originally 4 weeks) to 2 weeks. Thus the last two semesters give acceptable scores (although one can argue if students do understand the advantages, because they, unlike students in 2009, have no reference of another start since this is their first multidisciplinary exercise).

3.2 WORKSHOP REPORTS: MORE PIECES OF WORK TO EVALUATE

Figure 9. Response of students regarding the topics in the workshops.

Another reason to start with workshop weeks were complaints of students with a technical focus in the years before 2009, who were assessed for a large part on the disciplinary report. According to the assessment method the technical report had to be more than 5,5 on a 10-point scale (Moonen 2013a). The consequence of a disciplinary report that is substandard means that this student fails, even if the result of the design team as a total is considered very successful. The complaints of students related to designs that took a too long time span, leaving not enough time for making a disciplinary report on technical subjects. And because this was the only piece of work that caused the failing of a whole semester project, this was considered an unfair treatment. By changing the set-up by adding workshop weeks we could create an extra piece of work that was to be assessed at the beginning (where a students' result wasn't affected by working under pressure of time).

Figure 9 shows the results of the question "Are there enough interesting topics in the discipline weeks for the discipline that you represents?". The results is quite acceptable and the improvements in the later years are appreciated.

3.3 WORKSHOP ORGANIZATION: PRACTICE BASED

The idea to use workshops in the organization of the multi-project was partly derived from the way design teams function in real practice. Here members of a design team originate from different firms of consultants. Members of a design team meet each other quite often if they have to solve a complex assignment, however in the intermediate time the members will elaborate on a discipline at the office of the consultant. Working surrounded by (disciplinary) colleagues offers the possibility to ask a colleague for advice. We try to copy some of this by starting in a workshop, where all students with the same discipline meet and discuss with each other. This enables students to ask others for an opinion if they meet difficulties on a certain aspects. This interaction between students is a very effective way to gain knowledge for the student who brings up an issue as well as for the students who explains a matter to others. However a too strong focus on this in the early set-up of multi resulted in a kind of

Figure 10. Effect on students in regard to integral design.

conflicting situation when students of a discipline tried to help one another to “protect the discipline against the others”. This is one of the reasons why we don’t have monodisciplinary workshops anymore but interdisciplinary workshops instead. Interdisciplinary workshops also provide an opportunity for a duo of supervisors to collaborate and to serve as a model.

4. CONCLUSION

Educating students to gain practice in integral design is complex and requires a specific studio set-up. Even though students feel the pressure of this complex process we consider it essential to start by analyzing. In the first set-up (without workshops) it was hard to realize proper analyses to start in a design team. In particular the students with a technical and managerial responsibility in the design team put a lot of pressure on the urban and architectural designers in the team to produce a plan. The technical and managerial students had the idea that their work could only start after the outline of a plan was set. So other team members didn’t allow urban and architectural designers to start with a proper analysis. Technical and managerial students had the impression that they didn’t need analyses as long as the plan was not set. A consequence was that technical and managerial students weren’t all that involved in the early design decisions. Or they didn’t yet have the adequate understanding to take in consequences of early design decisions.

By introducing interdisciplinary workshop weeks we were able to make duo’s of supervisors that serve as a model for students in the design teams. We also are able to force *all* students to start with analyses of the specific problem, the appointed situation or to gain more detailed knowledge on relevant items. This is realized by 6 workshops (2 sessions of 3 parallel workshops in the first 2 weeks). In a workshop 10-20 issues are elaborated in teams of two students and the results are presented to one another and also a summary of the results of two A-4 is uploaded in a SharePoint. This procedure renders a vast amount of specific information and knowledge in a very short period.

For the urban and architectural disciplines it is evident that an analysis is needed; they get the proper time and an effective method to make analyses. But also for all other disciplines it is an asset to start by analyzing specific possibilities. This also helps to involve the technical and managerial disciplines to

be involved in the early design where the most far-reaching decisions are taken. In this set-up it helps students to gain experiences with an integral approach in designing.

By choosing which topics and issues are addressed in the workshop, different supervisors have to tune the focus of the problem to be solved by students to one another. This also gives way for supervisors to put students on the educational track that they have in mind.

Although students are eager to start with the design, and in some way consider that the workshop issues keeps them from designing, it is in fact a procedure that puts *all* students to work and learns them a lot about the assignment in an extreme short time span.

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ARCHITECTURAL EDUCATION AND QUALITY ASSURANCE IN THE EUROPEAN HIGHER EDUCATION AREA: DESIGN RESEARCH AS A PLEA FOR ACADEMIC FREEDOM.

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Abstract

The authors reflect on the academic bachelor and master programs of architecture. From the perspective of higher education policy in Flanders, Belgium, they examine the intrinsic challenges of the academic educational setting, and the way architectural education can fit in and benefit from it, without losing its specific design oriented qualities. Therefore, they unravel the process of architectural design research, as a discipline-authentic way of knowledge production, leading to the identification of a number of implicit features of an academic architectural learning environment. The disquisition is based on educational arguments pointed out by literature and theory. Furthermore, the authors analyze whether this learning environment can comply with general standards of external quality assurance and accreditation systems. Doing so, they reveal the Achilles' heel of architectural education: the incompatibility of the design jury with formalized assessment frameworks. Finally, the authors conclude with an advocacy for academic freedom. To assure the quality of academic architectural programs, it is necessary that universities maintain a critical attitude towards standardized policy frameworks.

Keywords: Educational Policy, Architectural Education, Design Research, External Quality Assurance, Academic Freedom.

INTRODUCTION

The authors want to contribute to the policy discussion on the position of architectural education in the European Higher Education Area, and more in particular in the prospective of external quality assurance. They examine the intrinsic challenges of an academic educational setting and the way architectural education can fit in and benefit from it, without losing its specific design oriented qualities. However, before directing the attention to the design studio as an academic learning environment, the authors frame architectural education in the agency of two complex challenges – possible threats – that can reinforce each other: (1) the position of science in the educational setting of universities and (2) demands and claims due to professional regulation and the professional field of architecture. In Flanders, Belgium, architectural education recently has been detached from the university colleges¹ to be integrated into the universities. This has regenerated discussions about disciplinary identity in education and research, vis-à-vis academic standards and traditions. For this reason, architectural education in Flanders provides an interesting case.

1) The integration of Flemish architectural education in the university is a fact, as determined by the Bologna Agreements. This means that architectural education is now officially academic. Obviously, the university is both enthusiastic and critical about this newcomer. Indeed, universities are not fully familiar with design education, designerly ways of knowing,

and design research. Design research still suffers from being contested as a valid method of academic inquiry. Prevailing performance-based funding allocation mechanisms, such as bibliometry, impact-factors, and Hirsch-index, are incompatible with the intrinsic values of the discipline, and its authentic modes of knowledge dissemination.² The result is a triple drawback: from the perspective of the discipline, a core part of its proper modes of research conduct is insufficiently supported and remains underdeveloped; from the perspective of the university, the newcomer is performing below par; from the perspective of society, the under-exploitation of the potentials of design research and designerly thinking, result in a loss of knowledge, insights and human capital. Furthermore, there are some particular internal and social concerns about the scientific and public role of the university and academic inquiry in itself. Academics and the media vastly report on unreasonable pressure to publish, science fraud, and an overall scientific crisis.

Architectural programs do not exclusively lead to the architectural profession. After graduation, masters in architecture are engaged in a myriad of branches, varying from contracting firms, over real estate and consultancy, to local authorities, policy making. Yet the goals and content of architectural education have to comply with several regulations concerning the profession of the architect. Also, several professional boards and organizations of architects have explicit expectations towards architectural education. However, these unilateral professional condi-

¹ Since then, "university colleges" (in Dutch: "hogeschool" to be compared with the German and Suisse "Hochschule") in Flanders only accommodate vocational bachelor programs. All programs leading to a European qualification level 6, 7 or 8 are accommodated exclusively by the universities.
² Cf. KNAW report, p.5.

tions can disturb the balance between teaching and research, and maintain the risk to suppress the theoretical and scientific fundaments of the architectural discipline. This also implies a potential danger for the academic position of architectural education at the university.

Within the complex conditions above, Flemish architectural education is expecting an external quality audit in the near future, based on a new accreditation frame. Institutions have to prove that the architectural programs they offer, meet the generic quality standards put forward by the accreditation organization, both in the academic and in the professional setting. The authors hereafter try to identify the implicit conditions to pass this quality assessment successfully, pondering the concept of academic freedom as a principle to safeguard the disciplinary specificity of architectural design education.

CURRENT CHALLENGES AND THREATS FOR ARCHITECTURAL EDUCATION

ARCHITECTURAL DESIGN AND KNOWLEDGE PRODUCTION IN THE REALM OF RESEARCH AT THE UNIVERSITY

After the former audit of architectural programs in Flanders, the assessment panels confirmed that each of the programs of the audited schools contained links to research; however, these links needed to be optimized and made more explicit. Flemish architecture programs have been integrated in the university since 2013, and are since "academic". One wonders, though, whether the latter does not imply a paradox, since "architecture is built, not written."³ The educational setting in a university strongly influences the learning outcomes, as well as the enactment of the curriculum, both formally and informally. Indeed, the architectural program has to comply with the culture and opinions of the university on science and scientization. One of the most important aspects in this is the emphasis on the research – teaching nexus: research and teaching are to be inextricably intertwined with one another. In the next few paragraphs, the authors will reflect on what research really means for an architecture program.

As a subject of academic inquiry, architecture is addressed by the humanities as well as by the social and exact sciences, and by artistic research approaches. Research *in, into or about*⁴ architecture is undertaken from the detached perspective of these scientific or artistic disciplines, applying their proper modes and methods, according to their own disciplinary focus and epistemological body of knowledge. Therefore, architecture is a field, rather than a discipline (Stevens, 1998). Architectural design, on the contrary, clearly is a discipline. It operates through a specific practice, which relies on particular ways of knowing – such as "designerly ways of knowing" (Cross, 1982, Lawson, 2006) and reflection in action (Schön, 1983), and a particular set of competencies, methods and tools, which can be taught, trained and developed. Architectural design practice is dynamically responding to and impacting societal, technological and environmental change. The development of an

architectural design proposal relies on findings and insights from human and exact sciences, though inescapably situated within a normative cultural and ethical frame. In the pedagogy of architectural design education, the architectural design, and the act of designing are core elements to make knowledge transferred, insights emerged and understandings developed – often in a tacit way (Polanyi, 1966, Schön, 1983).

Whereas "research in architecture" is undertaken by a variation of disciplines, each from its proper approach, investigations relying on the kind of competencies, methods and tools, that are resulting from the development of an architectural disposition, gaze, and state of mind – for instance through architectural education – are referred to as "architectural research". (European Association for Architectural Education [EAAE], 2012). Mowrer already noted eighty years ago that

"Facts are not born full bloom to be plucked by anyone. In every perceptive experience there is an infinite number of observations which might be made but which are not. What the individual sees is determined in part, at least, by what he [sic] is trained to observe." (Mowrer, 1932, p.281, cited in: Gilgun, 2005)

Architectural research is studying architecture from within, applying the perspective of a specific "architectural" epistemology – its own ways of seeing and knowing – and relying on its own particular mode, scope and methods. Claiming a proper approach however in no way escapes from full compliance with the regular and generic criteria for scientific quality, namely "significance, rigour and originality" (Till, 2007, REF2014, 2011). Architectural research can be scrutinized by both criteria of "research quality" and "societal relevance" (Koninklijke Nederlandse Akademie van Wetenschappen - Royal Netherlands Academy of Arts and Sciences (KNAW), 2011).

A specific approach within architectural research, is the use of designerly thinking, the act of designing architecture, and reflective practice; or, to put it a bit bluntly: design is applied as a way to explore the world. The Charter on Architectural Research, published by the European Association for Architectural Education (EAAE) defines this type of "research by design" – or "design research", as it is commonly referred to- as:

"any kind of inquiry in which design is the substantial constituent of the research process. [...] In research by design, the architectural design process forms the pathway through which new insights, knowledge, practices or products come into being. It generates critical inquiry through design work. Therefore research results are obtained by, and consistent with experience in practice." (European Association for Architectural Education [EAAE], 2012)

Design research typically addresses those phenomena, to which analysis of a perceived actual reality is inadequate, insufficient, or unavailable. It is applied in those situations in which empirical evidence is not providing sufficient inference to deliver convincing

³Citation of Dirk Janssen, chair of the educational board of the Architectural Program, University of Antwerp, at an internal symposium, October 2013.

⁴Referring to Fryling's categorization of research into, through, and for, art and design, in FRYLING, C. 1993. *Research in Art and Design*, London, Royal College of Art

insights. The Dutch urban planner, and methodologist Taeke de Jong put forward that “some futures can be predicted, others have to be designed” (de Jong and van der Voordt, 2002). Others have described these kinds of phenomena as “wicked problems” (Horst and Melvin, 1973). Due to the lack of existing evidence, design research aims at exploring and sharing insights which emerge from studying and scrutinizing future possibilities or alternatives, and possible or alternative futures (de Jong and van der Voordt, 2002, Geldhof and Janssens, 2007). As such, it is responding to the urge for not only *explaining* and *understanding* our fast changing world (and our way of thinking), but also *anticipate* and *influence* these changes (European Association for Architectural Education [EAAE], 2012). Design research provides substance for discussing, reflecting, pondering possibilities, and our way of thinking regarding the need to act or react. Design research thus offers a mode of knowledge construction which is fundamentally different, but complementary to more traditional scientific accounts, studying the world as *it is*. Nevertheless, there are strong similarities to existing approaches. Since architectural design is a culturally determined phenomenon, situated and to be comprehended within a very specific societal context, architectural design research has strong affinities, paradigmatically and methodologically, with qualitative research, to be found for instance in its inductive character and the position of theory, its emphasis on visual analysis, its interpretative nature, its attention to social processes, and its cultural and ethical normative framing. It also has strong similarities with artistic research, as it is rather explorative, and discovery-led than hypothesis-led (Rubidge, 2004, Borgdorff, 2010). But in fact, all of these undertakings belong to the large endeavor of science and research, as the social scientist, and former president of the European Research Council expresses:

“ Science and the arts are [...] much closer to each other than their currently institutionalized forms might lead one to expect. They share the creative impulse and their main driving forces of motivation: curiosity and imagination. [...] Research is the curiosity-driven production of knowledge. It is the process oriented towards the realm of possibilities that is to be explored, manipulated, controlled, given shape and form, and transformed. ”(Nowotny, 2010)

Within this disciplinary and multidisciplinary affected field of action and knowledge, architectural education aims at the development of creative minds, and critical thinkers. It teaches how to become a free and unattached designer who creates innovative solutions for contemporary architectural problems and needs. Architecture students learn how to transcend the restricted loop of concrete and profitable professional tasks of an architect. Indeed, the challenges which architecture faces are huge: climate change, globalization, urbanization and social transformation. Thereby the development of new technologies and media are rapidly and drastically expanding the knowledge base and the scope of disciplinary experimentation (European Association for Architectural Education [EAAE], 2012).

The university actually offers an utterly adequate learning and research environment for architectural education. Indeed, if anything, the university is the sanctuary for critical reflection and free research, where academics can develop new answers to complex open issues. Architectural education fully aligns with that setting, without losing any of its specific features.

Since design is the essential feature of the discipline and also the backbone of architectural education – an assertion which is confirmed by the new European professional directive 2013/55/EU⁵ – it should be self-evident, that its teaching would be largely based on a proper body of knowledge. This body of knowledge logically consists of constructive underpinnings and substantiating theoretical foundations which result from research, epistemologically and methodologically inherent to the field and its disciplines, including “research by design”. Since higher education intrinsically is intertwined with research, it seems obvious that academic higher architectural education would be highly determined by this architectural research basis in its own rights. This assumption however, evident as it might be, turns out to be more complicated than it looks. While on the one hand scholarly literature is offering confirmative evidence that design research, after more than a decade⁶, “has come of age” (Cooper, 1997, Fraser, 2010, Hill, 2014, Fraser, 2013) and several universities worldwide are delivering PhD’s based upon research-by-design – part of the or so-called practice-based PhD’s –, skeptical scholars are still arguing about the impossibility for design to be a valid mode for academic inquiry (Coppens and Van Geel, 2013). Although design research has developed for more than a decade, flourishing in academic institutions which embrace creative practice as a valid and unique way to face contemporary challenges, it is still contested by those academic institutions which remain reluctant to newcomers, and rigidly keep swearing by traditional accounts of scientific research conduct. Apparently, different opinions coexist about what to acknowledge as “valid knowledge” and “valid research”. There are many ways of knowing, not all of them situated within academia; as a result, “academic research” and “knowledge” have become indistinctive notions (Gibbons, 1994, Nowotny et al., 2001). What “counts” as *academic research*, and what “counts” as *knowledge* – and valid ways of knowledge production – is no longer univocally shared within academia (Colbeck, 1998, Reichert, 2009, Jenkins et al., 2007, Brew, 2001a, Brew, 2001b). Architectural design research, and architectural education typically is such a field where the notions of “research” and “knowledge” have challenged academia, and – depending on their institutional context, preferences and policy – seem to be contested.

Moreover, the university itself is in the middle of a process of searching for its identity and public role (Simons et al., 2007, Biesta et al., 2009, Habermas and Blazek, 1987). This observation connects to the recent discussion on the different models or paradigms that decide on the actual form of a university – briefly put: (1) the classical “von Humboldt model” versus (2) the “integrated European Higher Education Area” (EHEA) (Michelsen, 2010, Pauwels, 2009),

⁵Directive 2013/55/EU of the European Parliament and of the Council of 20 November 2013

⁶the origin of the concept of “research-by-design” can be traced back to the end of last century. Consequently it became established through scholarly publications and conferences such as the international conference “Research by Design” at the TUDelft, in collaboration with EAAE, Netherlands, 2000.

complying with Bologna standards. In the next paragraphs a brief description of both models is given.

1.) The "von Humboldt model" originates from the early nineteenth century Germany. It consists of the academic ideal perspective of the entanglement of research and teaching. The academic is first of all a researcher, a teacher he is only subsequently. Research activities also contain an educational value for students – "Bildung" – while students participate as fellow researchers. Furthermore, the model implies "academic freedom" on the level of universities as well as individual researchers. The latter is the so-called "Lehrfreiheit". It means that within the university academics could claim full freedom to conduct research and communicate their research results, without interference or fear for repercussions of the government or religious institutions (Alexander and Alexander, 2009). Today academic freedom still is a mandatory part of the individual statutory relationship of each Flemish academic with her university. It secures her substantial independence to research and teach.

2.) The European higher education area is situated in the Bologna Agreements and consists of the consensus and engagement of all member states. The participating governmental bodies stay in charge of education; in theory, the educational institutions keep their educational autonomy, but both are obliged to take into account certain agreements aiming for more transparency, mutual recognition of qualifications and mobility, e.g. the bachelor-master structure, programs based upon an explicit aim expressed in terms of learning outcomes to insure quality, external quality assurance and accreditation, the European credit transfer system and the Diploma Supplement. Doing so, the higher education system also fits within the European economic project and the Lisbon strategy. Nevertheless, the conviction grows that, within this model, the academic freedom of individual researchers is inferior to strategic and financial policy choices and management on an institutional level, even though the Bologna Agreements often refer to academic freedom (European Commission, 2005, Conference of European Ministers Responsible for Higher Education, 2005, 2007, 2009, 2010)(, ;Conference of European Ministers Responsible for Higher Education, 2007 #2920).

Literature uncovers a tension between both models, concerning academic freedom. However, this does not imply that each university either fits in with the one or the other model. Studies have shown how governmental bodies and universities develop very different policies within both paradigms (Michelsen, 2010).

In any case, critical academics tend to emphasize the negative effects of the European higher education area and the collapse of the traditional Humboldtian ideal of academic freedom (Nybom, 2003, Ash, 2006, Halvorsen and Nyhagen, 2005, Huisman and Van Der Wende, 2004): "scientific education has been reduced to teaching science, universities have become knowledge factories, and a strangling competition is occurring between institutions as well as academics, policy autonomy is inferior to formal quality assessments". Thematic project financing is also mentioned as an important technique to enhance economic pressure on universities. The dif-

ferent quality standards universities have to comply with are said to have rendered the internal institutional impact higher and diminished the professional autonomy of individual academics. Therefore, their conclusion is that the European higher education area is no longer compatible with von Humboldt's ideal of academic freedom (Serrano-Velarde and Stensaker, 2010).

In view of this perspective, architectural education is very concerned about potential overemphasizing of fundamental – financeable – research on a meta level. It is feared that, as a result of the high pressure to publish, the architectural discipline will lose its specific overall and multidisciplinary vision and re-orientate in favor of traditional – more remunerable – research disciplines. This implies a serious threat to the architectural discipline as such. Indeed, if traditional research on a meta level, like theoretical, historical or technical research, will expel design research due to opportunism, this will also become a threat to the research-teaching nexus and the teaching-praxis nexus in the design studio. Hence, a lack of academic freedom of the university and academics, under pressure by competitive research financing and intrusive output assessment systems, holds a high risk for the quality of architectural education.

In the previous paragraphs the risks were explained which influence the quality of architectural education in a university learning environment. Due to a growing lack of academic freedom, and increasing pressure to reorient their research conduct, away from its epistemological and methodological core, towards more proficient performance areas. In the next paragraphs the authors will focus on the ambiguous role of legislation and the organized architectural profession in this perspective.

LEGAL AND PROFESSIONAL DEMANDS FOR ARCHITECTS

In Belgium, the title of "architect" and the architectural profession are legally determined by and dependent on formal qualification. Therefore, the European 2013/55/EU directive⁷ as well as national legislation impose several demands on the architectural programs to guarantee the European recognition of the degree in order to carry out the architectural profession in each member state. It is, for example, mandatory that the program is of academic level and contains equal aspects of architectural theory and practice. Several knowledge domains are mentioned, such as architectural theory, cultural history, sciences, research skills and technical skills. Educational institutions that offer architectural programs are legally obliged to prove how the program complies with legislation. However, the practice of imposing compulsory content on educational institutions is highly contrary to European quality assessment legislation which is based on the aims of the program and learning outcomes, not on content prescription (Bollaert, 2011). This is a critical point.

Furthermore, the organized architectural profession and the professional field have explicit expectations concerning the immediate employability of masters of architecture. A survey conducted in 2012 showed that 86,4% of the architects think that gradu-

⁷Directive 2013/55/EU of the European Parliament and of the Council of 20 November 2013 amending Directive 2005/36/EC on the recognition of professional qualifications and Regulation

ates are not well prepared for the job and likewise 72, 2% of the graduates involved in their compulsory internship, state in a later survey that the educational program is insufficiently fitted to prepare them for the architectural profession. Therefore, the professional field points out the need for a stronger tuning between architectural education and the profession. Yet, the authors want to comment on this specific information. The particular survey was carried out to measure how masters of architecture function in this internship, which is different from the actual profession. Also, the pedagogical aspects of the internship were not examined. Moreover, literature explicitly warns for a potential loss of quality, if the architectural discipline is made dependent of the – commercial – needs of the construction and real estate sector. Indeed, these aim for fast employability of the graduates in order to carry out right away concrete and profitable professional tasks (Coleman, 2010). If an educational program turns out to be one-track professionally oriented, this will undermine its academic position. Therefore, the architectural discipline needs sufficient academic counterweight, with respect for the specific features of the discipline.

CONCLUSION

In the previous paragraphs the authors described the pressure on academic freedom at the university. As a result, the specific features of the discipline and the research-teaching nexus in architectural education are seriously threatened. Moreover, this potential danger is enforced by legislation and specific demands of the professional field, aiming for fast and easy employability of masters of architecture to carry out concrete and profitable professional tasks. This can also undermine the academic position of the architectural discipline at the university. Therefore, the authors advocate the need of a fitted academic counterweight.

If an architectural program wants to meet quality standards, it needs to enjoy sufficient academic freedom in order to preserve and develop its specific profile and features. Therefore, it needs to transcend the level of elementary and profitable professional tasks in order to focus on the teaching of highly educated, innovative designers. These are masters of architecture who are able to carry out “authorship” and “authority”, who can judge in an open-minded way within vast multidisciplinary frames of reference, exploring new dimensions and taking care of our built environment. In order to create this academic freedom, architectural education needs a balanced educational concept, which is suited to realize these specific goals whilst successfully meeting the challenges of quality assessment.

AN AUTHENTIC LEARNING ENVIRONMENT FOR ARCHITECTURAL EDUCATION

INTRODUCTION

In architectural education, design is generally considered as the backbone of the program, the design studio being its central locus. The design studio has historically grown as a very specific educational model. It

aims to the development of both professional and academic competencies. The emphasis oscillates in time, and depends on social needs and crises (Coleman, 2010, Sunwoo, 2012). Teaching in the design studio significantly differs from traditional university educational practices of lectures, seminars or labs (Morton, 2012), and it is not easy to grasp the fundamentals of this particularity. Therefore, a deeper understanding of the architectural design process is required.

ARCHITECTURAL DESIGN: KNOWLEDGE CONSTRUCTION THROUGH ABDUCTION AND ARGUMENTATION

Architecture is built culture. Its conception - the act of designing architecture - is a cultural process, targeting the quality of life and well-being of society and its inhabitants. Such a notion of *quality* is not universal nor absolute; inherently, it is referential to a cultural and ethical normative frame.

As a cultural process, architectural design consists of creating a concept, that aims to become true – anticipation as a kind of self-fulfilling prophecy. Taeke de Jong described this process as follows:

“In the abiotic sphere it is presumed that cause precedes effect. In cultural processes it should be presumed that concepts regarding effect may precede the cause of a change (anticipation).”(de Jong, 2010).

The application of knowledge and theory (deduction) and the conceptualization of specific information (induction) are part of the design process, and typically related to the problem-solving processes of analysis and synthesis. But there is more. Architectural design transcends the stage of ‘problem-solving’. Moreover, if one looks at architectural design questions in terms of ‘problems’, they behave “wicked”, as mentioned before (Horst and Melvin, 1973, Vandenbroeck, 2012). As such, they fundamentally differ from problem formulations in science or engineering. While scientific problems are looking for causality, and engineering and industrial design is aiming at risk reduction and optimizing performance, the mission of architecture is not about establishing laws and predictable patterns. Absolute truth or certainty is not an option (Eisinger, 2008, Yaneva, 2012).

In a design process, the organization of information is largely built on abductive reasoning⁸ (Kolko, 2010). Abductive inference is typically at stake in contexts where certainties and fixed patterns are unavailable. It is the inference of ‘the best explanation’, and therefore marked by its contextual situation, including result expertise, experience, worldview and beliefs of the person who makes the inferences, in casu the designer. Moreover, it is a kernel competence of the designer to feel comfortable in such situations and to be able to include imagination, free association and sudden leaps into a complex synthetic process of sense making. As a result, the embodied knowledge of each designed artefact is implicitly underpinned by contextual and individual frames of reference. From both an educational and a societal point of view, both the design student and the professional architect must be able to argue competently,

⁸The notion of abduction has been introduced by the American logician-philosopher Charles Sanders Peirce, as a third fundamental way of inference, alongside deduction and induction, and of the three admittedly the most fragile.

not only to explain the final product, but to demonstrate coherence in the underlying choices as well. Kernel features of such a practical argumentative discourse are (Yanik and Hewett, 2000):

- a deployment of the most appropriate means to present the case (phronesis);
- evidence of logical reasoning (logos);
- a combination of good sense, good intentions, honesty, and integrity (ethos);
- a sufficient understanding of human psychology in order to make appropriate emotional appeals to the audience (pathos).

Architectural design is based upon a qualitative underpinning and convincing argumentation about a feasible, attainable, and desirable future (de Jong and van der Voordt, 2002). “Hopeful suggestions” (Peirce, 1931) and “warranted assertibilities” (Dewey, 1938) - expressions from the philosophic pragmatism of Peirce and Dewey - are the highest degree of certainty that for these kinds of issues can be reached (De Walsche and Verbrugge, 2013).

THE ARCHITECTURAL LEARNING ENVIRONMENT

Previous paragraphs highlight the importance, from both a societal and an educational perspective, of an argumentative discourse. This argumentative discourse should make explicit underlying assumptions as processes of sense making, in order to allow the design reasoning for being scrutinized. Thus, an authentic learning environment for architectural education is based on the construction of personal argument by the student of her design proposal through verbal and visual rhetoric, aiming at susceptibility of scrutiny. In this process of development of beliefs, standards and values regarding the built environment, the design *proposal* is the mediator, through which this process is made explicit. The design *assignment* acts as an occasion and a catalyst, to induce this process of mental change (personal development, edification, *Bildung*) in the student, leading to an altered perception and understanding of the world. Finally, this process of edification can only actively be detected, monitored, enhanced and adjusted, when it is properly evaluated. Therefore, the *assessment* is another key feature of the architectural learning environment.

THE DESIGN PROPOSAL

During the design process, the student is involved in a ‘conversation’ (Schön and Wiggins, 1992) with her design, through the drawing, the model, the computer simulation. The design acts as an ‘epistemic artefact’, and an embodiment of the student’s knowledge (Ewenstein and Whyte, 2009, Goldschmidt, 1994, Knuuttila, 2005, Yaneva, 2009). As such, it mirrors the cognitive processes that take place in the mind of the student. Through the design proposal, the student situates herself in society and culture. The design proposal mediates teaching, and carries the learning process. Likewise, in the interaction between the teacher, classmates, and assessors, it is the medium through which communication takes place. The design

is the occasion for, and at the same time the evidence of argument construction, underpinning, and contextualizing. A crucial constituent for learning therefore is the interaction between artefact and student, artefact and teacher, teacher and student; thereby, this communication is multiplied by that of the fellow students. The interactions are colored by the live context and personal backgrounds and contributions of all participants - student, fellow students, and teachers.

THE ASSIGNMENT

While the interaction with the teacher is steering the process, the instrument that has catalyzed this process of generation of insights, is the *assignment*. Whether the learning process will be successful or not highly depends on the features of the assignment. An assignment possessing the capacities to reach the intended level of learning, includes a far-reaching personal engagement of the teacher. Both the selections that are made to delineate the endeavor, and the way the assignment is formulated in the brief, are directing the attention of the students, and arousing their interest. The teacher takes sides (De Walsche, 2013, Masschelein and Simons, 2012). Through the assignment, implicitly or explicitly, the teacher is providing a frame of reference for critical reflection, as an offer, to be taken for granted, or to be rejected, to be altered, or to be replaced by alternative points of view. The occasion for personal transformation of the student, and the development of her autonomy is occurring through, and simultaneously with her elaboration of spatial transformations, induced by the assignment, steered and fed by the interactions.

THE ASSESSMENT

Finally, learning through architectural design involves special conditions with regard to the *assessment*. It implies, as described above, individual affection, as well as unpredictability, and therefore, a readiness and capability to deal with uncertainty. As a peer and an expert, the jury member is able to acknowledge, assess the coherence and consistency between the process, the visual representation of the design, and the appearance of the artefact as an epistemic object. He is able to address the student’s frame of reference, and supportive to make it explicit. As such, the assessing jury member takes the role of a “critical educational connoisseur” (Eisner, 2002, Michels et al., 2011).

Assessment is not only crucial for detecting, monitoring, enhancing and adjusting the learning process, it also must allow for evaluating the qualification level of the student. In a previous section, the specific mode of knowledge construction through design was concisely explained, for instance through the concept of abductive reasoning. It is clear that for both design as research, and design as an educational tool, strong links exist between the specific mode of knowledge construction through design, and assessment of meaning, relevance and quality, of the insights, emerging from the design process. So, on the one hand, the assessment of education through design must be fully adapted to, and epistemologically and experientially in line with the processes of knowledge construction and argumentative discourse

as it occurs in the studio; on the other hand, the assessment must be compatible with the qualification frames that are provided to secure comparability and mutual recognition, as aspired to in the Bologna process. A next section will elaborate these conditions of evaluation and assessment, and relate them to generic quality standards for higher education.

CONCLUSION

The concept of design as research – explained earlier in this text – demonstrates how the designerly ways of constructing knowledge are offering key concepts for a deeper understanding of the world, especially concerning ways of understanding those issues for which inference based on analysis of precedence is not available (for instance “wicked problems”, and situations where “futures have to be designed, instead of predicted”). Thereby, the substantiation of the design proposal and its underpinning, is a key feature in the establishment of accepted value. The design studio is to be understood as an arena of interactions; knowledge therefore is to be understood as constructed and negotiated within the situatedness of that design studio, as a community of practice. The student’s development of a personal frame of reference through substantiating her design proposal is a key feature.

The observations in the previous paragraphs have led to the identification of some key features to bring architectural design education to its full potential. At this point contradictions may arise. The design studio is only successful as a learning environment when it meets the accreditation criteria of external quality assessment. So, in spite of its disciplinary specificity, its specific process of knowledge construction, and the critical requirement of appropriate assessment, architectural education has to comply with a number of generic quality standards.

ARCHITECTURAL EDUCATION AND GENERIC QUALITY STANDARDS

INTRODUCTION

In order to be accredited, the architectural education has to comply with four generic quality standards, as determined within the new accreditation frame of the Dutch-Flemish Accreditation Organization (NVAO): the intended qualification level of the educational program, the educational process, the realized qualification level, and the layout and organization of internal quality insurance. In other words, the way the design of the architectural education is conceived of, and the place given to the design studio in the learning process of the student come with some strings attached. After all, the programs have to demonstrate that their choices in these matters provide the qualities needed.

GENERIC QUALITY STANDARDS

To meet the quality standards, architectural education has to link up with European criteria for quality – the so-called Dublin descriptors. This contemporary European alternative for Von Humboldt’s ideal of Bildung consists of (1) the capacity for originality in

developing and/or applying new ideas, the capacity for applying knowledge and insight, (2) the capacity for integrating knowledge, (3) for dealing with complexity and judgment in situations with incomplete or limited information, and thereby for social and ethical reflection with regard to the implications of the judgment and its application. Moreover, qualities of (4) communication and discursive skills, and (5) learning skills for self-steered and autonomous study are specified.

These standard descriptors are legally anchored in the form of competences which an educational program needs to bring about. This concerns general competences, e.g. thinking and reasoning skills, scientific competences, the understanding of scientific disciplinary basic knowledge, and general and specific vocational competences for autonomous use of scientific or artistic knowledge at the level of a junior professional. These competences are generic, meaning that they not only count for architectural programs, but for all Flemish academic educational programs.

An educational program of course is not based on generic competences alone, but also on specific objectives which are exclusively relevant for architectural education. In the last accreditation round of Flemish architectural programs, these objectives have been bundled as so-called “domain-specific frames of reference”. The external quality audits, or “visitations”, of the architectural programs have on that basis been undertaken in Flanders. In the last published final assessment, the architectural programs are recommended to orient to the professional field, such as the Flemish Government Architect (Vlaamse bouwmeester), the national Board of Architects (Orde van Architecten), several professional organizations, local authorities, and the construction industry. Furthermore, it is recommended to pay special attention to internships. In the future, “domain-specific learning outcomes” will apply to architectural programs. They are written out by the institutions and validated by the Dutch-Flemish Accreditation Organization (NVAO).

An architectural program has to demonstrate that its training-specific learning outcomes align with these domain-specific learning outcomes. In previous paragraphs (cf. supra), the authors named the different interdisciplinary competences which are developed in the design studio via design research. Implementing the nexus education-research in the design studio contributes substantially to the academic standards of the program.

Previously mentioned implicit features of the design process – such as personal coloring, uncertainty, and unpredictability – however can turn out to be the Achilles’ heel of the program. This topic is dealt with in the following paragraphs.

THE REALIZED QUALIFICATION LEVEL IN THE STUDIO

The accreditation frame requires the realized level to be shown in the validity, reliability, and transparency of the assessment of students. The alignment of the implicit features of assessing in the design studio to the measurable criteria of the assessment system following the visitation and accreditation frame is, as previously mentioned, not self-evident. The authors will address

this problem in the following paragraphs, as to the how and why.

Presentations for a jury are common practice in the design studio of an architectural training for assessing the realized qualification level. The audience consists of design teachers and fellow students. The team of teachers is composed of a balanced mix of academics and practitioners with a teaching mandate. Often, it is complemented with external architects or experts.

When one is familiar with jury assessments in architectural education, one equally is with the paradigm of "inter-subjectivity". Traditionally, the design of the student constitutes the object which the different jury members approach from their own frame of reference, based on background and expertise. The assessment is constructed through "reading" the design – as an epistemic artefact – and the debate which is held from these different frames of reference. A jury assessment moreover remains a powerful bit of learning, through social interaction and a complex mix of dialogue, action, and visual design. Such critical interactions are a central aspect of architectural education (Webster, 2005, McCann, 2011, Dannels, 2005) and probably the most significant element of the design studio and its corresponding didactics (Keith et al., 2012).

Hence, the critical comments made in the context of the assessment are by no means based on an assessment frame with criteria which are set down beforehand. Ethno-methodological research and discourse analysis have shown how the assessment process, just like the design process itself, is based on abductive reasoning, rather than on deductive application of criteria or on inductive inference (Keith et al., 2012). Moreover, it is a feature of designers, in this case students as well as assessors, to feel comfortable with this kind of thinking (Kolko, 2010).

Hence, the jury assessment, and thus the assessment of the realized qualification level, is to a comparable degree subjected to complexity, uncertainty and unpredictability as the design assignment and process itself. The jury, moreover, not only judges the final product nor its mere conformity to set requirements. In this, the jury assessment differs from e.g. the assessment of a design outcome by a commissioner. The jury identifies and assesses transformation processes which have taken place, both in the frame of reference of the student and in the shape of the designed artefact. Therefore, assessment protocols should guarantee academic freedom to the extent that this expertise can develop. A standardized framework for assessment fails to take proper account of the disciplinary specificity of the jury assessment and is therefore ill-suited.

CONCLUSION

The academic freedom in architectural education is under strain, for several reasons. Today universities are becoming ever more entrepreneurial as conductors of academic inquiry. Research takes over from their educational mission. The gap with professional practice increases. The pressure to compete in research performance risks to dominate the urge to engage with deliberation in discussions of professional demands and requests. Moreover, the increasing dependency of universities on external funding and allocation mech-

anisms is a threat for institutional autonomy and academic freedom. These mechanisms, based on quantification of highly competitive performance-based output indicators, borrowed from the positive sciences, are inappropriate for quality assessment in the design disciplines. As a result, research conduct which relies on ways of knowledge production and dissemination, which are not valued in current accounts of quality assessment – as is the case for design research – is injured. This means a loss of knowledge production and human capital, as well as an under-exploitation of the exploration of solutions to urgent societal and environmental needs. The assessment of qualification in the discipline of architectural design requires acknowledgement and full comprehension of the processes of knowledge construction and dissemination of insights, as they emerge during design inquiry, be it as research, or as teaching.

The authors have detected (1) the fragile position of design research in the academic context, (2) the tension with the professional field as to one-sided professional demands to the architectural profession and the need for academic counterweight, (3) the specificity of the design studio as an authentic learning environment, and (4) the difficult connection of the common method of jury assessment to measurable frameworks for assessment, as four possible fields of tension for academic freedom.

Rather than applying standardized frameworks for assessment, quality assurance in architectural design education should secure the appropriate *conditions for interaction and negotiation* between students, and teachers, or between students and experts peers, or other – intended – audience. Moreover, quality assurance should secure that these conditions are appropriate and stimulating for the induction of critical inquiry, generation of knowledge and sharing of insights through the construction of argumentative discourses. The teacher, as an academic designer, and an architectural scholar, needs autonomy and freedom to undertake her dual commitment: both support society on the one hand - by identifying *what can be done* – and, on the other hand, critically reflect upon it – by expressing *what ought to be done*. This process of taking care for the future, is inescapably normatively framed, ethically and culturally. It will challenge policy and professional practice, politics and economy. Thereby, it must be secured from political and economic pressure or interference.

The authors therefore argue that universities and architecture teachers should claim their academic freedom in order to safeguard and further develop the design studio as an authentic learning environment and a unique educational setting for the realization of the nexus education-research in architectural education.

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DRAWING AND CONCEIVING SPACE: HOW TO EXPRESS SPATIAL EXPERIENCE THROUGH DRAWING?

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Abstract

Teaching drawing in architectural education raises questions regarding the representation of spatial experiences: to what extent can sensory experiences of space be intensified through observing and drawing and, perhaps equally important, what those drawings would look like?

In the context of their drawing classes, the authors started to inquire the discrepancy between conceiving and perceiving space, and the aptitude of representing spatial concepts upon a two dimensional surface. Through observation and translating observation into drawings, students discover that conventionalised ways of drawing, such as linear perspective, only reveal part of the story. While linear perspective remains the dominant way of representing space, obviously visible in photography, film, 3D-imaging and architectural impressions, the authors started looking for ways of drawing which inquire possibilities of expressing spatial experiences. Drawing as an activity which is able to enhance spatial understanding, rather than as a tool to communicate virtual spaces. Next to drawing as a 'skill', which can be learnt, the drawing classes started to inquire non-visual aspects of space by analysing attributes of spatiality, which are difficult to convey through two dimensional drawings.

Starting from a contextualisation of spatial drawing within architectural practice, the article examines the discrepancy between geometric space and lived space, in order to reveal the dubious role of linear perspective within (architectural) culture and history. After a brief return to how we imagined and represented space in our childhood, the article presents a series of practice based examples. Drawing on the authors' teaching practice, it illustrates possibilities to expand our visual language by exploring space and spatiality through observing and drawing.

Keywords: Architecture, Drawing, Pedagogy, Representation, Spatial Experience.

L'ESSENTIEL EST INVISIBLE POUR LES YEUX

In Antoine de Saint Exupéry's famous book 'Le Petit Prince' (1943) the protagonist reveals his simple little secret: 'Il est très simple, on ne voit bien qu'avec le cœur. L'essentiel est invisible pour les yeux.' To illustrate this statement, the protagonist tells the story in which the Little Prince asks him to draw a sheep. Without hesitation, the protagonist takes out a little piece of paper and draws a sheep. The Prince looks attentively but says: 'This one looks already ill, draw me another one'. After a second, and even a third attempt are rejected, the protagonist - losing his patience - draws a box with three air holes and says: 'The sheep you want resides in the box'. The Little Prince suddenly looks satisfied: 'That's precisely how I wanted it.' The vented box in de Saint Exupéry's story could be seen as metaphor for spatial representation in architecture. Architects constantly face the incongruence between the embodied experience of space and how to translate that experience into a drawing.

Architectural drawing pedagogy is traditionally directed towards a geometric understanding of our surroundings. Basic lines and planes are considered as a stepping stone to introduce projective drawing and linear perspective. While these tools communicate architectural ideas, we postulate that they reveal only part of the story. As architect and theoretician Juhani

Pallasmaa (2005) emphasises, spatial experiences surpass the visual, they are personal, dynamic and involve all of our senses. If spatial experience involves all our senses, what kind of drawing allows to convey these sensory qualities of space? Which paths can we possibly explore in order to enhance spatial knowledge? To what extent can drawing help to intensify such a spatial experience, and what kind of drawing allows us to express it? What kind of conditions can we create to incorporate the experience of space within drawing classes?

HOW TO CONCEIVE SPACE?

"A thermometer indicates the temperature visually by the length of the mercury column, but it does not give us the experience of warm and cold" (Arnheim R. 1954, 228).

Since architects usually do not construct their own buildings, a design, until it is completed, only exists in the minds of the people involved in the design and building process, and in the representational artifacts they use. (Vermeersch P.W. 2013; Medway P. 1996). Representation here, as perceptual psychologist Rudolf Arnheim (1954) points out, does not produce a replica of the object, but its structural equivalent in a given medium. All the knowledge about the virtual

building is stored in representational artefacts, but also carried in people's situated knowledge, words and gestures (Vermeersch P.W. 2013). Precisely this virtual aspect may be worrying when teaching architectural students 'how to draw', because an all too radical exclusion of the experiential, when imagining virtual spaces, runs the risk of producing empty boxes; boxes which lack perceptual and sensory information marking our spatial experiences.

The introduction of geometry has enabled us to represent the world as a quantifiable phenomenon, characterised by the point, line, curve, surface and figure (Hernandez E. 2013). Science considers space as a homogeneous medium, where things are identified according to their three dimensions. But, as philosopher Maurice Merleau Ponty (1948-2002) remarks, the idea that object characteristics remain constant, denies our ability to mentally change the identity of an object by merely displacing it. Scientifically speaking, the displacement does not alter the object's geometric features, only its physical conditions change. The theoretical concept of pure space, which science has put forward, sharply contrasts with the spectacle brought to us by our senses. With this contrast, Merleau Ponty draws our attention to the fact that the scientific idea of pure space can exist only as a hypothetical concept, because we are quite unable to relate to space in such a detached way, as a kind of body-less object. We, Merleau Ponty continues, are all part of that space, we are one with it. Looking for a definition of space, author Eckhart Tolle (1997) juxtaposes the concept of space with the concept of silence: "If there were nothing but silence, silence would not exist; it is only when we hear sounds that silence is able to surface". Thus, Tolle continues, space cannot exist if there were nothing but space and no objects in it. Nothing can exist without space, while space, in essence, is nothing: space is "not – something" (Tolle E. 1997). In other words, what we regard as sensory qualities are, a priori, not there. They can only exist through our personal experience and relation to space. The whole concept of pure space, as architecture historian and theoretician Jacob Voorthuis (2012) states, is essentially inaccessible to us. We can only know the space which we are able to experience through our own body. Voorthuis considers physical space as the world of tactile matter, of form, colour, light and texture. Pure space is space even before it acquires meaning through our perception: it is not space as we experience, but space as it is outside of us.

Our everyday perception of space is not quantitative but qualitative. Our experience of space is pre-mathematical – it precedes our mathematical understanding. Phenomenology has taught us that the experience of space is characterised not by points but by place, not by measurement but by orientation. Our ability to look about on all sides, examining all the circumstances that may affect the experience, is what characterises the difference between geometric and lived space. This kind of (subjective) spatiality is such that we do not start from where our body is but, rather, we begin over there, where our senses are dwelling at any given moment. We do not perceive pure space, a pure up and down or behind, instead we discover and interpret positions and distances on the paths and ways of everyday associations, which are not ascertained and catalogued by the conventional measurement of space (Hernandez E. 2013).

Taking these sensory issues into account

poses severe questions for anyone involved in the pedagogy of perceiving, conceiving and drawing space. Any attempt to visualise spatial experiences is bound to leave the quantifiable framework of geometry to enter the uncertainty of the experiential. As Voorthuis (2012) points out, our ideas about space are influenced by our individual and unique perception of space. As such space becomes more than the surfacing and positioning of forms and materials in some kind of abstract void. Our preconception about the world's functioning and behaviour, combined with the way our body experiences situations, shapes our perception of the world. We do not live in a space that is made up of objectively organized things, we live in a world that concerns us (Hernandez E. 2013). As Arnheim's thermometer illustrates, the feeling of warm and cold surpasses the metric position of the mercury column. Colours, lighting, materiality, sound, personal mood and history, among other things, all shape our experience of warm and cold.

THE SHADOW OF THE MIRROR

The optical and geometric proof that projective drawing, linear perspective and their family members allow to accurately describe the world, enabled 15th century artists to establish drawing, as 'disegno', into academia (Hill J. 2005). To this end, drawing was stripped of its subjectivity to resurface as a standardised, mathematical tool for visualising and even measuring form and space. The architectural intelligence of the Renaissance was quick to appropriate the newly found geometric tools of imagination to establish them as the lingua franca of architectural and building practice.

The idea of realism was the late and laboriously accomplished product of such sophisticated cultures as Hellenism and the Renaissance. Its evolution can be traced in workshop plays, which were refined and improved over generations of painters better to suggest pictorial depth. These plays used geometric elements, but they were used in an intuitive, piecemeal way (Evans R. 2000). Since its introduction, linear perspective gradually became the dominant way of communicating visual information. The tendency to present linear perspective as a superior tool led sociologist and philosopher Bruno Latour (1986) to draw a link between how cultures make the world visible and how a culture understands that world. Because perspective drawing appeared as such a powerful tool, it was adopted in the scientific world and additionally influenced science to go in a direction that further developed technologies of optical consistency: lenses, mirrors, microscopes, ultrasound images, etc. Architectural design followed a similar path, exploring projective and perspective drawings, and later photography and photorealistic rendering technology, to analyse existing places and design and conceive new ones.

Since its introduction, the principle of linear perspective has cast a dark shadow upon our imagination. This shadow severely obscured other ways of imagining the world and eventually we were led to uncritically interpret frozen mirror images as a certified (mirror) view of the world out there. By doing so, we tend to ignore the full density and richness of day-to-day spatial experiences and how to record them.

BACK TO THE PLAYGROUND

In searching for experiential ways of drawing, we could perhaps look back to our childhood and rediscover some of our 'pre-mathematical' attempts to capture the world around us. During our childhood, the world had many faces and when we attempted to draw that world, we drew its physiognomy, its general form or appearance. Children draw what they experience and this experience is related to what the child assimilates emotionally, affectively and functionally. Children constantly re-contextualise the things they have seen and these experiences are constantly transformed by new experiences. So, when children ignore certain details in their expressions, this is only because those details do not play a significant role in the experience (Van Dongen, N., Vanengbersen, E., Meeuwis, W., Mous, M.,s.d.). Rudolf Arnheim (1954, 159) acknowledges the experiential character of children's drawings stating that "children draw what they see, but they see more than they draw". According to Arnheim our youthful perception is made up by the formation of perceptual concepts, our grasping of integral features of a structure. Children generally start to draw from bodily movement, Arnheim continues. Their motor control is not complete yet, but their lines indicate what the drawing is supposed to be like. The imprecision of their strokes gives way to an exactness that is more than sufficient to show what the child is trying to do. "If one wants to represent the roundness of the head, one cannot use the shapes actually given in the head, but one must find or invent a shape that will embody the visual generality of 'roundness' in the world of tangible things". Only after laborious experimentation, children come to draw the head of human being as a circle. For Arnheim this represents a genuine invention (Arnheim R. 1954).

Only gradually children discover and accept the fact that a visual object on paper can stand for an enormously different one in nature. "It takes a great deal of spoiling before we come to think that representation is not only an imitation of the object, but also of its medium, so that we expect a painting not to look like a painting but like a physical space, and a statue not like a statue but like a living body of flesh and blood" (Arnheim R. 1954,163). In returning to our childhood, we also return to our unspoiled view upon the world and, perhaps more importantly, a certain freedom in representing our observations.

STEPPING OUT OF THE SHADOW, DRAWING SPACE

In order to open ourselves to space through all of our senses we have to immerse ourselves in real time space. Conscious spatial experiences draw attention to the visual, as well as the non-visual aspects of space. Both, visual and non-visual information, should find a place in our graphic explorations, because they mutually shape our understanding of space. Regarding our senses as equally important tends to redefine the drawing classes. Rather than a place to learn preconceived skills, the classes become a laboratory to study the translation of sensory and physical, spatial experiences. Within the laboratory, both the significance as well as the language to signify an observation is inquired. As a result, the teacher has to accept to deviate from preconceived visual conven-

Figure 1. Artist Jane Grisewood combining performance and drawing as a way to connect with space and time (Grisewood, 2013).

tions and the student has to decondition her/himself of any preconceptions regarding visualising perception. Both the teacher and the student are required to leave their pictorial comfort zone by converting drawing to multiple points of view informed by the senses.

In what follows, we will illustrate some practice-based examples of drawing exercises, which aim to extend the language of drawing through addressing other senses than the visual: (i) positioning the drawing body in space as a way to connect a physical experience to the surrounding space; (ii) drawing in the dark by blinding the visual realm and allowing other sensory stimuli to influence the observation and the resulting drawing; (iii) specific drawing techniques, such as wrapping and negative space as an attempt to convert hand and eyes to perform other sensory functions; (iv) adding or isolating other senses to confront the draughtsman with non-visual ways of representing experiences; and finally (v) drawing from (spatial) memory as drawing from the ability to recollect the specificity of (a) spatial experience(s).

(i) Bodily contact, exploring real-time space, being able to move around and dwell in a space, opens up our awareness of the dynamics of spatial experiences. There are several ways to analyse space starting from the human body as a point of reference for instance:, by using the body as a marker where one's movements leave marks upon walls and floors. Marking space through movement reveals features of a space based upon occupation rather than interpretation. Another possibility is analysing movement. Movement reveals information about the various ways in which a body is able to move about in a space, revealing relationships between different elements making up that space. How 'large' or 'tiny' a body is in relation to a space is analysed as the resultant of position, movement and the room's scale and properties (McCall, C. and Grisewood, J. 2011). Drawing while moving (Figure 1) is another way to step away from frozen perspectives. According to artists Mick Maslen and Jack Southern (2011) drawing while moving relinks our eye and hand synchronicity. When observing movement, the draughtsman is confronted with a continuous shift-

Figure 2. Drawing in the dark blindfolded (left) or without looking at the drawing (right) (images by the authors).

ing of focus, because moving bodies do not stand still. Drawing from movement questions preconception and forces the draughtsman to inquire other ways of mapping experience. Mapping techniques, musical or dance notation, diagrams, tracings suddenly become course material and reveal possible routes to represent the experience.

(ii) Drawing in the dark, by touch or without looking at the drawing paper, confronts the draughtsman with the dominance of the visual. Unable to rely upon known drawing strategies, this exercise forces the draughtsman to translate experience into images, without interference or qualification of the visual drawing during the process. As such, the draughtsman is not hampered by her/his preoccupation about how a drawing should look. In its most extreme form, the eyes are excluded from the experience, for instance, through drawing things which are hidden in non-transparent bags. One hand touches the object while the other hand draws (Figure 2). Moulding a form of clay under the table while simultaneously drawing the mould without looking at it introduces haptics into the drawing process. The pencil moves simultaneously with the touching. According to Maslen and Southern (2011), drawing blind creates a direct route between the two hands. It appears that touching without seeing draws our attention to other characteristics than visual observation. In their drawings our students revealed that the crown of a pineapple, when drawn from touch, appeared as more important and larger than when drawn from visual perception alone. Figure 2: drawing in the dark: blindfolded (left) and without looking at the drawing (right) (images by the authors)

Another way of cutting off the eyes from the observation is drawing without looking at the drawing itself. The idea is that eyes perform the act of touching. As such the eyes move around space and the movement of the eyes and those of the drawing hand are coordinated. The inability of looking at the drawing disengages the mechanism of controlling the expression while drawing. Not looking at the drawing confronts the draughtsman with her/his delusion of

expecting the drawing to conform to some sort of pre-conceived aesthetic scheme. When drawing blind there is no preconceived order, the observing eye leads the drawing hand. The activity enables the draughtsman to switch between the object and the space around it, moving from one space to another. One student testified that after a while her hand stopped drawing immediately when she stopped observing.

(iii) Wrapping, or cross contour drawing (Nicholaides K. 1990, Cooper D. 2007) is another way of allowing touch to direct the drawing (Figure 3). Suggesting the third dimension through using a continuous line which is virtually wrapped around the object one is holding as if strings of rope are spun around it. Again an immediate relation between the observer and the object informs the draughtsman about the object's spatial constellation.

Negative space is another way to search for the space surrounding an object. Negative space is an established exercise within art drawing courses. It is often linked to a Buddhist's awareness for the non-material and so-called negative (Maslen M. and Southern J. 2011, Edwards B. 1989). Negative space establishes a relation between a form and its background. The change of focus forces the draughtsman to study the interaction between form and space, between subject

Figure 3. Wrapping (left) and negative space (right) (images by the authors).

and its surroundings. Within this exercise an object is studied not by drawing the thing in itself, but by building its contours up from the surrounding space. This exercise avoids our inclination to start drawing from lines with the lines functioning as a boundary between objects and the space around them. Wrapping or drawing negative space breaks with one's perceptual habits.

(iv) Other senses than touch and vision also offer invaluable spatial information. Hearing, smell and taste inform our spatial awareness. Music, spices and flavours confront the draughtsman with yet another difficulty. How to translate non visual concepts into a drawing or expression? Memories of sounds, smells and tastes are deeply rooted in our bodily experience of the world. Drawing from these other senses draws attention to the link between all of our senses. A possible exercise to connect with auditory stimuli is translating an experienced musical composition into colour and form (Figure 4). Colour can be used as a tool to describe a composition in terms of rhythm, harmony and mood. When the musical experience is repeated a blinded draughtsman is invited to trace the movement of the music, using two colours only, one in each hand. To conclude the exercise, a graphical score is produced to summarise the musical experience. As such the music challenges one's ability to translate sound into colour by juxtaposing and balancing two colours by movement. This exercise reveals a kind of uniformity in the imagery the draughtsman use to translate sound into form. The resulting forms, colours, movements and composition reveal striking resemblances. Variations on this exercise can be explored by using tastes, smells and other non-formal elements as a driving force for the drawings.

(v) Another exercise draws from our memory and storytelling abilities as a means to (re)discover spaces. We all have memories of spatial experiences. Those memories are cerebral and manifest themselves as a kind of collage of impressions (Van der Linden, 2013). They surpass the visual, because our recollections are both made up and distorted by a combination of the sensory experience and our interpretation of the experience. Sofie Van der Linden's work expresses her ability to record the remembrance of spatial experiences. Visiting people in their houses, talking to them, making small sketches of spaces and details as a memory aid, trying to capture the atmosphere of a space and its inhabitant, Van der Linden composes a mental map of the spaces she visits. In her studio she meticulously tries to reconfigure her observation in large scale drawings. Her choice of perspective mode varies, and can best be described by a non-mathematical parallel perspective. But she also allows plan views, projections and mixed forms. Layers of information sometimes overlap, they sometimes contradict each other and certain spots are deliberately left empty. They represent the blank spots in our mind (Van der Linden, 2013). Sometimes a story directs her drawing, sometimes she is the director of her own story, her own recollection of the space she personally experienced. These kinds of drawings make the subjectivity of spatial encounters explicit. A cup of coffee, an abandoned book, unmade beds, visualise recognisable traces of life and reveal possible stories for us to imagine. Here again the human factor is more than a silhouette inhabiting space. The silhouette actually changes the space, defines it. In trying to incorporate the traces of life, the imagined spaces become more vivid.

Figure 4. Translating sound (images by the authors).

Figure 5. Sofie Van Der Linden: Schippershof (Drawing and Text) (image courtesy of the artist).

CONCLUSION

The exercises illustrated above confront the draughtsman with the tendency to over evaluate visual stimuli when observing space. We are inclined to see what we think to see and to relate what we think to see to things we already know. In order to study ways of imagining space upon a two dimensional plane, the exercises invite students to look beyond the conventional boundaries of projection and linear perspective. These kinds of exercises, in our view, should complement conventionalised drawing, in order to raise awareness about the relative character of the convention by drawing attention to multivariate points of reference. In inquiring the imagination of space, cultural, historical, technical, mathematical as well as sensory information should complement each other, in order to explore the full scope of experiencing space. As such we try to expand the draughtsman's knowledge and vocabulary upon spatial matter, in order to enable her/him to choose a personal way of expression, corresponding to the intended imagination.

Opening up the drawing classes to the sensory aspects of spatial experiences, diverts attention from the known to the interpretative, towards personal experience. Through exploring concepts to represent the sensory phenomena, the draughtsman is confronted with perceptual layers which make up space and with the limitations of the medium of drawing, to express certain of these phenomena. Opening up the drawing classes to the sensory means, we have to inquire possibilities to represent experiences, both by provoking thought and by practically illustrating how a drawing, a tool or a technique works. In order to step out of the mirror's shadow, we have to explore graphic possibilities to convey the experience of space, by and through drawing.

In order to enhance spatial awareness, we believe conventional drawing should be complemented by non-mathematical expressions of space. Designing spaces involves studying what it is (a) space is made of. Architectural space is something corporeal and the human body, as an inhabitant of space, has to find its place within it. Ignoring the sensory runs the risk of reducing architectural imagination to a detached concept of non-embodied space.

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THE ANALYSIS OF A HYBRID EDUCATIONAL APPROACH IN INTERIOR ARCHITECTURE DESIGN STUDIO: THE CASE OF BAHÇEŞEHİR UNIVERSITY.

Sezin Tanrıöver, Zeynep Ceylanlı, Pınar Sunar

Abstract

Architecture as a discipline has gone through a serious change since the post-war period and became a recognized profession focusing on human needs in the physical environments. The issue of educating new practitioners for the transforming field has turned out to be the subject of a lively debate for the last 10-20 years.

The current position and approach in design studios of Department of Interior Architecture and Environmental Design of Bahçeşehir University, were thought to be worth putting forth and sharing with the design community to initiate a discussion for the future of the discipline in general. Consequently, this study was structured to present a paradigm in Interior Architecture Education by focusing on the case of Bahçeşehir University (BAU) Interior Architecture and Environmental Design Department design studio education. The four-year program consisting of eight academic semesters, is addressing the combination of two methods; namely, horizontally organized design studios (HODS), and vertically organized studio groups (VODS). Currently, this approach is subject to many discussions within the department due to many aspects. This approach was tested, evaluated and criticized through student and instructor comments collected via questionnaires. Results were collected and interpreted through three main issues of learning, teaching and assessment.

Study moving from general design studio education to the case of Department of Interior Architecture and Environmental Design of Bahçeşehir University, concludes with general comments, mentioning the lack of literature on design studio education, and the significance of sharing different approaches and applications. Lastly and specifically, the revisions following the completion of the experiment in the department was put forth. With reference to the case of BAU, initiating a discussion regarding current design studio education was intended.

Keywords: Interior Architecture, Design Education, Design Studio Education.

THE EVOLUTION OF INTERIOR ARCHITECTURE AS A PROFESSION

The existence of interior architecture as a profession is rather a new situation compared to that of architecture; this is mostly related to the fact that the interiors gained importance in people's lives especially within the social, cultural and economical influences nourished after the industrial revolution. Mass production, standardization, immigration from rural to urban, faster means of transportation (both for the goods and the information), and accordingly, new ways of lifestyles brought about the specialization of the interior space as well as the specialization of the professionals dealing with it (Blakesmore, 1997; McKellar & Sparke, 2004; Pile, 2005).

Interior architecture has nourished from interior decoration, which as a profession first appeared at the very end of the nineteenth century in the United States. However, the significant escalation of interior design would be seen after the radical building boom occurred following the end of the World War II. Not only these developments but also the expanding educational system with the participation of women accelerated the development and the professionalization of interior architecture (Whitney, 2008).

While the terms of design education evolved,

professionalization of interior architecture brought along several necessities. As Lees-Maffei points out, "interior design has needed to shift its emphasis from taste to skill, and interior designers have necessarily asserted their expertise and authority, often working as advisers and practitioners". (Lees-Maffei, 2008). It is important to note that several labels have been used for the profession respectively: interior decoration, interior design, and interior architecture. Although these labels seem to differ at approaching the interior itself, all of them lead to the same result as the other: they "determine the relationship of people to spaces based on psychological and physical parameters, to improve the quality of life." (IFI, 2011).

EDUCATING PROFESSIONALS TODAY

The standardization of interior design/architecture education is a highly debated matter nowadays. As all higher education institutions in Turkey are experiencing a reorganization of programs, namely the Bologna Process at present, aiming to increase the mobility of students and academic staff throughout Europe; it is observed that (with slight differences in regional/practical contents) the body of knowledge of the interior design/architecture programs are already overlapping with the equivalents throughout the world. The courses offered can mainly be summoned as:

- Design, drawing, two and three dimensional studios
- History of art, architecture, and decorative arts
- Computer Aided Design (CAD), Sketch-up, Vis, Photo-shop, and other graphic
- Presentation computer programs
- Methods & materials for interior architecture
- Construction documents and building systems
- Lighting & mechanical systems
- Professional practices
- Human factors and environmental psychology

In the 21st century, interior design/architecture education and accordingly interior design issues are nurtured from the web and trade publications, developing means of software programming, and internet-based design solution resources, which enriches the learning process of the student, design perspective of the instructor, and the perception of the profession by the masses (Guerin and Thompson, 2004). One important point of the design education is that it embraces both the objectivity and the subjectivity in itself: there is no certain correct answer to one design problem. The main issue is to figure out the fundamental data about the user and the spatial necessities of the design in question, and subsequently enhance the quality of life. *"The uniqueness of the studio as a vehicle for student education"* is accepted by the scholars, and it is surely evident in the curricula of the faculties of design and architecture. (Dutton, 1987) In interior design/architecture education, the design studio is central where the students learn to deal with generating a real interior by evaluating user and functional needs, proposing innovative and creative solutions, and supporting design act by using the information gained from other courses in the curriculum and media. In the work of Demirbaş and Demirkan (2003), the nature of design studios is thoroughly summarized:

"In design education, design studios are the places in which the simulation of the real situation occurs. Design studio process is quite important in design education since it is the core of the curriculum and all the courses taught in design education are related to the design studio. The design studio is concerned with the definition of design education, its problems, relations and contents at sociological level and its relation to other disciplines at epistemological level. [...] Design studio offers an atmosphere that is conducive to a free exchange of ideas through and information processing which may be considered as organizational and social process for both the students and the instructors."

Since the design studio represents the core of the design education, it is worth questioning the aspects of the operating system. As the professionalization and thence institutionalization of interior design education has been discussed and evolved since its emergence, as the notions like computation and sustainability have recently been reevaluated in the design studio process, it is crucial to review the currently established situation in our terms. With references to these points, investigating the experiences of both students and instructors concerning design studio approach in BAU Interior Architecture and Environmental Design Department found worth pinning down and discussing for the development of the interior design education.

DESIGN STUDIO EDUCATION

Studio based design education was derived in Europe from the atelier-based training at the Ecole des Beaux-Arts in 19th Century in Paris, and then the Ecole's phi-

losophy was expanded to the United States. Later, a new German modern movement developed within the Bauhaus by mid 19th Century in design studio learning. The influence of that school and its approach to design education was spread throughout the world in the following years (Lackney, 1999).

Design studio education is significant in the processes of learning and teaching in design. Studio education aims to provide design experiences, gain knowledge, create communication between students and receive comments from instructor. Three important aspects appear in design education; learning, teaching and assessment. In the literature several learning models are being used. These learning models are Myers-Briggs-type indicator (MBTI), Kolb's Experiential Learning Theory, Hertmann Brain Dominance Instrument (HBDI) and Felder-Silverman Learning Style Model. However, these educational theories differentiate among learners manners, their goal and approaches are similar (Demirbaş, Demirkan, 2003).

The most important method of teaching and learning in design studios is critique sessions. Critiques improve the process of design, final product of design and students point of view; moreover acts as a control mechanism in the whole process. In design education, the most commonly used critique methods are; desk critique, interim critique and group critique (Farivarsadri, 2001). Desk critiques are the active dialogue sessions between the instructor and the student, by which students take feedback about their projects and the process itself. Interim critique is significant for the students, since it is the critical pre-evaluation of their projects. It gives students a chance to improve before they submit their works for the assessment in interim jury. Students present their projects in front of their instructors and peers, and receive feedback from the instructor that is named group critique. From the students' perspective, these critics create an opportunity to see a variety of approaches, make students participate more actively in the design process and make them aware that there may be various solutions for a design problem (Utaberta, Hassanpour, Bahar, Ani, 2013).

The last part of the design education is the assessment process. Assessment process is associated with juries which are generally carried out two/three times (midterm and final juries) an academic semester. The main aim of the juries are to create discussions on the works from several perspectives. In this way students can learn and improve their projects from constructive criticism that is received from the jury members. In addition to this, students graphical and verbal skills are encouraged in jury presentations which is a significant part of their profession (Uluoglu, 2000).

THE ANALYSIS OF AN EDUCATIONAL APPROACH: DESIGN STUDIO EDUCATION IN BAĞÇEŞEHİR UNIVERSITY

The Faculty of Architecture and Design was established in 2003 with three departments, namely Department of Architecture, Industrial Design and Interior Architecture and Environmental Design. In all three departments of the faculty, design studio education is being carried out with an approach similar to the one described in the previous section.

Each year the faculty enrolls approximately 220 students, and 68 out of total enrolls to Department of Interior Architecture and Environmental Design. At the time this study was conducted (2011-2012 spring

semester), the total number of students continuing their education in the department were 281. When the students were classified according to the years; 90 first, 66 second, 64 third, 61 fourth year students were counted. 120 students out of the total 281, and 15 instructors out of 30 have participated to the study. Since 2010-2011 academic year, students from 3rd to 7th semesters are experiencing VODS, meanwhile the 1st, 2nd and 8th semesters are experiencing HODS in the Department of Interior Architecture and Environmental Design in Bahçeşehir University.

In the current curriculum, there are 46 courses, in which the design studio of each year is central. Theoretical, technical and artistic courses are positioned in related semesters of the curriculum to support and fortify the performance of the student and the end product of the studios.

In the eight-semester program of the department, at the first two semesters students are prepared to the *Interior Architecture Design Studios* by *Basic Design* and *Interior Design Studies* courses. Starting from the 3rd semester, each student participates six interior design/architecture studios, one in each semester, where the last is the Degree Project Design Studio.

Design studios are carried out with two different educational/organizational methods; namely, horizontally organized design studios (HODS) and vertically organized design studios (VODS). The students of the first two and last two semesters and their instructors experience the HODS method, where students of the same level are grouped together. On the other hand, students from 3rd to 7th semesters are assembled in mixed groups via VODS method. In both methods, learning and teaching process (critiques) in the design groups are formed with continual dialogue through verbal and/or written and/or visual media among the instructors and the students.

Assessment process is also significant part of the learning and teaching in interior design/architecture education. In the assessment process, students from VODS and HODS system present their design projects in front of the jury, which consists of design group instructors, guest instructors and/or professionals, and the students. Students' projects are reviewed and criticized under several design topics such as concept, design approaches, technical drawing quality, and problem solutions. Juries are arranged three times a semester (two midterm juries and a final jury) and jury schedule is declared to the students via syllabus at the very beginning of the semester.

4.1. THE AIM AND SCOPE OF THE RESEARCH

The aim of this research was to question and understand the experiences of both students and the teaching staff considering VODS, which was the current teaching method in the 3rd-7th semester design studios; and the experiences of the same two groups in the 1st, 2nd and 8th semesters, HODS which also was the design studio teaching method previously used until 2010.

The current hybrid approach, a combination of VODS and HODS, is subject to many discussions within the department with regard to many aspects. These aspects formed the foundation of this study and are listed below:

1. In vertically organized design studios (VODS), concentration, communication within and between the groups and assessment issues were observed as problematic, while the atmosphere of education

was defined as rich and dynamic; due to the heterogeneous nature of the groups and the projects.

2. In horizontally organized design studios (HODS) concentration, communication within and between the groups, learning by comparison, development of awareness and assessment issues were observed as successful, while the atmosphere of education was defined as dull and statics; due to the homogeneous nature of the groups and projects.

Through the statistically analyzed data, the comparison of two methods mentioned above revealed the advantages/disadvantages that are experienced in teaching and learning, the roles of these models in enhancing communication between the students of different semesters, and finally their impact on student performance. With reference to the case of BAU, this study hopefully will initiate a discussion and a communion regarding design education in general.

4.2. THE METHODOLOGY AND THE PARTICIPANTS OF THE STUDY

PARTICIPANTS

This study was conducted during 2011-2012 Spring Semester with the participation of 120 students and 15 instructors from Interior Architecture and Environmental Design Department of Bahçeşehir University. The hybrid approach in which, first two and last two semesters of the whole 8 semester of design studio education is evaluated and criticized separately from the 4 other semesters in the middle. The group subject to this study consisted of students from 3rd, 4th, 5th, 6th, 7th, and 8th semester students, who have experienced both VODS and HODS. Only the students of 1st and 2nd semesters were excluded from the study due to their lack of experience in design studio education.

It is also worth mentioning that all the instructors subject to this research have also experienced both of the approaches sometime in their academic lives in BAU. The instructor group consisted of both 7 full-time and 8 part-time instructors. Among these instructors, 7 of them were interior architects and 8 were architects.

METHODOLOGY

Participants were subjected to two different sets of questions on the topics of design studio teaching methods VODS and HODS, and learning and communication in the studios. The system, defined as a hybrid approach above, was evaluated and criticized through student and instructor comments collected via two sets of questionnaires and interviews. Questionnaires consisted of 14 questions for which the subjects can select among five options as never, seldom, sometimes, often and always. Each questionnaire ends with two general questions evaluating the group coordinator assignment method, with the same five options above.

4.3. DATA ANALYSIS STUDENTS

The student data was analyzed according to the introductory information, such as design studio that the subjects were registered to, and the design studios repeated by the students. Gender and age information though collected, were considered negligible for the scope of this particular stage and omitted from the analyses of this

study. Students' comments through 3rd and 8th semesters concerning two different studio methods were analyzed and interpreted.

Through the statistically analyzed data, comparison of two methods mentioned above was done revealing the advantages/disadvantages experienced in teaching and learning, and communication between the students of different semesters in the studio. The impact of these two methods on student and instructor performances will be the focal points of the further research. Statistical analysis consisted of frequency, percentage, mean and standard deviation values of each question, and one-way analysis of variance (ANOVA) according to the demographic data were completed. In the student group, 'design studio that the subjects are registered to', and 'the design studios repeated by the students' were tested.

Student subjects when compiled according to 'the design studio that they were registered to', 33,3% (n=40) were at the 6th (3002), 25%(n=30) 4th (2002), 12,5%(n=15) 8th, 10,8%(n=13) 7th, and 7,5%(n=9) at the 5th semester design studio students of the department. Lowest participation was from the 3rd semester design studio. Students, when compiled according 'the design studios repeated by the students', 23,3% (n=28) of the subjects were found to repeat one or more than one of the design studios during their education.

Students participated to the study were subjected to two sets of questions, considering their experiences in VODS and HODS as given Table 1 and 2.

In the VODS, the percentages revealed that majority of the students SOMETIMES do have information about different projects; see projects from upper levels and their perspective is enhanced; learn from the friends in the upper levels; share their knowledge with lower levels; find studio studies dynamic; think critics on different design project enhances their creativity in learning; think that having different design projects in the jury assessments enriches the discussion; think that level difference is being considered in the jury assessments and think that their thinking, criticizing and designing abilities have been affected positively. Meanwhile, students OFTEN do think that seeing projects from upper levels

gives an idea about the whole studio education; discussions on different designs encourages innovative designs; learn from the projects they see; compare their work with others; and think that level difference in the studio are being considered in the jury assessments.

In the HODS, the percentages revealed that majority of the students OFTEN do think that they can concentrate better with a group of students at the same level; one design project subject enables a detailed research; they can share knowledge with classmates at the same level; learn from classmates at the same level; see many examples on single design project subject; learn from the examples in the studio; can compare their work with others'. Meanwhile, students SOMETIMES do, think that having only one design project subject encourages and enhances creativity; jury critics are monotonous due to one design project subject is being discussed; jury assessments of projects at the same level and subject provides fair evaluations; and the ability of thinking, criticizing and designing have been affected positively. Same percentage of SOMETIMES and OFTEN have been determined for, concentrating on only one subject clarifies and eases to follow up the criteria of the studio.

In the One-Way Analysis of Variance (ANOVA) with regard to students' demographic data 'the design studio that they were registered to' and 'the design studios repeated by the students', significant differences appeared in the group as mentioned in the Tables 3 and 4 below.

According to Table3 below, the comment (experience) "I can share my knowledge with my classmates at the same level" of the students shows a significant difference due to 'the design studio that they were registered to'; graduates' mean values are higher than the others. The comment (experience) "I can learn from the projects I have seen" of the students shows a significant difference between the graduates and the second and fourth year students. Second year students' mean values are lower than the others.

Another comment (experience) "It is positive to let students to choose their own project coordinator for the design studio in each semester" of the student shows

according to my experiences, in VODS.		Never	Seldom	Sometimes	Often	Always	Mean $\pm$ Std. Dev
I can have information about different projects	n	1	12	47	33	27	3.608 $\pm$ 0.973
	%	.8%	10.0%	39.2%	27.5%	22.5%	
seeing projects from upper levels gives an idea about the whole studio education system	n	3	8	35	40	34	3.783 $\pm$ 1.014
	%	2.5%	6.7%	29.2%	33.3%	28.3%	
seeing projects from upper levels enhances my perspective in design	n	5	11	40	37	27	3.583 $\pm$ 1.066
	%	4.2%	9.2%	33.3%	30.8%	22.5%	
allows me to learn from my friends in upper levels	n	10	14	40	34	22	3.367 $\pm$ 1.159
	%	8.3%	11.7%	33.3%	28.3%	18.3%	
sharing my knowledge with my friends in lower levels refreshes and reinforces my knowledge,	n	6	13	46	38	17	3.392 $\pm$ 1.023
	%	5.0%	10.8%	38.3%	31.7%	14.2%	
I find studio studies dynamic	n	8	15	47	38	12	3.258 $\pm$ 1.025
	%	6.7%	12.5%	39.2%	31.7%	10.0%	
critics on different design projects enhances my creativity	n	3	11	46	39	21	3.533 $\pm$ 0.97
	%	2.5%	9.2%	38.3%	32.5%	17.5%	
discussions on different design projects encourages me to create innovatively	n	4	15	40	41	20	3.483 $\pm$ 1.021
	%	3.3%	12.5%	33.3%	34.2%	16.7%	
I can learn from the projects I have seen	n	2	11	35	51	21	3.65 $\pm$ 0.932
	%	1.7%	9.2%	29.2%	42.5%	17.5%	
I can compare my work with others	n	2	10	23	53	32	3.858 $\pm$ 0.964
	%	1.7%	8.3%	19.2%	44.2%	26.7%	
having different design project subjects in the jury assessments enriches the discussions	n	9	11	38	35	27	3.5 $\pm$ 1.16
	%	7.5%	9.2%	31.7%	29.2%	22.5%	
different design projects blurs evaluation criteria and cause difficulties in following up jury assessments	n	10	19	34	36	21	3.325 $\pm$ 1.182
	%	8.3%	15.8%	28.3%	30.0%	17.5%	
level difference between design studios are being considered in the jury assessments	n	12	24	43	27	14	3.058 $\pm$ 1.14
	%	10.0%	20.0%	35.8%	22.5%	11.7%	
in general, my thinking, criticizing and designing abilities have been affected positively	n	11	8	43	39	19	3.392 $\pm$ 1.117
	%	9.2%	6.7%	35.8%	32.5%	15.8%	

Table 1. Students' Questionnaire1: Frequency, Percentage, Mean and Standard Deviation Values for VODS.

according to my experiences, in HODS,		Never	Seldom	Sometimes	Often	Always	Mean $\pm$ Std. Dev.
I can concentrate on my project better with a group of students at the same level	n	7	13	35	36	29	3.558 $\pm$ 1.143
	%	5.8%	10.8%	29.2%	30.0%	24.2%	
working on one design project subject within a group, enables a detailed research on the subject	n	4	10	23	49	34	3.825 $\pm$ 1.042
	%	3.3%	8.3%	19.2%	40.8%	28.3%	
I can share my knowledge with my classmates at the same level	n	5	8	33	45	29	3.708 $\pm$ 1.04
	%	4.2%	6.7%	27.5%	37.5%	24.2%	
I can learn from my classmates at the same level	n	5	7	37	45	26	3.667 $\pm$ 1.015
	%	4.2%	5.8%	30.8%	37.5%	21.7%	
having only one design project subject creates monotony in the studio,	n	15	23	35	23	24	3.15 $\pm$ 1.294
	%	12.5%	19.2%	29.2%	19.2%	20.0%	
having only one design project subject encourages and enhances my creativity	n	11	12	51	32	14	3.217 $\pm$ 1.078
	%	9.2%	10.0%	42.5%	26.7%	11.7%	
I can see many examples on a single project subject	n	6	11	32	43	28	3.633 $\pm$ 1.092
	%	5.0%	9.2%	26.7%	35.8%	23.3%	
I can learn from the examples I saw during the semester	n	4	8	34	49	25	3.692 $\pm$ 0.986
	%	3.3%	6.7%	28.3%	40.8%	20.8%	
I can compare my work with others' in the studio	n	1	2	36	42	39	3.967 $\pm$ 0.879
	%	.8%	1.7%	30.0%	35.0%	32.5%	
Jury critiques are monotonous since only one project subject is being discussed	n	9	16	47	29	19	3.275 $\pm$ 1.115
	%	7.5%	13.3%	39.2%	24.2%	15.8%	
concentrating on only one subject, clarifies and eases to follow up the criteria of the studio.	n	3	9	41	41	26	3.65 $\pm$ 0.984
	%	2.5%	7.5%	34.2%	34.2%	21.7%	
jury assessments of projects at the same level and subject provides fair evaluations	n	9	10	39	37	25	3.492 $\pm$ 1.138
	%	7.5%	8.3%	32.5%	30.8%	20.8%	
in general, my thinking, criticizing and designing abilities have been affected positively	n	7	10	48	33	22	3.442 $\pm$ 1.067
	%	5.8%	8.3%	40.0%	27.5%	18.3%	

Table 2. Students' Questionnaire 2:Frequency, Percentage, Mean and Standard Deviation Values for HODS.

a significant difference due to 'the design studio that they were registered to' second year students' mean values are lower than the others. The mean values for the general questions for HODS, shows a significant difference between the graduates, and second and fourth year students. Second year students' mean values are lower than the others. Moreover, difference between the graduates and third year students are also significant where the mean values of the former is higher than the latter. Meanwhile, (VODS) General Mean Value and (HODS) General Mean Value did not indicate a significant difference due to 'the design studio that they were registered to'.

According to Table 4 above, the comment (experience) "seeing projects from upper levels gives an idea about the whole studio education system" of the students showed a significant difference due to 'the design studios repeated by the students' in the VODS. The mean of the students who didn't repeat any of the studios are higher than the ones repeated. Another comment (experience) "I can compare my work with others" of the students showed a significant difference due to 'the design studios repeated by the students' in the VODS. The mean of the students who didn't repeat any of the studios are higher than the ones repeated. Meanwhile, (VODS) General Mean Value and (HODS) General Mean Value did not indicate a significant difference due to 'the design studios repeated by the students'.

INSTRUCTORS

Instructor subjects consisted of 7 interior architects, 8 architects; 15 in total when compiled according to the profession. According to their staff status 7 out of 15 were full-time and 8 were part-time instructors. In addition, 13 out of 15 participants are teaching with this method for 2 years, 1 for 4 years and 1 for 1 year. 12 out of 15 stated that they have not used this system in anywhere other than Bahçeşehir University.

Instructors' data was analyzed according to the introductory information, such as profession, staff status (part-time, full-time) and the years spent teaching by VODS method. Similar to the student subject group, gender and age information though collected were considered negligible for scope of this particular stage and

		n	Mean	Std. Dev.	Mean Rank	Chi-Square	Asymp. Sig.
(HODS) I can learn from my classmates at the same level	second year	35	3.429	0.948	45.93	10.965	0,012*
	third year	49	3.714	1.173	62.30		
	fourth year	38	3.786	0.876	61.54		
	graduate	8	4.625	0.518	92.13		
(HODS) I can learn from the examples I saw during the semester	second year	35	3.486	0.853	52.04	9.683	0,021*
	third year	49	3.551	1.138	56.88		
	fourth year	38	4.000	0.770	70.61		
	graduate	8	4.375	0.744	84.31		
(General) It is positive to let students to choose their own project coordinator for the design studio in each semester	second year	35	3.400	1.376	44.04	12.937	0,005**
	third year	49	4.245	1.090	66.60		
	fourth year	38	4.250	1.143	67.09		
	graduate	8	4.500	0.756	72.06		
(VODS) general mean value	second year	35	3.533	0.593	64.44	1.631	0.652
	third year	49	3.493	0.684	58.88		
	fourth year	38	3.370	0.694	55.79		
	graduate	8	3.634	0.940	69.69		
(VODS) general mean value	second year	35	3.420	0.545	51.51	9.522	0,023*
	third year	49	3.493	0.643	57.35		
	fourth year	38	3.731	0.539	69.48		
	graduate	8	3.981	0.413	87.69		

**p<0.01, *p<0.05

Table 3. Students' experiences according to 'the design studio that they were registered to' **p<0,01, *p<0,05

	Repeat	n	Mean	Std. Dev.	Mean Rank	Mann-Whitney U	Asymp. Sig. (2-tailed)
(VODS) seeing projects from upper levels gives an idea about the whole studio education system	Yes	28	3.429	1.069	48.98	965.500	0.036*
	No	92	3.891	0.977	64.01		
(VODS) I can compare my work with others'	Yes	28	3.393	1.100	46.30	890.500	0.009**
	No	92	4.000	0.877	64.82		
(VODS) General Mean Value	Yes	28	3.378	0.702	53.68	1097.000	0.336
	No	92	3.518	0.667	62.58		
(HODS) General Mean Value	Yes	28	3.621	0.478	61.89	1249.000	0.808
	No	92	3.541	0.628	60.08		

Table 4. Students' experiences according to 'the design studios repeated by the students' **p<0,01, *p<0,05.

omitted from the analyses of this study.

In the VODS, the percentages revealed that majority of instructors ALWAYS do think, concentrating on projects from different levels and subjects enhances knowledge and experience; it enriches to have students from different levels and projects in a studio group; variety in project and students levels bring dynamism to the studio studies; variety in the subjects enriches jury critiques; jury becomes an educational tool; and level and subject differences are being considered during the jury assessment. Meanwhile, instructors OFTEN do think, students from lower levels can have a preview of the coming semesters and projects; discussions on different

according to my experiences, in VODS ,		Never	Seldom	Sometimes	Often	Always	Mean ± Std. Dev.
concentrating on projects from different levels and subjects enhances my knowledge and experience	n	0	0	4	4	7	4.2 ± 0.862
	%	.0%	.0%	26.7%	26.7%	46.7%	
it enriches to have students from different levels and projects in my studio group	n	0	0	4	4	7	4.2 ± 0.862
	%	.0%	.0%	26.7%	26.7%	46.7%	
students from upper levels share knowledge and experience with the others from lower levels	n	0	3	6	5	1	3.267 ± 0.884
	%	.0%	20.0%	40.0%	33.3%	6.7%	
students from lower levels can have a preview of the coming semesters and projects	n	0	0	1	9	5	4.267 ± 0.594
	%	.0%	.0%	6.7%	60.0%	33.3%	
variety in project and students levels bring dynamism to the studio studies	n	0	3	3	2	7	3.867 ± 1.246
	%	.0%	20.0%	20.0%	13.3%	46.7%	
discussions on different subjects from different levels enables innovative and creative designs	n	0	2	2	9	2	3.733 ± 0.884
	%	.0%	13.3%	13.3%	60.0%	13.3%	
students learn from the projects they saw in the studio	n	0	0	3	6	6	4.2 ± 0.775
	%	.0%	.0%	20.0%	40.0%	40.0%	
variety in the subjects enriches jury critiques	n	0	1	2	5	7	4.2 ± 0.941
	%	.0%	6.7%	13.3%	33.3%	46.7%	
variety in the subjects and levels of the projects complicate clearness of the assessment criteria and cause difficulties in following up jury evaluation	n	3	1	8	2	1	2.8 ± 1.146
	%	20.0%	6.7%	53.3%	13.3%	6.7%	
jury becomes an educational tool	n	0	2	2	2	9	4.2 ± 1.146
	%	.0%	13.3%	13.3%	13.3%	60.0%	
level and subject differences are being considered during the jury assessment	n	0	3	3	3	6	3.8 ± 1.207
	%	.0%	20.0%	20.0%	20.0%	40.0%	
generally, students' thinking, criticizing and designing performances are affected positively	n	0	1	3	6	5	4 ± 0.926
	%	.0%	6.7%	20.0%	40.0%	33.3%	
I have difficulties in following up and concentrating on different projects from different levels	n	4	5	3	3	0	2.333 ± 1.113
	%	26.7%	33.3%	20.0%	20.0%	.0%	
I can overlook all the projects from different levels and subjects in my group	n	1	0	2	6	6	4.067 ± 1.1
	%	6.7%	.0%	13.3%	40.0%	40.0%	

Table 5. : Instructors' Questionnaire1 - Frequency, Percentage, Mean and Standard Deviation Values for VODS.

subjects from different levels enables innovative and creative designs; students' thinking, and criticizing and designing performances are affected positively. In addition, instructors **SOMETIMES** do think, students from lower levels can have a preview of the coming semesters and projects; variety in the subjects and levels of the projects complicate clearness of the assessment criteria and cause difficulties in following up jury evaluation. Lastly, instructors **SELDOM** think they have difficulties in following up and concentrating on different projects from different levels. Same percentage of **ALWAYS** and **OFTEN** have been determined for the case that they can overlook all the projects from different levels and subjects in a group.

In the **HODS**, the percentages revealed that majority of the instructors **OFTEN** think, students working on the same project subject learn from each other in the studio; can see a lot of examples on the same project subject; can learn from the project they see in the studio; can evaluate his/her own work by comparing with the

others' in the studio; the evaluation of same level students is much more fair and balanced in the jury assessments; students' thinking, criticizing and designing performances are affected positively. Meanwhile, instructors **ALWAYS** think, they can concentrate better on one project subject with the students from same level; working on one design project subject within a group, it enables a detailed research on the subject; discussions are more efficient and balanced with group of students of the same level; and juries become an educational tool. In addition, they **SOMETIMES** think, working on the same project subject by all the students creates monotony in the discussions and products in the studio; and working on the same project subject by all the students creates innovative and distinct products of design in the studio. Lastly, instructors **NEVER** think, they have difficulties in following up and concentrating on the same subject projects of students. The percentages for **SOMETIMES** and **OFTEN** are equal for, instructors' difficulties in following up and concentrating on the same subject projects of

according to my experiences, in HODS ,		Never	Seldom	Sometimes	Often	Always	Mean ± Std. Dev.
I can concentrate better on one project subject with the students from same level.	n	0	3	1	3	8	4.067 ± 1.223
	%	.0%	20.0%	6.7%	20.0%	53.3%	
working on one design project subject within a group, enables a detailed research on the subject	n	0	1	4	3	7	4.067 ± 1.033
	%	.0%	6.7%	26.7%	20.0%	46.7%	
discussions are more efficient and balanced with group of students of the same level	n	0	0	4	4	7	4.2 ± 0.862
	%	.0%	.0%	26.7%	26.7%	46.7%	
students working on the same project subject learn from each other in the studio	n	0	3	3	6	3	3.6 ± 1.056
	%	.0%	20.0%	20.0%	40.0%	20.0%	
working on the same project subject by all the students creates monotony in the discussions and products in the studio	n	0	0	8	4	3	3.667 ± 0.816
	%	.0%	.0%	53.3%	26.7%	20.0%	
working on the same project subject by all the students creates innovative and distinct products of design in the studio	n	0	3	7	4	1	3.2 ± 0.862
	%	.0%	20.0%	46.7%	26.7%	6.7%	
student can see a lot of examples on the same project subject	n	0	1	1	9	4	4.067 ± 0.799
	%	.0%	6.7%	6.7%	60.0%	26.7%	
student can learn from the project they see in the studio	n	0	1	5	5	4	3.8 ± 0.941
	%	.0%	6.7%	33.3%	33.3%	26.7%	
student can evaluate his/her own work by comparing with the others' in the studio	n	0	1	2	8	4	4 ± 0.845
	%	.0%	6.7%	13.3%	53.3%	26.7%	
the evaluation of same level students is much more fair and balanced in the jury assessments	n	0	2	2	8	3	3.8 ± 0.941
	%	.0%	13.3%	13.3%	53.3%	20.0%	
concentrating on one project subject provides clarity in the assessment criteria and eases to follow up the jury	n	0	0	5	5	5	4 ± 0.845
	%	.0%	.0%	33.3%	33.3%	33.3%	
juries become an educational tool	n	0	3	4	6	7	4.133 ± 0.99
	%	.0%	20.0%	26.7%	40.0%	46.7%	
generally, students' thinking, criticizing and designing performances are affected positively	n	1	2	4	6	3	3.4 ± 1.121
	%	6.7%	13.3%	26.7%	40.0%	13.3%	
I have difficulties in following up and concentrating on the same subject projects of students	n	7	4	4	0	0	1.8 ± 0.862
	%	46.7%	26.7%	26.7%	.0%	.0%	

Table 6. Instructors' Questionnaire 2 - Frequency, Percentage, Mean and Standard Deviation Values for HODS.

	Staff Status	n	Mean	Std. Dev.	Mean Rank	Mann-Whitney U	Monte Carlo Sig. (2-tailed)
(HODS) working on one design project subject within a group enables a detailed research on the subject	full-time	7	3.571	0.976	5.86	13.000	.049*
	part-time	8	4.500	0.926	9.88		
(HODS) student can evaluate his/her own work by comparing with the others' in the studio	full-time	7	3.429	0.787	5.14	8.000	.019*
	part-time	8	4.500	0.535	10.5		
(HODS) juries become an educational	full-time	7	3.429	0.976	5.00	7.000	.012*
	part-time	8	4.750	0.463	10.63		
(VODS) General Mean Value	full-time	7	3.643	0.367	5.71	12.000	.068*
	part-time	8	3.929	0.416	10.00		
(HODS) General Mean Value	full-time	7	3.418	0.552	6.00	14.000	.116*
	part-time	8	3.946	0.388	9.75		

Table 7. Instructor experiences according to 'the staff status'
b. Based on 10000 sampled tables with starting seed 1615198575. *p<0,05.

students; and **ALWAYS**, **OFTEN** and **SOMETIMES** for, concentrating on one project subject provides clarity in the assessment criteria and eases to follow up the jury.

According to table 7 above, the comment (experience) **"working on one design project subject within a group, enables a detailed research on the subject"** of the instructor showed a significant difference due to 'the staff status' in the HODS. Part-time instructors' mean value was higher than the full-time instructors. Another comment (experience) **"student can evaluate his/her own work by comparing with the others' in the studio"** of the instructor showed a significant difference due to 'the staff status' in the HODS. Part-time instructors' mean value was higher than the full-time instructors. In addition, the third comment (experience) **"juries become an educational tool"** of the instructor showed a significant difference due to 'the staff status' in the HODS. Similar to the other comments, part-time instructors' mean value appeared to be higher than the full-time instructors. Meanwhile, **(VODS) General Mean Value** and **(HODS) General Mean Value** did not indicate a significant difference due to 'the staff status' of the instructors.

RESULTS AND DISCUSSION

The results of the study was organized and presented under three subheadings which points out three view points of the design studio education in the Department of Interior Architecture and Environmental Design of Bahçeşehir University.

5.1. LEARNING

The student comments regarding the topic "learning" for the two methods in question were investigated through multiple propositions.

In **VODS**, the students evaluated their acquisition of knowledge, both on their own projects and the studio education system, by having the chance to see projects from different semesters (either from upper or lower levels). They commented on the enhancing creativity and innovation achieved through critics and discussions on different design projects. Nevertheless, they were asked whether their thinking, criticizing and designing abilities had been affected positively in general. Results revealed a concentration on **SOMETIMES** and **OFTEN** choices of students' for **VODS** evaluations. However, significant differences appeared for the comments **"seeing projects from upper levels gives an idea about the whole studio education system"** and **"I can compare my work with others"**, between the students who repeated anyone of the studios and the ones who did not. The mean values for both were higher for the one who did not repeat (Table 4).

In **HODS**, the students assessed the situation of

seeing one single design project; whether it improves the communication among the students at the same design project group, or it encourages and enhances their creativity, or it enables a more thorough research on their own design project. Meanwhile, they also evaluated the state of monotony in concentrating on only one design project subject. Results revealed a concentration on **SOMETIMES** and **OFTEN** choices of students' for **HODS** evaluations. However, significant differences appeared between the comments of graduates and the others for **"I can share my knowledge with my classmates at the same level"** in which graduates' mean values were higher than the others (due to their experience in the department); and also between the comments of graduates, and second and fourth year students for **"I can learn from the projects I have seen"** in which second year students' mean values were lower than the others. (due to the few number of subjects). Moreover, significant difference appeared in the comments of second year students for the comment **"It is positive to let students to choose their own project coordinator for the design studio in each semester"**, since it was their first time in deciding their own project coordinators, and their acquaintance with the coordinators was less than the other groups. When general questions for **HODS** were observed, similarly graduates comments appeared significantly different than the others (Table 3).

5.2. TEACHING

The comments regarding the topic of "teaching" for the two methods in question were also investigated through multiple propositions.

In **VODS**, the instructors assessed the contribution of different levels and projects to their knowledge and experience, the level of creation and innovation achieved in design groups, and the dynamism experienced through the variety in design project topics and student levels. They also commented on the positive effects of **VODS** on the students' thinking, criticizing, and designing performances. Results revealed a concentration on **ALWAYS** and **OFTEN** choices for instructors' **VODS** evaluations. However, no significant differences appeared for the comments due to the 'staff status' of the instructors.

In **HODS**, the instructors evaluated the positive and negative aspects of working on one single project, such as the efficiency of the discussions held in the group, distinctiveness of the end-products, or the monotony of the critics. Meanwhile, they commented on evaluating the student's own work by comparing with the others' in the studio. Results revealed a concentration on **OFTEN** and **ALWAYS** choices for instructors' **HODS** evaluations. However, significant differences appeared for the comments **"working on one design project topic within a group, enables a detailed research on the subject"**, **"student can evaluate his/her own work by comparing with the others' in the studio"**, and **"juries become an educational tool"**, where the part-time instructors' mean values are higher than the full-time instructors'.

5.3 ASSESSMENT

The propositions on the assessment of the processes and the end products in **VODS** and **HODS** were reviewed both from the perspectives of the students and the instructors. The common question for both methods was the consideration and the fair evaluation

of different project levels and design project topics.

In **VODS**, students and instructors were asked about the positive and negative effects of having different project topics on jury discussions, considering the evaluation criteria and following up the jury assessments. According to the percentages of both students' and instructors' evaluations of the comments on the positive aspects of the assessment, a concentration on **ALWAYS** choice is observed in the latter, while a concentration on **SOMETIMES** choice is observed in the former.

In **HODS**, students and instructors commented on the ease of the following up the jury as well as concentrating only one single design subject. According to the percentages of both students' and instructors' evaluations of the comments on the positive aspects of the assessment, a moderate distribution of **SOMETIMES**, **OFTEN** and **ALWAYS** choices are observed in the latter, while a concentration on **SOMETIMES** choice is observed in the former.

CONCLUSION

The focal points of this study given in detail in the discussion section were summarized and the outcomes below are derived:

-Results for "learning" indicate that the positive propositions as part of HODS method are more likely accepted than the ones in VODS method.

-Results for "teaching" indicate that although no significant difference between HODS and VODS methods are observed, the positive propositions of VODS method are one step ahead.

-Results for "assessment" indicate that despite the neutral perception of the students for both methods, instructors' evaluations in VODS method seem more positive than HODS method.

During the preparation process of this study, it has been observed that related literature lacks similar studies that put forth the situation in different institutes. However, it is quite valuable to increase the number of similar studies that describes different approaches and applications in various institutions, for the development of the design studio education and the related literature in general. Such experiments, as this study for the department in question, are very beneficial because it is possible to first, to conduct trials of different approaches; second, to locate the advantages and disadvantages of different approaches by comparison; and finally to revise the program by referring to the results of the experiment.

After the completion of the study, hybrid design studio education system in the department was revised as HODS for all years and semesters, due to the need of a unified curriculum. The assessment of the previous hybrid approach visualized/set out compatibility problem of these two methods within the 4-year program of the department.

Questioning, rethinking and revising the approaches and applications in design studio education is crucial, due to its central position and significance in design education since development and revision of studio education brings about the development of the program itself.

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DESIGN WORKSHOPS AS A TOOL FOR INFORMAL ARCHITECTURAL EDUCATION.

Hülya Turgut, Emel Cantürk

Abstract

Although the design studio has formally been the locus for design education, informal education approach has gained more and more acceptance in the world. Informal education, which is the education outside the confines of curricula, includes the acquisition of knowledge and skills through experience, reading, social contact, etc. Workshops cover the essential weight of this informal education. Although the role of the design workshops in architectural design education has been very limited through overall design education's past, many schools of architecture have taken steps to consider workshops as the part of informal learning and education.

"Culture and Space in the Build environment" (CSBE) Network of IAPS have been organizing "culture and design workshop series" for graduate and post graduate students in Turkey since 2001. In these workshops, a design teaching approach based on the conceptual framework of culture and space interactions is applied. The conceptual framework developed for the architectural design education, takes three fundamental starting points for workshops as the part of informal design education: as a tool for informal design education (method), as a tool for learning & understanding culture-environment relations (content), and as a tool for awareness of different environments/contexts (scale/place). The foundation of the conceptual framework is based on the general approach that discusses the "architectural design process" with regards to environmental context and content.

Within this context the aim of the paper is to discuss and evaluate the importance and the contribution of workshops as tool for informal architectural design education. These discussions will be held on the case of IAPS-CSBE Network's last workshop "Istanbul as a Palimpsest City and Imperfection". In the paper, the process, the method, the content and the results of workshop studies will be discussed and evaluated.

Keywords: Informal Architectural Education, Workshops, Place, Istanbul, Palimpsest City.

1. INTRODUCTION

The Design studio is a central part of the architectural design education. It works as a method by which we demonstrate the integration and syntheses of the key themes in students' academic portfolios. Design is an iterative process, which involves research and its reflection and integration of knowledge. It takes time, space and careful mentoring to acquire the practical and mental agility, the complex interaction of skills, knowledge and creativity that is central to the practice of architectural design (Milliner, 2003). Since there are many different points of views on what constitutes architectural education, there are also a variety of methods, including different contents and scales in teaching design.

Although the design studio has formally been the locus for design education, informal education approach has gained more and more acceptance in the world. Informal education includes the acquisition of knowledge and skills through experience, reading, social contact, etc. Workshops cover the essential weight of this

informal education. A workshop is a brief, but intensive group meeting often facilitated by one or more people from several disciplines.

The role of the design workshops in architectural education has been very limited through overall design education's past, and thus has gone largely unnoticed by the educators of design. The drivers of this change in design education and practice; and changing student demographics brought some inevitable changes to design studio practices. The introduction of workshops, which aids not only developing and sharpening design skills in a short period of time, but also help to construct new approaches in architectural education. Many schools of architecture have taken steps to consider workshops as the part of informal education.

"Culture and Space in Build environment" (CSBE) Network of IAPS¹ have been organizing design workshop series for graduate and post graduate students in Turkey since 2001.²

In organizing these design workshop series, the main aim is to focus on architecture and culture interac-

¹ Coordinated by Hülya Turgut and Peter Kellett, IAPS-CSBE Network is a scientific organisation taking place within IAPS "International Association for People-Environment Studies" aiming at defining the problems arising from the interaction between the culture and the space; seeking for solutions in an interdisciplinary framework after establishing a relation between theory and implementation; including these issues in the architectural education process along with theoretical and implementation studies in the overall context of built environment, design and planning issues. IAPS webpage: <http://www.iaps-association.org>

² The first one was organized in the historic town of Amasya in North Central Anatolia, entitled as "Amasya: Continuity and Change". The second workshop was organized in Trilye between 12 to 17 July 2007 entitled as "Trilye: Continuity, Change & Transformation". The third one was organized in Istanbul between 15 to 20 February 2010 entitled as "Istanbul: The routes of Culture of Architecture". And the last one was organized within the context of the Academic Program of the 1st Istanbul Biennale, between 1 to 5 October 2012 entitled as "Istanbul as a Palimpsest City and Imperfection".

Figure 1. The conceptual framework of culture and space interactions in architectural design education (based on Turgut Yıldız & İnalan, 2008).

tion using the concept and theories on culture and space in architectural education. Our other aim is to form a platform for architecture students to communicate, collaborate and share their experiences and knowledge.

2. THE CONCEPTUAL FRAMEWORK FOR THE DESIGN WORKSHOPS OF IAPS-CSBE NETWORK

In general, and in the framework of this paper the teaching approach to the design education used by authors is based on the perspective of *environment-behavior studies* of which *culture-environment* relations are a part. Using the conceptual framework of culture and space interactions comprising the components of **scale/environment, user groups/culture, behavior and time**, help us to develop a conceptual framework for design education. In relation with this conceptual framework, architectural design education is a combination of three basic systems: **scale/place, content, and method**. Where content component consists of user groups and wider culture, scale/place component defines coverage and space and the teaching methods comprise the processes and techniques in design (Eren and Turgut, 2001; Turgut and others, 2002; Turgut Yıldız, 2007; Turgut Yıldız and İnalan, 2008). While creating this framework, the focus has not been on the typological building design, but more on 'how' to think while designing an environment in an experimental process (Figure 1).

The foundation of the conceptual framework is based on the general approach of the authors, educators and architects, discussing the 'architectural design process' with regards to environmental context and content. In the context of the conceptual framework as defined above, the examination of the environment is a starting point for theoretical considerations of the design teaching. The ability to 'read' and understand the environments in different contexts, urban forms, and building typologies is implicit in the discussion of the integrity of culture, space, and architecture. Therefore, to include field works aimed at 'reading the environment' to the design education process and taking students, either individually or as a group, to a place is very useful for the conceptual basis of teaching model. As pointed out by Bechhofer who has been taking his student abroad, students will have perceptions of the environment as well as of themselves in relation to it, in an unfamiliar context (Bechhofer, 2001).

Based on the framework and approach of authors to architectural design education, we can summarize three fundamental starting points for **workshops as the part of informal design education**:

- workshops as a tool for informal design education: **Method (techniques & process)**
- workshops as a tool for learning & understanding culture and environment relations (and EBS more generally): **Content**
- workshops as a tool for awareness of environments in different contexts/importance of place: **Scale/Place**

2.1.METHOD (TECHNIQUES &PROCESS): WORKSHOPS AS A TOOL FOR INFORMAL DESIGN EDUCATION

The main aim of a contemporary design education is to provide *process-focused education*, rather than *product-focused education*. Process-focused design needs an inspiring atmosphere which is possible with the workshops out of studios; this is because workshops offer a free environment of interaction which is purged from constraints of formal education (Civaroğlu, 2003).

Workshops are educational tools developed to facilitate an understanding of different strategies for defining and exploring design problems, generating new ideas and making decisions towards solving them in a short period of time. It is evident that they help sharpen students' perception and accordingly design skills. As teachers and designers we know that skills learned by doing - visualization, hands-on manipulation, and modeling - are not easily forgotten. More of field visits, studios, workshops and tutorials; less of lecture courses are very essential, as the learning in architecture is predominantly sensual and perceptual.

The free atmosphere of workshops provides the medium for productivity and creativity of the students. These intensive but time limited group meetings work as an enabler to set of activities designed to promote learning, discussion and feedback by highly involvement and interaction of the participating students. The free discussions, exchange of ideas, and demonstration of methods of practical application of skills and principles by others help students to achieve collected knowledge and real life experience.

From this point of view, carrying out the architectural design workshops in different contexts expands the horizon of the students. Learning by seeing and living with the different physical and social characteristics of different areas is ever lasting experience. Since workshops serve as an anchor for this type of informal learning, it is important to encourage students to be an active learner by giving them the chance to participate, explore and be motivated about learning all dimensions of the environment in order to be creative.

2.2.CONTENT: WORKSHOPS AS A TOOL FOR LEARNING AND UNDERSTANDING CULTURE AND ENVIRONMENT RELATIONS

By designing workshops that cover the analysis of certain culture groups and their built environment, it is aimed to display the man and environment relationships that will provide data for design disciplines and emphasizing the socio-cultural factors affecting the formation of physical environments.

Socio-cultural aspects of environments have been a growing focus of people-environment research in

the past decade but despite this expansion in research, architectural education does not appear to have been changed in any significant way. There are, however, a few strands in architectural education, which offer the most promise for integrating socio-cultural aspects of environments into their studies. Such strands in education include architecture programs with a regional or social-group focus, with a vernacular or social history emphasis, where research and undergraduate programs are less separated, and where there is an emphasis in theory of place and community (Low, 1992).

In the socio-cultural approach, social and cultural issues are regarded as crucial to understanding the built environment. These issues both dictate the nature of the design projects and form part of the design process. The students are encouraged to develop an awareness of environmental issues and the ability to respond these issues through their work. The emphasis has been on the process of response to social and cultural issues (Bar-eli and Oxman, 1998).

The analysis of culture-environment relationship is not a new topic of study. But using it in architectural education in the context of cities, has gained momentum in 1980s. The reason for that is, urban areas and cities in the world has experienced a fundamental social, cultural and economic transformation in past two decades. Globalization, internationalization and the rapid flow of information have played a significant role in changing cities, and its people. The multi-dimensional outcomes of this transformation have manifested themselves through the peculiarities of activity patterns, behavioral relationships, social and cultural norms, as well as architectural and urban patterns. The drivers of change have also reflections on the design education.

As Rapoport has stated "All these developments are highly relevant for understanding issues of culture change, identity, culture-environment relations, developing countries etc. Once the concept becomes available, examples are everywhere, and the concept becomes explanatory for a large number of environments" (Rapoport, 2008).

On the other hand, architects are responsible for the solution to this architectural and urban chaos. Architects are also culture-makers in the sense that they give form to our cultural ideals, beliefs and norms. They therefore are responsible for understanding the complex relationship of culture, place, and the built form. Teaching about culture and place is one useful way for integrating this understanding into design practice and education.

2.3.PLACE/SCALE: WORKSHOPS AS A TOOL FOR AWARENESS OF DIFFERENT ENVIRONMENTS/CONTEXTS

The significance of the concept of "place" and different urban identities in architectural design is undeniable. Therefore, for architecture students "studying, exploring and understanding all the dimensions of the environment" is crucial to be creative. Learning by exploring different physical and social characteristics of different areas is a more lasting approach than traditional methods. The design workshop set in different environments and scales provide architecture students an introduction to the significance of cultural awareness and socio-cultural sustainability issues in design. They are intended to provoke discussions regarding issues of space, time, spatial and socio-cultural change, and environmental

and architectural identity.

We live in an era that contemporary cities and life styles are transformed by the impacts of globalization. Within the globalization process, rapid change in everyday life practices and the contradictions between global and local cultures create new paradigms and new dimensions about culture-space interactions in the city. Moreover, within this ongoing transformation 'culture', 'city' and 'urban life' gain new meanings and new forms. Therefore, it becomes more and more urgent understanding the relation between the place and cultural change.

While the topic of place becomes a key issue within the debate of globalization, much of the discussions focus on the idea that global flows of capital, culture and ideas threatens the local (Walker, 2001). As Rapoport stated, although cultural change is a general phenomenon, rates of change vary and change is especially rapid in developing countries where most traditional environments survive and are at risk (Rapoport, 2002). The internationalization of cities came into conflict with so-called "traditional" values, and in the confrontation, continuity with the past was broken and livable cities were destroyed. The *essential humanity* and the *sense of place* characteristic of traditional urban environments continue to be replaced by culturally and environmentally anonymous or irrelevant forms (Warfield, 2002).

In-situ experiences in settings identified by their historical or local attributes, settings that emphasize the historical and local characteristics provide students with the opportunity to increase their architectural experience by seeing and meeting the locals in their own setting.

Based on above structure and having the results of the four design workshops of the CSBE Network, purposes of the design workshop set in different environments can be summarized as follows:

- Enhancing students' cultural understanding through analyzing the socio-cultural and spatial characteristics and values changing in time
- Developing an understanding of the relationship between different scales of environmental settings and socio-cultural factors
- Developing design strategies to generate new ideas and solutions for different environments/contexts
- Understanding issues of scale: encouraging students to think about from neighborhood to urban scale
- Promoting the discussion on some important questions such as; What are the relations between place and culture, environment and behavior? What is contextual design?
- Understanding the effects of global culture and changing everyday life practices on the transformation of the cities.

Figure 2. Intertwined activities of IAPS-CSBE Network within the 1st Istanbul Design Biennial.

Figure 3. The Place of the Workshop: Taşkıışla Building .

3. CULTURE-SPACE DESIGN WORKSHOP OF CSBE NETWORK: ISTANBUL AS A "PALIMPSEST" CITY AND IMPERFECTION

The first Istanbul Design Biennial with the theme of "Imperfection" took place between 13 October-12 December, 2012. The theme of "Imperfection" was attempted to be read through Istanbul during the Biennial. The expectation was for Istanbul to provide an inspiration for the design creation process with its far from being imperfect nature, fuzzy and temporary and yet exciting characteristics.³

Within the context of the Academy Program of the Biennial a number of intertwined activities such as paper selections, design workshops, student competitions, exhibitions and symposiums were jointly organised by "IAPS-CSBE Network" and the ITU, Faculty of Architecture Department of Architecture and the Department of Urban and Regional Planning. (Figure 2).⁴ Within the scope of these activities, the main aim was to analyse the "Palimpsest"⁵ state of Istanbul and the discussion of concepts such as *spatial and social oppositions, change, transformation, continuity, urban and architectural identity urban palimpsest* within a dialectic framework.

The design workshop was held between 1 to 5 October 2012, in the campus of Istanbul Technical

University, Taşkıışla with the participation of undergraduate and graduate students from many universities (Figure 3). On the basis of the conceptual framework developed in the first part of the paper, tutors from different universities⁶ carried out the design workshop. The students were expected to read and interpret the multi-layered and palimpsest state of Istanbul and imperfection of its layers from their points of views and express their interpretations with a single image/poster.

In the workshop process, the tutors dwell upon not only the end products but especially on "reading and conceptualizing the city and the place".

If we emphasize the role of "place" in architectural education in the context of the workshop:

- Culture and space concepts together with spatial and social change, transformation, continuity, urban and architectural identity, urban palimpsest is being the workshop's theme (Content)
- The city chosen for the workshop is being Istanbul (Place)
- Seminars and lectures given on technical and conceptual issues and a simultaneous design process in the studio (Method)

3.1.CONTENT: ISTANBUL AS "PALIMPSEST" CITY AND IMPERFECTION

The *multi-layered, complex and intertwined structure of Istanbul* created by *overlapping social, spatial, temporal layers* (Figure 4) and the spatial and social transformations ongoing in Istanbul was the main theme of the workshop. It is possible to state that cities are formed of different contextual layers that are sometimes one on top of the other, sometimes side-by-side and sometimes intertwined forming its original characteristics. This formulation's most fundamental and visible element is architecture. Furthermore it can be said that the mutual interaction of the dynamics is also rapidly altering the daily life as well as the cities themselves. These transformations are resulting in new urban spaces and spatial practices. In the on-going re-structuring and transformation process, the transformational relationship between the city and architecture takes a dramatic appearance.

Figure 4. Istanbul as a 'Palimpsest' City; intertwined, overlapped and side-by-side spatial layers.

³<http://istanbultasarimbienali.iksv.org>

⁴Scientific Committee: Orhan Hacıhasanoğlu, ITU, IAPS-CSBE Network Founding Member; Peter Kellett, Newcastle University, IAPS-CSBE Network Co-Coordinator; Handan Türkoğlu, ITU, IAPS-CSBE Network Founding Member; Hülya Turgut, ITU, IAPS-CSBE Network Co-Coordinator; Alper Ünlü, ITU, IAPS-CSBE Network Founding Member. Organisation Committee: Bihter Almac, ITU, Faculty of Architecture, Department of Architecture; F. Belgin Gümrü, ITU, Faculty of Architecture, Department of Urban and Regional Planning; İpek Şen, ITU, Faculty of Architecture, Department of Urban and Regional Planning; Önen Günöz, ITU, Faculty of Architecture, Department of Architecture; Şebnem Şoher, ITU, Faculty of Architecture, Department of Architecture.

⁵Palimpsest: A manuscript or piece of writing material on which later writing has been superimposed on effaced earlier writing, but still bearing visible traces of its earlier form

⁶Tutors: Bihter Almac, ITU, Faculty of Architecture, Department of Architecture; Zeynep Bacınoğlu, ITU, Faculty of Architecture, Housing Research Centre; Emel Cantürk, İKU, PhD student; İslı Ekin Çalrak, MSGU PhD student; Önen Günöz, ITU, Faculty of Architecture, Department of Architecture; Derya Gürsel, ITU, Msc student; İlgi Hacıhasanoğlu, ITU, Faculty of Architecture, Department of Architecture; Zelay Rahmancı, Maltepe University, Faculty of Architecture, Department of Architecture; Şebnem Şoher, ITU, Faculty of Architecture, Department of Architecture.

In this process, spaces that are produced and reproduced continually, creates a spatial layering and this time-space accumulation becomes a basic fact that needs to be explained in the process of the analysis of urban transformation. Within this context, the following concepts of “urban palimpsest”, “palimpsest identity” and “palimpsest in architecture” should be explicated.

The **the multi-layered identity of Istanbul** is undergoing a speedy economic, social and political transformation and the concept of urban transformation, that aims to obtain a more “perfect” appearance in various parts of Istanbul, has gained momentum in last few years. It has been occupying the national agenda since it is affecting the physical urban characteristics as well as the daily life routines. Istanbul is expected to become one of the global brand cities with a view of turning it into a source for economic prosperity by ridding it from the decrepit and turning it into a city with a perfect appearance. However, each new layer in the historical geography eliminates the physical existence of the previous one or exists by appending itself onto that previous layer. Today, the on-going transformation of Istanbul is brought about by removing the already existing, and by replacing it with the requirements of the branding process namely –the new, modern, intact, perfect.

In this context, it becomes crucial examining the intertwined relations between political and technological developments, economic structure, cultural interactions, and urban environment to understand their effects on the on the continuing transformations in Istanbul.

3.2. METHOD: READING & CONCEPTUALIZING THE CITY

The workshop was designed through a parallel structure, regarding the simultaneity of the design process and the seminars given on conceptual and technical issues (Figure 5). Therefore, a design process model which proliferates and transforms through the articulation of different layers of information and perspectives to the process of design was aimed, rather than creating products through predetermined and limited perspectives.

Seminars and Discussions: During the workshop process, a number of seminars aiming to nurture the study from different points were conducted in accordance with the design process. The seminars focused on several themes such as “multi-layered structure of Istanbul”, “approaches and ways of thinking that map-

ping produces”, “the effects of urban transformation on the ‘imperfect’”, “the effect of perceived space on comprehending the city”, “the collective memory of the city”, “the visualization of the concepts” and “phenomenological approaches”.

Place Analysis/Reading the City: As a variety of approaches and methods are available for an “urban reading” intended for the discovery of the implicit situations, each workshop group has developed its own experimental method. The differentiation of the methods used is not meant to compare their success, rather it was aimed to enrich the collective experience during the workshop.

In this context, one of the methods developed was “using the metrobus line to reveal the layers of imperfection”. According to this approach, folds in space are temporarily opened or closed; when they are opened the subject is associated with space, when they are closed the subject is back to his/her own layer. During the metrobus line, the subject traces the openings and closings of folds by blunting and sharpening his/her senses. The intricate layers of Istanbul constantly appearing and disappearing during the continuity of the metrobus line provide opportunities to explore about the city (Figure 6, 7).

In another method, “Sirkeci-Halkalı” rail line was used. The rail line, starting from historical peninsula, is one of the most important transportation lines of Istanbul, which links the periphery of the city to the historical centre of the city. The train passes by splitting the overlapping layers of Istanbul; and through this intersection many layers of Istanbul become visible. The perception of these different layers from the moving train creates a space-time compression. “How speed, time-space compression and layers compose and decompose the city?” Through the experience of time-space compression, it is aimed to find answers to this question.

Another approach is intended to decompose and then recombine the spatial and temporal layers of the city. In this context, the city which is composed by layers is something more than the sum of the parts or layers. Each layer is a product of a significant time and context. Therefore, contextually and temporarily differentiated layers overlap and accumulate in cities. In this manner, through diachronic and simultaneous readings carried, the aim is to understand the volumetric structure of the space better, and to decode the layers more explicitly (Figure 8, 9 and 10).

Figure 5. Discussions and design process in the studio.

⁷Prof. Dr. Semra Aydın, “Phenomenological Ways of Seeing”; Ass. Prof. Dr. Pelin Tan, “Pushing the Limits”; Ass. Prof. Dr. Zeynep Kuban, “Layered Istanbul”; Aslı Kiyak İngin, “Imperfection and Being Multilayered through the Transformation Processes in the City Centers”; Ass. Prof. Dr. Aslıhan Şenel, “Mapping”; Ass. Prof. Dr. Şebnem Timur, “Perceiving the City by Senses”; Prof. Dr. Fatoş Adiloğlu, Res. Ass. Bora Fer Görsel, “Concept and Graphic Space”.

In another approach, the city has tried to be read through the different framings. Accordingly, there is connectivity between the whole and the parts/details. In reading the layered structured of the city, visible details that different framings and different scales reveal, make possible to read the invisible. In this way, the participants were expected to use different observation points of the city and to be a *flaneur*, in order to compare the different framings such as urban fabric captured from a high observation point or a broad Istanbul skyline photographed from the ferry and views captured from human scale.

Yet another approach was about to create series in the city. Each traveller was expected to create his/her own serie. With this method, a random reading of the layers through a serie of symbols is aimed. The

Figure 6. Image of Istanbul as a 'Palimpsest' City – Gözde Uyar, Bahçeşehir University, "Route of Heads: In Istanbul which is a palimpsest city, one of the most important places where layers of different people come together is the metrobus, a public transportation vehicle. People coming from different districts of the city, are dispersed to different parts of Istanbul by following different routes. People make up the various layers of the city by carrying the traces of the places where they live or come from. Despite being in close contact and nested in the city, these people coming from different layers, do not communicate with each other. Therefore, people get lost in the chaotic layers of people and get lonely inside the crowds. In this case, which situation causes imperfection to emerge? People who come from different layers and do not know each other being nested, or people being so close physically, but so apart in reality?"

Figure 7. Image of Istanbul as a 'Palimpsest' City Püren Çetin, Bilkent University, "Image of Trash: If one could take the photograph of my brain, on the evening of the day I travelled around the streets of Istanbul, could see such images. All of these images are overlapping and stratifying in my brain and poisoning me slowly."

Figure 8. Image of Istanbul as a 'Palimpsest' City Ayşıl Coşkun, MSGU and Gülay Özgün, Işık University, "Istanbul embraces such a chaos in itself; you feel yourself almost in a surrealistic film frame. Demolished and rebuilt buildings, historical buildings, purchasings, gentrification and people stacked between all of them... Sometimes it is the memory of a street that is stucked between two buildings. Each visitor has left a trace from herself/himself here. For some, Istanbul invites us to congestion, for others, to dynamism. Come in, the door is open! Ring the bell..."

Figure 9. Image of Istanbul as a 'Palimpsest' City, Elif Atasoy, Maltepe University, "Istanbul as a 'Palimpsest' city is not just where we live, it is also the place where we draw lessons from the moral values of each other, where we create a sense of law and justice, and where we grasp our future through the many layers which are side-by-side or overlapped in the city. The city should be open to new varieties, new fusions and new hybrids. Beside the discourse of "gentrified (I) Galata", Galata which hosted many different typologies of people through the history, is a 'place' which still preserve its layers. Today the gentrification ongoing in Galata is in an endless process of demolition and reconstruction which causes a sterilized and fake place as a film studio."

method was determined by the city, rather than the traveller. Therefore, each traveller was asked to read the city through the randomly collected data as the parts of a single and meaningful whole.

Poster/Conceptualizing the City: Students were

Figure 10 . Image of Istanbul as a 'Palimpsest' City Bahar Nama, Istanbul Technical University and Nesil Suyaran, Istanbul Technical University, "Istanbul was so layered. No trace was visible anymore. This city which have never been perfect, had a self-renewing structure which accommodates the culture, diversity and dynamism in itself. But this diversity, on one hand was slowing the city down and on the other was making it transparent. All these images stored in the memory caused the identity of Istanbul to be questioned again and again. Instead of reading this layers one by one, perhaps we should just live Istanbul within its harmony?"

asked to express their readings, interpretations and ideas with a poster as the final product of the design process. Expressing the analysis, made through an urban architectural reading, with a single image was not an easy work and it required an extremely careful and painstaking data selection process. Using and reflecting the concepts which we have attributed to urban space, without ascribing them overmuch meaning, and without losing the perspective was a challenging but also an eye-opening process.

The posters, shown below, were mostly focused on multi-layered structure of Istanbul. The participants of the workshop traced the various social and historical layers, through the routes they travelled. They emphasised the **intertwined, illegible and complex, but still meaningful aspect of Istanbul** created by overlapping cultures.

The exhibition and presentations: At the final day of the workshop, the students were asked to give presentations and exhibit their final products. Workshop ended with a closing session organized in an historical Turkish bath building, which is contemporarily being used as a design atelier⁸ (Figure 11). In the closing session certificates were given to participants.

CONCLUSION

The results of the workshop demonstrate how students' interest in exchanging ideas and their willingness to work both individually and in collaboration with others in a learning environment that encouraged their curiosity, changed their attitudes towards the city. The learning process was as important as the final products in this workshop. This learning process was driven here by the concept of working in teams. The team works carried out through different methods has created a quite fruitful workshop process, in terms of enabling exchange of different teaching methods, perspectives and ideas.

Besides, the workshop taking place in an art activity such as Istanbul Design Biennial, was very beneficial for students in terms of raising their awareness about current approaches, discussions and productions in the realms of "city", "architecture", "art", and "design" in a changing and transforming world under the effects of globalization, and increasing their interest in these issues.

During the workshop process, students carried out "urban readings" intended for understanding the illegible, complex and multi-layered character of Istanbul by tracing the different social, spatial and temporal layers of the city. They have tried to understand and interpret the changing dynamics of Istanbul, and its social, temporal and spatial reflections, by developing their own viewpoints. One of the most important outcomes of the workshop was enhancing the students' understanding of the multi-layered, multi-dimensional and complex nature of "urban space" and "urban life" and encouraging them to develop their own perspectives for comprehending the city.

While the world is changing in the context of socio-cultural, physical, economic, political and technological dynamics, the cities occur to be the main places where these changes are reflected. Through the interplay of these dynamics, *new everyday life practices, a new urban space, and new spatial practices* emerge, therefore both the "city" and the "urban life" gain new meanings. In the context of new meanings of the city and the urban life, for architectural education the necessity to reposition itself in the light of this change is inevitable. In that respect, it is possible to say that "the city is a rich source and a research area" for architectural design education, as well as for the practice of architecture itself. The architectural design education must be aware of contemporary cultural transformation in order to approach to the city as source and resource, and to work

Figure 11. The closing session of the workshop.

with the city actively and understand its complex and multi-layered structure.

At last but not least, the reciprocal benefits of organizing design workshops in cities with a “palimpsest” identity such as Istanbul, aiming to explore the multi-layered nature of the city, must be emphasized since it provides sources of inspiration with rich experiences for developing an understanding of the relations between **global culture, transformation of cities and emergent spatial practices** for the architecture students.

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INDIFFERENT OR DEVOTED: AN EXPLORATION OF STUDENT IDENTITY THROUGH THE DESIGN STUDIO.

Rania Abdel Galil, Yasmin Kandil

Abstract

In the wake of the Egyptian revolution, the role of the youth and their sense of belonging, the level of their understanding and responsibility have all been reevaluated in the society at large. It was a general belief that the youth were disconnected from the surrounding political events, their living environment, their history and any consideration of the future. The revolution challenged many of these convictions and this resonated in educational institutions. This paper presents a design studio experiment where students were given an area at the heart of the city, which carries historical significance, both in terms of events and its built environment. The area witnessed drastic change over the years, transforming it from elegance to chaos, where listed buildings have come to decay, occupied by ill uses. The area rarely attracts the youth who instead are attracted to emerging hubs in the city.

The paper explores an important pedagogical query; the capacity of the design studio to reinforce issues of identity, sense of ownership and belonging. It also raises questions of the role of the teaching staff in fostering cultural responsibility. Literature strongly recommends relating academic scope to the students' surroundings and environment and for topics to be discussed in an integrated manner. It also suggests that the studio offers the ideal setting for integrating knowledge; where synthesis and application, reflection and action take place and where a student's architectural identities develop. Less is mentioned in literature of a student's cultural identity and sense of belonging.

Through a project in 2012, the students were divided into groups tackling four main aspects for a given location (the social, economic, physical and environmental aspects), then discussed and debated among themselves, facilitated by the tutors, in an active learning environment. Students collected their data using surveys, interviews, observations and document analysis which informed their design of a master plan and single buildings in the area. A critical pedagogy was adopted in the studio, encouraging students to think critically about the area reflecting on experiences and social contexts in which they are embedded. The studio experience was assessed using focus groups, interviews and individual project content analysis at two stages over the students' final year. Assessing the learning experience over a long term, clarified the changes that occurred to the students' vision towards the issues and problems that their design projects dealt with as well as their affiliation with the historic area. Results have implications both to the quest of identity and to the methods used to support a critical pedagogy.

Keywords: Active learning, Critical pedagogy, Identity, sense of place, Design studio.

INTRODUCTION

The Egyptian society had long accepted that change was impossible and that the youth are passive individuals disconnected from the surrounding political events, their living environment, the history and the future. The revolution came to challenge this perception as the youth surprised everyone with their courage, drive and ability to act. Consequently, the attitude towards the youth dramatically changed, in all aspects, particularly in higher education. The new founded respect calls for a departure from the traditional teaching practice where the teacher is the knowledge provider and the student is the passive receiver. Rather a new pedagogy needs to be adopted where students can take lead of their learning; where they can be active learners.

This is true of the architectural education pedagogy explored in this paper. In the case presented here, conventional ways of teaching architectural students

have a long standing in the institute. An emphasis is on drawing and form manipulation skills rather than critical thinking, not dissimilar to other architectural schools worldwide (Goldschmidt et al., 2000; Salama, 2008). Also, knowledge is typically imparted and design studio education thrives to produce creative students able to impress fellow architects rather than one responsive to the users and the context (Cuff, 1991; Salama and Wilkinson, 2007; Salama, 2012a).

The reaction of students immediately after the revolution triggered the question on the relationship between 'self' and 'place' described by Relph (1976) as the degree of attachment, concern and involvement of a person with a place and how they belong to and identify with it. Students were involved with cleaning streets, painting pavements and more importantly joining action groups to document and save heritage buildings. They had meetings to think of ways to positively aid the change the country was going through, perhaps out of a

new belief that they have recovered their country, enhancing their sense of belonging.

Against the current evolving political events and the continuous deterioration of the built heritage, the paper poses the dual question: can architectural education through the design studio offer students a learning opportunity in which they expand their knowledge acquisition/production patterns and progressively identify with the built environment? The design studio was held in 2012, for students in the last year in a design module that directly preceded their graduation project. The design team staff deliberated on choosing an area which is rich, iconic and controversial because of the state it has reached and the type of activities it currently entertains. The project was held in four phases: understanding the area, developing a vision, creating a master plan and developing a catalyst building project. The first three phases were conducted in groups while the last was individual. The students' sense of place was observed at different stages to infer whether the adopted pedagogy affected their sense of place or not.

The paper is divided into 6 parts. Following the introduction, Part 2 discusses architectural pedagogy and the required shift using critical pedagogy to encourage critical inquiry and reformulate the tutor-student relationship. Part 3 explains the term sense of place which lays the foundation for the main question of the paper regarding student identification with a place. Part 4 presents the studio work on which the critical pedagogy and active learning environment was adopted to encourage students to engage with an area nearly foreign to them. Part 5 shows the result of the experimental studio work and presents the analysis of the feedback received from students and observation of the tutors. Part 6 discusses the results and draws conclusions of implication to studio pedagogy.

CRITICAL PEDAGOGY

Architectural education has tended to follow a mechanistic approach where elements of the education are disconnected; lectures, studios and exercises are taught in segregation. Pieces of information given in one course do not necessarily tie to another. Students endorse the mechanistic approach and evaluations focus on their ability to reproduce what they've been taught (Salama, 2012a). In the case of this paper, the mechanistic approach is a continuum to pre-university education where mainstream national education treats information as confined to the boundaries of a subject and an emphasis is on achieving high grades through memorization of the information rather than critical understanding. A shift is evidently underway (Sanoff, 2003; Salama, 2009; Salingaros and Masden, 2010) where a systemic approach focuses on grasping the relationship between different parts of knowledge and where the chosen setting (lecture, self-learning, seminar discussion) depends on how best to develop knowledge. The systemic approach has underlined the studio experience presented in this paper, where lectures by the staff and practitioners were given in the studio, as each phase demanded, tying the 'learning' of information with the 'doing' and promoting an integration of disciplinary knowledge.

The interaction between the tutor and student and the environment in which this takes place is an important dimension in architectural education. In this context, the critical pedagogy and its underlying hidden

curriculum concept offers a valuable approach. The critical pedagogy initiated by Paulo Freire (1970) recognizes experiences and social contexts in which students and tutors are embedded. It also advances critical thinking and encourages students to question and challenge dominating practices and ideas. It places an emphasis on unstated values, norms and attitudes in action in the learning setting brought about by experiences of tutors and educators (the hidden curriculum) (Dutton, 1991), adopting a non-positivist position validating individual and group generated knowledge. These practices are equally as influential as a structured curriculum, as asserted by pedagogues (Salama, 2012a).

An interpretation of the 'Critical pedagogy' adopted in the design studio presented in this paper builds on critical inquiry and the ability to critically examine traditional assumptions, based on experiences and encounters of all involved; the student, the tutor and users of the studied area. It revises the relationship between the student and tutor such that it does not follow the traditional knowledge provider – receiver relationship, rather a relationship where the student is actively involved, equally generating knowledge based on their experiences.

As knowledge generators in the design studio, it is worth outlining methods and tools of knowledge acquisition, assimilation and production integral to the interpreted pedagogy adopted in our design studio. Salama (2012b) explains a theory for integrating knowledge in architectural education founded on three components; the disciplinary component, the cognitive-philosophical component and the inquiry epistemic component. The disciplinary component advocates basing architectural decisions on a rigorous transdisciplinary knowledge base. The cognitive-philosophical component explores the split brain theory, how 'feeling' and 'thinking' guide one's decisions and positivism and anti-positivism positions in validating acceptable knowledge. Finally, the inquiry epistemic component, of interest in this paper, focuses on the methods for knowledge acquisition and assimilation. He points to *ethnography*; a description of social and behavioural phenomena based on its context, *appreciative inquiry*; identifying positive aspects in specific environments or building types, and *active and experiential learning*; students involvement in higher order thinking that involves analysis, synthesis and evaluation of multiple issues simultaneously with the ability to talk, think and relate to past experiences. They need to get into close contact with the environment, exploring culture, diversity, and people's behavior, and utilize that knowledge in deciding on action in a project and future situations. The last two methods are of particular interest and were heavily utilized in the design studio to be explained in the section 4 of the paper.

SENSE OF PLACE

The investigation presented in this paper aimed to appraise the capacity of the design studio to reinforce issues of identity, sense of ownership and belonging. It is based on the premise that place identity carries two different meanings (Lewicka, 2008) as it may refer to a characteristic –unique spirit- of a place or a characteristic of a person as he distinguishes himself as belonging to it, to build positive self-esteem. The former is explained by Relph (1976) as the physical settings or appearance, the observable activities and functions and meanings or symbols related to it. In the latter, the place

becomes a symbolic extension of the self as it holds memories, life experiences and meanings embedded in the built environment. Building on the definition of place identity, a sense of place can be defined as "a collection of symbolic meanings, attachment and satisfaction with a spatial setting held by an individual or group" (Stedman, 2002).

The degree of attachment, concern and involvement were used as indicators to assess a students' sense of place of the area studied in the design studio. This was assessed by direct questions about the frequency of their visit to the area and for what reason, how they saw the area (in a positive or negative way), how they would like to see the area change (if they can envision change). Also tutors observed their enthusiasm in discussions and presenting the area to their fellow students as well as tutors' assessment of the type of building each student decided to design to act as a catalyst in their visionary master plan as well as observing the final graduation project.

A detailed explanation of the methodology used to appraise the students' identification with the area will be discussed in section 5. The next section gives a brief background of the area and explains the phases and conduct of the Design Studio adopting a critical pedagogy.

'DESIGN 6' STUDIO

The design studio experiment was chosen on Al Mansheya, Alexandria, Egypt. Al Mansheya, is an area once labeled as the district of consulates for what it held of prestigious public and private buildings ranging from the main court quarters of the city, to commercial malls 'wekalat' in regal times, consulates and churches as well as the infamous Stock Exchange building burnt in the 1960s. It was targeted by the British invasion and bombing in the 1920s. It was where many of the demonstrations of the 1950s took place to topple the monarchy, considered as the main hub of the city then. Abdel Nasser (leader of the 1952 revolution) gave the speech to the nation declaring the nationalization of the Suez Canal from the Stock Exchange building overlooking the square and later an attempt on his life took place there. The area has many physical symbolic and historical riches yet it has suffered deterioration over the years because of bad management; street vendors occupied streets and open spaces between buildings, maintenance of buildings was disregarded leading them to decay, many activities and land uses changed and many of the older residents flock to new areas in the city. The students rarely visited this buzzing commercial area because of the chaotic environment, and belonging to a middle class community, Al Mansheya was not regarded as an attractive place; they sought newly developed hubs around the city.

'Design 6' is an architectural design studio held in a student's final year of study for a BSc in Architectural Engineering and Environmental Design at the College of Engineering, Arab Academy for Science and Technology. It is the final studio preceding the graduation project and acts as a vehicle to fully understand an area, conduct research and develop a program for the graduation. The output of the course is a group work developed master plan and an individual conceptual design of a building set in the area of study. The cohort of study graduated in June 2013 (Academic year 2012/2013).

The project was handled in four main phases; understanding the area, developing a vision, creating a master plan, developing a catalyst building project.

Understanding the area: students were taught how to build the foundation of their knowledge through four different means. First, they were required to make a research that explores similar international examples. Then an external lecture was given to establish their knowledge about the history of the area in order to build on it for the future. Third were the self-guided tours. Checklists were provided to offer students a procedure for taking a structured walk through and around the area. The evaluation strategy in this context was considered to be impressionistic, which increases students' awareness by focusing on specific factors (Salma, 2012c). These guided tours were parallel to the spatial analyses. For the purpose of knowledge acquisition students were guided to gather data by using unobtrusive photography and walkthrough in a manner that documented real life activities in public spaces. The sketches, drawings and descriptions help to gain background information and enhance systematic thinking (Inceoglu, 1995; Gencosmanoglu and Nezorb, 2010). The third stage (self-guided tours) took place in order to assess the various aspects of the area and understand the users/residents requirements, to reach real development and solutions that could be successful and responsive. Clearly, different types of buildings are generated as a result of social work-sharing or functional organization and socio-behavioural factors (Aksoy, 1987), hence students were guided to uncover the narratives of the space not only the physical spatial analysis. The fourth part was an external lecture demonstrating successful practical examples that were applied in the Middle East for development of a heritage site in the historical core of a city. The aim was to provide them with international, local and practical knowledge that would enable them to deal with their chosen project.

Developing a vision, the cohort was divided into four main zones (subdivisions of the studied area, Al Mansheya). Each zone was analyzed according to three main themes (Natural & Built environment theme, economic aspects theme, and social & governance theme) (fig. 1); each theme was divided into its own sub-themes. The natural and built environment was discussed from the accessibility issues, urban and architectural structural issues, and environmental issues. The economic aspect was discussed from locally supported economy, making use of locally economic opportunities, and property development. The social and governance theme discussed the governance issues, social services issues/concerns, and social well-being/concerns. The three main themes mentioned above were divided in these sub-themes in order to form a comprehensive view of the area and engage well with everyday issues. Students were encouraged to collect data using observation, interviews, and surveying use of notes, sketches, diagrams, and verbal description. They were active learners seeking pieces of knowledge from fellow students, the surveyed public and specialists with knowledge of the historic area. Students weaved their research bearing in mind that the knowledge they were accumulating for the area was to be used to make a better environment with the multiplicity of questions attached to this as Rapoport mentions "What is better, better for whom, and why it is better?" (Rapoport, 1994: 35). They discussed their analysis in visual and oral presentations, with tutors' supervision at times. The tutor-student relationship endorsed critical thinking, fostering knowledge acquisi-

Figure 1. Phases of the design studio of Al Mansheya area.

tion, assimilation and production. The discussion wasn't only in the same group of the same theme for the same zone, but the analysis process took place through re-grouping students of same theme in different zones together to have the chance to study the whole zone from a theme point of view (fig.1). Each theme from the four zones collaborated together to demonstrate through an audio-visual presentation their findings for the theme they studied to the whole class. Discussions involved questioning norms, drawing on experiences and adopting clear social standpoints. Thus, every student was aware of the issues in all themes across the whole area (the 4 zones). The resultant of this phase was a deep understanding of the area and an idea of how to proceed with the development of the area according to their interpretation of it. For example, the area was regarded by some as a commercial district, others as a cultural quarter, by some as a light industries and crafts zone, and some realized the deteriorated heritage buildings and aimed to base their vision on the reuse of these buildings. A vision was consequently drawn.

Phase number three; **creating a master plan**, the students were required to put their own interpretation to the development of the historical context according to the various aspects/themes they studied earlier in the surveying stage. This interpretation was translated in a vision and demonstrated in a master plan. The students at that stage were able to decide on a proposed scheme for the area based on a wide base of knowledge.

Fourth phase; **developing a catalyst building project**, students were separated to work on an individual project, each to fulfill their own desire, beliefs and vision based on their group interpretation for the zone (master plan, reached in phase three). Suggested projects by the students dealt with learning from the actual environment rather than being hypothetical. Projects that were founded on a better understanding of the past resulting from research done in phase one helped envision a clear future.

STUDENTS' IDENTIFICATION WITH THE PLACE

In order to appraise students' identification with the studied context, and in order to determine the development of their sense of ownership and belonging a 4 staged survey was performed with a sample of the cohort. The

Figure 2. Stages of the student survey.

first stage (preliminary) took place at the very beginning when the project was introduced before any investigations. The second stage was a pilot study done after the 'creating a master plan' phase discussed earlier. The third stage was applied after submission of their individual projects (at the end of the first semester of the academic year). The fourth stage and the last were done after the completion of their graduation project, a semester later (fig 2). The study was completed in a whole year which made it possible to monitor the development of the students' understanding and attachment to the area. Questions were designed in a generic manner that reflected the essence of each phase monitoring the sense of belonging. (Salama, 2012c)

The sample chosen to survey, were students who had enrolled in the Design 6 Studio then progressed to the Graduation Project, in order to observe the change in sense of belonging with respect to the shift in adopted pedagogy. The number of students enrolled in class was 90. The students were grouped according to the themes demonstrated in Fig (1).

Whereas working with the project the tutor-students relationship was coordinated by the critical pedagogy, the project was handled through a systematic approach, where lectures were given related with the stage of the project, students were guided to comprehend the disciplinary information and present it to other fellow students and knowledge generated touched real life issues not a hypothetical scenario. In this design studio students were active learners not just passive recipients. Students were involved in individual or group activities during the class session including reading, discussing, commenting, and exploring fostering an experiential learning environment. These activities involved higher-order thinking such as analysis, synthesis, and evaluation of a wide range of issues and phenomena, (Salama, 2012b). This was done by the professors facilitating these activities, and students received immediate feedback in the design studio, as adopted by Bonwell (1996).

Surveys were deduced at each stage of the 4 stages mentioned above and the results were as follows:

There were diverse results in various phases of the sample study. As mentioned in section 3, the sense of place can be indicated by the degree of **attachment, concern and involvement**.

In the preliminary stage, week 1 of the project, the questionnaire was basically structured to read the extent to which the students were familiar with the proposed zone of study. The result was that 90% of the students knew the studied zone, however only 13% had visited it before the project commenced, hence their degree of attachment and involvement was nearly absent.

In the pilot study, after 8 weeks, the student sample was 10 students. They were asked to respond on a scale: strongly agree, agree, no opinion, disagree or strongly disagree to the questions and each answer was given a relative weight. The results were averaged as follows: 63% mentioned that the project added to their understanding of their city. 72% stated that their identification with the area increased, 91% wanted to see the place developed to a better place (reflecting a concern for the area), 50% believed that the place still has assets. Finally for that stage 55% found working in a historical context challenging but restricting at the same time.

From the staff observation/point of view to the resultant individual projects 49% developed the context according to physical or aesthetic aspects, 10% according to functional aspects, 12% according to heritage/civilization aspects, 2% restoration, 15% revitalization, 10% re-use, 10% socially, 2% depending on cultural aspect. It can be inferred that over half of the students were more sensitive to the context of the area, responsive to the social and cultural aspects.

In the main survey, by the end of the term, the focus group was 36 students, 75% mentioned that the project added to their understanding of their city. 89% stated that their identification with the area increased, 45% believed that the place still has assets, 85% mentioned that they would take part if the proposed project was allowed to take place. There is a clear increase in their sense of place and identification with the area, and moreover they would like to increase their involvement stemming out of a concern for the area.

The final stage; at the graduation - a term later after the previous stage, the studied sample was 36 students. 11% of students changed the type of building they chose to design in the previous term. 38% found the site limiting because of the old restricted context. 67% believed that the site will eventually deteriorate. In terms of students' interpretation of the zone, the type of development they proposed was as follows: 10% commercial, 37% touristic, 38% retain existing mixed use state, 15% suggested it is revived to its former use as the administrative hub of the city. These results were not expected. After the positive reactions throughout the Design 6 Studio which adopted the critical pedagogy hinged on discussions, experiences and active learning, it was surprising that a term later attitudes shifted. This can be partly explained as a reflection of mistrust to the political environment and the condition the site reached from violations and deterioration. These mixed feelings that the students had appeared in the interviews and the surveys. Once reflecting appreciation to the old context and old glory of the zone, majority declaring their willingness to take part if the project was to take place in real life, others losing hope in the possibility of change and the true commitment of the government to develop the area and stop the violations. On a pedagogical level, the group

work is non-existent in the graduation project and tutors would not necessarily implement the critical pedagogy. This will be further discussed in the following section.

DISCUSSION AND CONCLUSION

Implementing critical pedagogy was testing. Students were able to observe, document, and gather the information, as practiced in most of their previous design projects. However, most of them could not phrase or interpret the gathered information or handle the project from its various aspects in a balanced manner independently, due to their being used to the mechanical method in architectural pedagogy, where they were not given enough space to analyze, interpret or experiment with their own technique and evaluations. Systemic and critical pedagogy brought the synthesis of various pieces of knowledge and allowed critical inquiry to take place. Group discussions, facilitated by the staff, enabled students to reorganize their data and formulate it into an interpretative vision, shaping the environment, transforming the physical aspects of the setting to support users' activities, create attractive nodes, or block activities, distractions and violations. Some students had a pre-set ambition of how their graduation project would be in terms of scale and location hence changed their choice of building type due to suitability of lot area and the historical restrictions imposed by the site limiting their 'out of the box' creation. Students appreciated the group work and the lecture input as reflected in their responses: 75% found the group work useful in surveying, 61% found the group work useful in analysis, 95% found the group work useful in making decisions, 25% found the group work useful in choosing their graduation project and 75% found the group work useful in group discussion. 98% found the inserted lectures useful as they were introduced when that knowledge was instrumental to the development of their ideas. As mentioned in the previous section, not all tutors in the graduation studio were supportive of an active learning environment based on critical inquiry, hence were more traditional in their approach, influencing student choice.

The findings point out that the students were able to make judgments about the built environment and give reasons for those judgments, which implies a grounded understanding of the area and the development of a concern for it. Despite not knowing the area and only visiting it for specialized merchandise, in phase two, after the research, survey and discussions, bringing in their experiences and those of others, they attained a deeper understanding of their old city context and developed a stronger sense of place and commitment.

The fact that the sense of place measure was 23% at the beginning of the study and 51% at the end shows that the design studio which departs from a traditional student/tutor relationship, encourages critical thinking, regards students as active learners and investigates an area with real issues, is effective in fortifying the students' identity, sense of belonging and responsibility towards their city. This encourages the notion that the students' identification with an area can be enhanced by the method of education.

The trial was positive but not to the extent the staff expected where the sense of place increased from 23% to 51%. This short of percentage raise was explained due to three main reasons. First was the mistrust in the political parties that they will really allow the youth to participate in deciding their future. Second was

the deteriorated chaotic state the chosen zone reached, which affected students' hope in the possibility of change. Combined, they reinforced the youth hesitance in further developing any suggested scenario for the chosen zone. Third students' higher education lacks any analysis and synthesis method as well as critical thinking. Applying the critical and systemic architectural pedagogy wasn't widely encouraged by the senior staff members in the Department; this scared some of the students to continue with their deduced concept, instead, they chose to adjust their projects to the senior staff's ideas.

To conclude, the results of the study that aim to examine the possibility of affecting students' sense of place and responsibility towards their city could be affected by the change in the approach adopted in the design studio. While the exercises emphasized knowledge acquisition based on students' perceptions and interpretations of the built environment driven by knowledge delivered in the additional lectures, class discussions, group discussions and data analysis, they also attempted to develop students' understanding of how a real project is handled and how interdisciplinary studies should take place. The change in the architectural pedagogy could increase students' ability to have control over their learning by establishing links between spatial and sustainable design parameters of the required zone of study. From this point of view, it can be deduced that systemic and critical pedagogy in architectural education increases the ability of students to approach the project with a greater sense of place affecting their attachment, concern and involvement with it.

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