CONTINUITY OF PERSONAL KNOWLEDGE CONSTRUCTION THROUGH CREATIVE ACT: FIRST YEAR ARCHITECTURE EDUCATION RECONSIDERED AS A MEDIUM FOR TRANSITION

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ABSTRACT

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The assertion that knowledge of architecture is not a bulk of objective canon, but rather the knowledge of its practice, requires an inquiry into its personal dimension, which cannot be articulated completely. The investigations on the inarticulate (tacit) portion of knowledge in Polanyi's works enable an inquiry into the act of comprehension with its cognitive value. This inquiry regards architectural knowledge as personal and acquired through experiences of comprehending meanings; either by interfering with existent entities or by creating meanings in personal problem solving processes like designing. The reorganization of knowledge through articulation is explained to be possible by comprehending the meaning transmitted through the articulate. Continuity is viewed through the idea that, the comprehended meaning irrevocably enlarges personal knowledge and contributes to the comprehended meaning in the upcoming experiences of the individual.

This approach to continuity is the account for regarding architectural education as a self-conducted act that lasts as long as the individual continues comprehending. The first year architecture education is regarded as a time limited external support for preparing the students for this continuous self-education. The discussion of the thesis is structured around the depicted polar tension of the first year design studio; between the conformist tendency of

the students and the instructors' attitude to enable students' creative experience. The first year of institutional education on architecture is significant for the opportunities it provides for the students' transition from conformism to creativity. The aim is to illustrate how it functions for transition to reintroduce the students' personal dimension into their articulations in the first year design studio practice. This attitude is displayed by exemplifying the setting designs and practices for the students' reorganization of knowledge through the creative act of articulation. The thesis adopts in its discussions that the design exercise is a task handled not only for design learning but also for learning how to learn from the design act, which enables the development of creative skills.

Keywords: tacit knowledge, creative act of comprehension, learning through experience, transition, first year architecture education.

ÖZ

YARATICI EDİM YOLUYLA KİŞİSEL BİLGİ İNŞASININ DEVAMLILIĞI:
BIR DÖNÜŞÜM ORTAMI OLARAK MİMARLIK BİRİNCİ SINIF EĞİTİMİNİ
YENİDEN ELE ALMAK

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Mimarlık bilgisinin bir nesnel kurallar yığını değil, daha çok mimarlık pratiğinin bilgisi olduğu iddiası, onun tamamen ifade edilemeyen kişisel boyutuna inen bir incelemeyi gerektirir. Polanyi'nin çalışmaları içinde yapılan, bilginin ifade edilmemiş (müphem) kısmına dair araştırmalar, bilişsel değeriyle kavrayış edimine dair bir incelemeyi de mümkün kılar. Bu inceleme, mimalık bilgisinin kişisel olduğunu ve bir deneyim yöntemi olarak, algılanan ya da üretilen anlamların kavranması ile kurulduğunu kabul eder. Bilginin ifade yoluyla yeniden düzenlenmesi ise ifade edilmiş olanı kavrama yöntemi ile açıklanır. Devamlılık kavramı, kavranan bütüncül bir anlamın kişisel bilgiyi kalıcı olarak genişletmesi ve dolayısıyla bir sonraki kavrayışta ulaşılacak olan anlama etki etmesi fikrinden çıkar.

Devamlılık kavramına bu bakış, mimarlık eğitimininin bireyin kavrama deneyimleri sürdüğü müddetçe kendi kendine gerçekleştireceği bir edim olduğu düşüncesini açıklar. Birinci yıl mimarlık eğitimi, öğrencileri kendi kendine sürekli eğitime hazırlayan sınırlı süreli bir dış destek olarak kabul edilir. Tezin tartışması birici yıl tasarım stüdyosu için belirlenen kutupsal gerilim etrafında kurgulanır. Bu gerilimde bir kutbu öğrenci tarafından temsil edilen uymacı tutum teşkil ederken, diğer kutup öğrenciye yaratıcı deneyim yaşatmayı hedefleyen öğretim elemanı tarafından temsil edilir. Kurumsal mimarlık eğitiminin birinci yılı öğrencinin uymacı yaklaşımdan yaratıcılığa dönüşümü için sunduğu imkanlar dolayısıyla önemlidir. Burada amaç, öğrencilerin birinci yıl tasarım stüdyosundaki ifadelerine kişisel boyutun

yeniden kazandırılmasındaki işlevi aydınlatmaktır. İzlenen tutum, yaratıcılık yönünde gerekli dönüşüm için izlenen yöntemlerin ve tasarlanan ortamların örneklenmesiyle netleştirilir. Tez, tartışmasını yürütürken, tasarım deneyiminin yalnızca tasarımı öğrenme aracı olarak değil, aynı zamanda tasarım yoluyla 'öğrenmeyi öğrenme' aracı olarak yaratıcı becerileri kazandırabileceğini kabul eder.

Keywords: müphem (zımnî) bilgi, yaratıcı kavrayış edimi, deneyim yoluyla öğrenme, dönüşüm, mimarlık eğitiminin birinci yılı.

To my family

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INTRODUCTION

1.1. The Demand for the Argument

When the requirements of and expectations from architectural knowledge are confronted, it is possible to sense the hidden portion of it, which rests behind the architect's practice. Its requirement for further compatibility is in order to respond the expectations of his/her practice. The expertise knowledge of an architect covers his/her practical, authoritative, courageous, and discovery experiences; a discussion, which requires a reference from the concept of learning through experience. This concept has been adopted to date back to Plato. According to Plato's Meno Dialogue, Socrates not only cares for learning through experience, but also self-learning as he states to Meno about an occasion experienced between a slave of Meno and Socrates himself:

> There, see that, Meno? You realize where he is now on the road towards remembering? At first he didn't know which line gave us an area of eight square feet … and he still doesn't know now; but the point is back then he thought he knew, and he answered as if he knew without the slightest hesitation. He didn't feel baffled. But now he does feel baffled; and as well as not knowing, he also doesn't think he knows.[1]

Later he will explain what he means by "remember" as trying and finding out about something, which is learning through experience. According to him, this experiential learning of the slave was made possible by supporting him through asking questions, but not

[1] Plato. *Protagoras and Meno*, Trans. Adam Beresford, 350 BC. (London: Penguin Classics, 2005: 108)

teaching him. The conversation between Plato and Meno is going to include the following dialogue later:

> Socrates: So that means he'll have knowledge without anyone having taught him, just through being asked questions – by retrieving the knowledge from within himself?
> Meno: Yes.[2]

This depiction by Plato overlaps the launching step of the discussion in this dissertation, which asserts that learning is a self-conducted act, which can only be supported externally. There is a difference between the knowledge of doing and the knowledge of what is done. The knowledge of recognitions, decisions, renouncements, and crafts cannot be completely articulated. This assertion covers the knowledge of expertise. It triggers an inquiry into the inarticulate facet of an architect's knowledge; the knowledge that renders him/her as a learner and as a creative producer. The depiction of Plato further overlaps with the idea of learning from one's own knowledge, through articulation of tacit knowledge. Indeed referring back to Plato is the way Grene interposes it to Polanyi's discourse on personal knowledge, which is an exposition of an idea hidden but existent at least since Plato.[3]

Regarding every experience as a potential opportunity for self-learning or learning from oneself, learning is a lifetime process, which does not end until one ceases experiencing. So is an architect's learning. Therefore, it is possible to think of the beginnings or ends of architectural education only for the external supports for his/her learning. The first year architecture education is a beginning of this kind, which is a limited period of time in an architects' introduction to the world of architecture.

This study on first year architecture education can be considered as an identified part of a broader inquiry on the improvement of creative skills and the role of tacit knowledge for this improvement on architectural design act. This attempt originates through the belief that the power of architecture should be acknowledged on changing the worldviews of people. This requires architect's expertise on achieving meaningful totalities through his/her works with creative solutions to original problems while keeping faith with the traditional, the place

[2] Plato. *Protagoras and Meno*, (2005: 112)

[3] M. Grene. "Introduction" to M. Polanyi. *Knowing and Being: Essays by Michael Polanyi*, Ed. M. Grene, (Chicago: The University of Chicago Press, 1969: ix)

identity, the functional needs, economical constrains, and other responsibilities. The reason for this is that, as Norberg-Schulz states, arts can create new objects, meanings, perceptions, experiences and "… teaches us to see the things in a new way."[4] He adds that architecture as a meaningful whole (*Gesamtkunstwerk*), has the power to fulfill the meaning of our daily life different from other forms of art.[5]

1.2. Problem Statement of the Study

The personal learning adventure of a student in an educational institution on architecture cannot be considered to have started in the first year of this external support. Nor it is reasonable to think that s/he has had the necessary experience to have the courage to jump into the abstract or unfamiliar problems of the design thinking experiences. The first year in architecture education is rather a force to pull the students into a transition from their old learning habits to new experiences of learning. The process of learning to design requires the skill of developing personal means and methods to acquire knowledge and take decisions through them; rather than repeating the readily given explicit information.

Continuity of learning act makes it necessary to consider a time-limited external support as part of a whole, which is learning through lifetime. This means that it is possible to regard first year in architecture education as an experience in the development of an architect's personal knowledge; not as the year of birth for his/her architectural knowledge. This would be simply disregarding the experiences of the individual before his/her decision to become an architect.

This dissertation is an inquiry to comprehend the *tension* between the two opposing dynamics in an architect's personal knowledge development, which are *conformity* on the one end and *creativity* on the other. This tension is expected to illuminate the potential dangers of the pole represented by proneness to conformism that hardly considers the *personal dimension in knowledge*, which holds the will to establish their new experiences. Adopting the idea that the development of knowledge is a continuous personal task, which is possible only by including the personal experience, it investigates the creative act in order to

[4] C. Norberg-Schulz. *Intentions in Architecture*, (Oslo, London and Cambridge: M.I.T. Press, 1965: 73)

[5] Norberg-Schulz, *Intentions in Architecture*, (1965: 126).

bring about a concrete discussion area on the inclusion of the personal dimension of the students in the first year architecture education.

1.3. Argument of the Study

The current paradigm on the development of knowledge dates back to the hermeneutical turn of the twentieth century. The Twentieth Century 'hermeneutical turn' is known to be the rise of an intention for not excluding any part of the knowledge of a complete field of study and not disturbing its totality; in order to comprehend the meaning of it as a whole.[6] Similarly, in architecture the functionalist approach of the early modernist architecture has begun to be questioned for the same reason. From the phenomenological point of view, as C. Norberg-Schulz argues about the early functionalist approaches of the modern movement in architecture, ignoring the personal dimension initiated the 'problem of meaninglessness' in architecture. This problem has been commonly questioned since the end of the Second World War with an attempt to consider architecture as a totality with all of its particulars including the inexplicable or tacit dimension.[7] Related with this argument, Norberg-Schulz has stated that "the poetic dimension" and the "unmeasurable" in architectural knowledge are very important means for creating meaningful works of architecture.[8] Also, N. J. Habraken states that any practitioner's knowledge including that of the architect's "is a knowing-in-practice that is learned by doing and that must necessarily be largely implicit."[9] Moreover, says G. Broadbent: "There is no way an architect can work at the level of pure thinking entirely in Plato's 'Intelligible World', nor can he ignore the 'World of the Senses'; indeed everything he does is going to affect the senses of those who use his buildings."[10]

Similarly, this study stands on the argument that architecture cannot be studied merely on its own explicable database detached from the personal knowledge of its subjects. This

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[6] S. Seidman, "Introduction." *The Postmodern Turn: New Perspectives on Social Theory* (Cambridge: Cambridge University Press, 1994: 8-9).

[7] C. Norberg-Schulz. *Architecture: Meaning and Place: Selected Essays*, (New York: Electa/Rizolli, 1988: 17).

[8] Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 13).

[9] N. J. Habraken, "Forms of Understanding: Thematic Knowledge and the Modernist Legacy." *The Education of the Architect: Historiography, Urbanism and the Growth of Architectural Knowledge (Essays Presented to Stanford Anderson)* (Cambridge, Massachusetts, London: M.I.T. Press, 10 1997: 267).

[10] G. Broadbent, "Architectural Education." *Educating Architects* (London: Academy Editions, 1995: 11).

approach was a consequence of the shift in the attention from the concept of 'function' to the concept of 'meaning' in architecture.[11]

In line with this point of view, this study accepts the definition of architecture, in agreement with Norberg-Schulz[12], as the creation of a new meaning, in which aspects of the architect's world are unified. Accordingly, *meaning in architecture* should be considered as the meaning of a whole, the parts of which are unified with the architect's creative powers that are subject to his personal knowledge. In this concern, M. Polanyi[13] in his discourse on personal knowledge states that comprehending a meaningful whole is a kind of participation in that whole, which can only be possible with the personal knowledge of it. [14]

On that ground, this study investigates the role of the *personal dimension* in architecture regarding the *creative act* of the architect, who desires a *new meaningful whole*. The reason behind this attempt is the question how the creative powers of an architect in his/her 'problem solving'[15] process can be improved. This attempt is believed to be promising for the improvement of the personal creative powers in architecture that is expected to be favorable for improving the awareness of the importance of 'meaning' in architecture.

Related with this scope, Polanyi has studied on *a theory of personal knowledge* concerning the structure and the operations of human mind on its 'tacit knowledge' ground. In this theory he discusses the creative powers of mind with a vital emphasis on the *tacit dimension* for the educated man with developing skills and knowledge in his/her personal problem

[11] M. Gandelsonas, "Neo-Functionalism." *Oppositions Reader: Selected Readings from a Journal for Ideas and Criticism in Architecture 1973-1984* (New York: Princeton Architectural Press, 1, 1998: 9).

[12] Norberg-Schulz, *Intentions in Architecture*, (1965: 179).

[13] Michael Polanyi (1891-1976), who was born Polányi Mihály (in the Hungarian style) in a Jewish family in Budapest, was a Hungarian-British polymath who studied physical chemistry, economics, and philosophy of science as mentioned by R. T. Allen in his "Introduction: The Intention of this collection" in the book where he has collected certain essays by Michael Polanyi: R. T. Allen, "Introduction: The Intention of This Collection." *Society, Economics, and Philosophy: Selected Papers* (New Jersey: Transaction Publishers, 1997: 3).

[14] M. Polanyi, "The Calling of Man." *The Study of Man* (Chicago: The University of Chicago Press, 1959: 49).

[15] The term 'problem solving' for the design process of the architect should not be confused with what was called 'problem-solving activity' in the Modern Movement, which was about a purely functional solutions for any set of technical, economic, and social problems (M. Gelernter. *Sources of Architectural Form: A Critical History of the Western Design Theory*, (Manchester and New York: Manchester University Press, 1995: 251)). What is meant by this term in this study is the architect's individual efforts for the problem that he has derived as a meaningful unity of the existing conditions, which may also be called as the 'central idea' (as borrowed from Lawson, 2006) of the design work.

solving processes.[16] Polanyi's theory of personal knowledge is taken to provide the framework for studying the personal dimension in architecture with a special concentration on the role of the inexplicable (tacit) knowledge in architectural creative act.

Tacit knowledge is the hidden part of practical knowledge that is inexplicable but employed in the action of the skillful performances of the architectural design act.[17] Since, it can only be learned through the internalization of information by means of an experience, it overlaps with the general principle in architectural education that it is primarily based on *learning through experience*.[18] Moreover, as Polanyi identifies the decisive characteristic of tacit knowledge, its vital role in the creative design act of an architect can be more clearly visualized. This study is based on the idea that architectural knowledge is primarily grounded on its tacit knowledge base which is totally personal knowledge; and the creativity of the architect can be attained by the improvement of tacit decisive powers of his/her mind.

Regarding this summary of scope, that is going to be discussed in detail in this chapter with their prospects in architectural knowledge, this dissertation particularly focuses on the development of architectural knowledge and argues that it is the *reorganization of knowledge* provided by *articulating* personal knowledge, a big portion of which is tacit.

The following discussion is the expansion of the explained argument through the structure of architectural knowledge, its operations and the architect's act of comprehension as his/her 'creative act'. It aims to transmit the viewpoint provided by studying the theory of personal knowledge specifically with it's fundamental idea that "… tacit knowing is the dominant principle of all knowledge …"[19] on attending to architectural knowledge.

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[16] M. Polanyi, "Understanding Ourselves." *The Study of Man* (Chicago: The University of Chicago Press, 1959).

[17] In agreement with this, says Schön: "... architecture exemplifies in a particularly visible and valuable way, the process of reflection in action (D. Schön. *The Design Studio: Architecture and the Higher Learning in Exploration of its Traditions and Potential*, (London: RIBA Publications Limited, 1985: 31))."

[18] In this concern, says N. J. Habraken: "Of all the professional fields, architecture is where the virtue of knowing-by-doing is most easily accepted by its practitioners (Habraken, "Forms of Understanding: Thematic Knowledge and the Modernist Legacy." (1997: 267)."

[19] Polanyi, "Understanding Ourselves." (1959: 13).

1.4. Polanyi's Theory of Personal Knowledge

1.4.1. Polanyi's Position in the Scientific Research

As F. Duffy states, architecture in nature is an unstable kind of discipline the boundaries of which have always been flexible.[20] According to him, also the self-subsistent and isolated disciplines in their traditional academic understandings have begun to lose the certainty of their disciplinary boundaries, while the recently developing information-based sub-disciplines have almost the same unstable interdisciplinary characteristic with architecture.[21] According to Duffy, within this decline of boundaries in the general understanding of epistemology, the open-ended problem-solving characteristics of architecture seem to be regarded as "normal rather than eccentric".[22] As S. Seidman expresses, the seeds of this current condition have been planted during the twentieth century hermeneutical turn from foundationalism to anti-foundationalism, where the value of interpretation increased while the value of objective scientific knowledge decreased.[23] The leading philosophers of science who took part in this turn were Thomas S. Kuhn, Karl Popper and Imre Lakatos[24], remembering the thoughts of whom would be beneficial for a comparison to understand the position of Polanyi, who also witnessed the hermeneutic turn of the twentieth century.

While rejecting a positivist point of view[25] in opposition to Lakatos and the "naïve falsificationism" of Popper[26], Polanyi seems to stand on a closer position with Kuhn[27] who

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[20] F. Duffy and L. Hutton. *The idea of a profession: Architectural Knowledge*, (London: E & FN Spon, 1998: xiv).

[21] Duffy, *The idea of a profession: Architectural Knowledge*, (1998: xiv).

[22] Duffy, *The idea of a profession: Architectural Knowledge*, (1998: xiv).

[23] Seidman, "Introduction." (1994: 8-9).

[24] R. J. Bernstein. *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*, (Philedelphia and Pennsylvania: The University of Pennsylvania Press, 1983: 22).

[25] Polanyi, *Knowing and Being: Essays by Michael Polanyi*, (1969: 152).

[26] Kuhn states that Popper can legitimately be treated as a "naïve falsificationist" in T. S. Kuhn, "Logic of Discovery or Psychology of research?" *Criticism and the Growth of Knowledge* (London: Cambridge University Press, Preface 1970: 14).

[27] The close thoughts of Polanyi and Kuhn are usually interpreted as the influence of Polanyi on Kuhn's views as we can also see in Bernstein's words (Bernstein, *Beyond Objectivism and Relativism: Science, Hermeneutics, and Praxis*, (1983: 57)):

suggests that science proceeds in periodic revolutions, which he calls as 'paradigm shifts'; where a 'paradigm' is the complete worldview of a scientific community, the failure of which generates a crisis.[28] Like Kuhn, Polanyi suggests that a theory can only be accepted as 'truth' for a specific community who has common beliefs to regard it as acceptable, valuable and unquestionable.[29] However, in addition to putting these 'common beliefs' in the place of the 'hardcore theory', the idea of 'progressive hardcore theory' of Lakatos and obliquely Popper[30] appear relevant with Polanyi's emphasis on the act of observing and understanding, which accepts 'discovery' as the pioneering conception for the extension of man's mind as an irreversible act.[31]

According to Polanyi, in science complete objectivity is a false ideal.[32] He argues that both the acceptance of the evidences and the selection of the hypotheses are inevitably dependant on the scientist's personal judgments dominated by his/her decisive tacit powers.[33] He states that personal knowledge can be neither merely subjective nor merely objective,[34] because;

> "Like Polanyi, Kuhn is arguing that the tacit knowledge of the scientist may be more important for understanding science as it is practiced than what can be explicitly stated into propositions and rules."

[28] Kuhn, "Logic of Discovery or Psychology of research?" (1970: 5-7).

The period of crisis in Kuhn's terms is identical with what we are going to see as the 'period of incubation' as Koestler calls it: a period which is pregnant to a paradigm shift in a scientific community; a leap of the individual's world (see footnote 148).

[29] This attitude of Polanyi is visible in his M. Polanyi, "Convivality." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 7: 1, 1962: 203); however, Lakatos also explicates the common attitudes of Polanyi and Kuhn in I. Lakatos, "Falsification and the methodology of scientific research Programmes." *Criticism and the Growth of Knowledge* (London: Cambridge University Press, 1970: 115).

[30] It is known that the 'naïve falsificationism' of Popper has been critically interpreted by Lakatos as progressive falsificationism which in its essence protects the hardcore theory from anomalies with a protective belt that is falsifiable. Lakatos, "Falsification and the methodology of scientific research Programmes." (1970: 91).

[31] M. Polanyi, "Articulation." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 5: 1, 1962: 123).

[32] M. Polanyi, "Probability." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 2: 1, 1962: 18).

[33] M. Polanyi, "The Unaccountable Element in Science." *Knowing and Being: Essays by Michael Polanyi* (Chicago: The University of Chicago Press, 1969: 105).

[34] M. Polanyi, "Commitment." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 10: 1, 1962: 302).

the participation of the knower in the shaping of knowledge does not invalidate knowledge but impairs its objectivity.[35]

1.4.2. The Theory of Personal Knowledge

The theory of personal knowledge is depicted as the primary source to transmit the viewpoint of the study about the reintroduction of personal dimension in architectural knowlegde, from which the discussion is going to attend to the concepts of *creative act* and *transition* for processing with the argument of the study.

On building up his theory of personal knowledge, Polanyi states that he has been influenced primarily by the existential phenomenologists.[36] As he states, the foundations of his theory was shaped primarily by Edmund Husserl, who also influenced the phenomenological view of the contemporary Western philosophy.[37] Polanyi also refers to Maurice Merleau-Ponty's *Phenomenology of Perception* for deriving "the mind-body problem"[38] and Dr. F. S. Rothschild as he calls "another follower of Husserl."[39] The common point of all the philosophers that he refers to is that their existential phenomenological[40] perspective

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[35] Polanyi, "Understanding Ourselves." (1959: 13).

Related with this, P. Hammond states that the "anthropocentric" approach of Polanyi should not be misinterpreted as defending personal introspection or narcissism; because, according to him, Polanyi's argument is that "true personal knowledge is objective knowledge of the external world, because it is validated by the implications of that knowledge." P. Hammond explains that "anthropocentrism" defends that no knowledge that is detached from human persons can have value. (P. Hammond, "Personal Knowledge and Human Creativity." *Tradition & Discovery: The Polanyi Society Periodical* (Polanyi Society, 30.2, 2003: 26)).

[36] M. Polanyi, "The Structure of Consciousness." *Knowing and Being: Essays by Michael Polanyi* (Chicago: The University of Chicago Press, 1969: 221).

[37] In "The Structure of Consciousness", Polanyi states that Edmund Husserl had "A systematic attempt to safe-guard the content of unsophisticated experience against the effects of a destructive analysis" to which Polanyi refers as a move towards the conclusion that mental actions cannot merely be explained through the observations of physiology (Polanyi, "The Structure of Consciousness." (1965, 1969: 221)).

[38] The 'mind-body' relationship may be grasped in what Marleau-Ponty says for the functions of our bodily organs that "all [their] movements are available to us in virtue of their common meaning" which is also cited by Polanyi in his "The Structure of Consciousness." (1969: 221), (M. Merleau-Ponty. *Phenomenology of Perception*, (Paris: Routledge, 1962: 172)).

[39] Polanyi, "The Structure of Consciousness." (1965, 1969: 221).

[40] It is clearly explicated by S. Priest that Merleau-Ponty is an existential phenomenologist (S. Priest. *Merleau-Ponty*, (London: Routledge, 1998: viii)) and Husserl (who is a phenomenologist) has influenced many existentialists (as he has influenced Merleau-Ponty) (Priest, *Merleau-Ponty*, (1998:5)).

enforces them to seek for an explanation for how human mind works in ways other than observations of physiology.[41]

In light of this existential phenomenological influence, Polanyi states that the problem of pure objective knowledge can be studied only when the distinction between *tacit* and *explicit* knowledge and the *decisive power of tacit knowledge* is recognized. He explains the reason for this as, in the process of developing his knowledge, man *irrevocably enlarges* his world with the act of understanding and comprehending mostly guided by his tacit powers. In line with this, Polanyi's view about the principle of "all knowledge" is composed of two distinct theses as: "…tacit knowing is the dominant principle of all knowledge…" and "…the rejection of tacit knowledge would automatically involve the rejection of any knowledge whatever." [42]

In the personal knowledge theory, Polanyi transposes the findings of Gestalt psychology into a theory of knowledge, which is primarily based on the analysis of comprehension.[43] Regarding the Gestalt idea 'the whole is more than the sum of its parts'; Polanyi states that the particulars of a whole can be noticed in two different ways within the act of comprehension[44] in relation to our consciousness of them: they can either be noticed isolated in themselves or comprehensively in their participation in a meaningful whole.[45] Related

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[41] Also in other resources than that of Polanyi, there are statements about how Polanyi is influenced to build up his theory. For example, Marjorie Grene suggests that "Polanyi's doctrine of tacit knowledge" is necessarily founded on what Merleau-Ponty meant by "the primacy of perception (M. Grene. *A Philosophical Testament*, (USA: Open Court, 1995))." It is also pointed that Grene also played an important role in shaping Polanyi's philosophical thought in P. Mullins, "Vintage Marjorie Grene:A Review Essay on *A Philosophical Testament*." *Tradition & Discovery: The Polanyi Society Periodical* (Polanyi Society, 27.1, 2001, 2000: 33).

[42] Polanyi, "Understanding Ourselves." (1959: 12-13).

[43] Our discussion on Gestalt psychology is limited to Polanyi's interpretations of the findings of Gestalt psychology as he discusses in his "Understanding Ourselves" (1959: 29) and *Personal Knowledge* (1964: 55-65). Meanwhile it is apparent where Polanyi has appealed for Gestalt psychology on S. Priest's comments that Merleau-Ponty deploys Gestalt psychology against behaviorism (Priest, *Merleau-Ponty*, (1998: 3).

[44] The acts of understanding and comprehension are going to be discussed in detail in 1.5.4: "Tacit Knowledge within the Acts of Understanding and Comprehending in Architecture."

[45] M. Polanyi, "Knowing and Being." *Knowing and Being: Essays by Michael Polanyi* (Chicago: The University of Chicago Press, 1969: 128).

James A. Hall compares Polanyi's ideas with that of Carl Jung (who has carried a correspondent work with J. B. Rhine) and Joseph Banks Rhine (whose work has been followed by Polanyi). The reason for this comparison is that Hall thinks that there is a very significant relation between the states of being unconscious/conscious (as studied by Jung and Rhine) and the tacit/focal awareness as he states in his

with this, Polanyi distinguishes two forms of awareness of things as *subsidiary awareness* and *focal awareness* in the process of comprehension, where the meaning of the focally known whole attains the subsidiary awareness of its particulars.[46] According to Polanyi, tacit knowledge is what makes these particulars subsidiary in a meaningful comprehensive whole and us subsidiarily aware of them.[47]

Polanyi's theory is interested in the workings of the man's mind and he makes a comprehensive analysis of "mind" starting from its workings in babies and animals at the lowest levels to its workings in the educated genius at the highest levels. In this identification of the 'levels of mind', he distinguishes the mind of the ordinary man from the mind of the educated man at the 'intermediary level', where the decisive power of tacit knowledge is mostly dominant. Polanyi identifies 'educated mind' as of having more chance for the power of the "creative act"[48], which also concerns the mind of the architect.

The phenomenological influences on Polanyi make it evident that an attempt to understand the power of the inexplicable in architectural thinking and behaving may have a proper discussion area on the basis of his theory of personal knowledge. The reason for this is that the theory of 'phenomenology in architecture'[49] offers proper dimensions for discussing not only the explicable knowledge of architecture; but also, the powers of an architect's mind with its tacit knowledge and his individual personal position in the creative design act.

1.5. Personal Dimension in Architecture on Its Tacit Knowledge Base

As Polanyi defines, tacit knowledge is the inarticulate knowledge that is acquired over a long period of time with the joint weight of all personal memories of observations and

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"Three Explorers: Polanyi, Jung, And Rhine" published in *Tradition & Discovery: The Polanyi Society Periodical* (Polanyi Society, 27.1, 2000: 16-17).

[46] Polanyi, "Understanding Ourselves." (1959: 30).

[47] Polanyi, "Understanding Ourselves." (1959: 30).

[48] M. Polanyi, "The Tacit Component." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 2: 1, 1962).

[49] It is going to be discussed further how phenomenology in architecture has been dealt by C. Norberg-Schulz, and what kind of a path it may offer for a study starting from Polanyi's theory of Personal Knowledge in 4.1: "The Interpretation of Personal Knowledge theory with Regards to Tacit Knowledge in Architecture."

experiences.[50] A. P. Gomez suggests that in light of the phenomenological criticism in architecture, it is believed that "… architectural knowledge is grounded not in abstract, mechanistic principles but in representations derived from the experience of things."[51] Moreover, the idea that 'the general architectural knowledge is not domain specific' as stressed by R. Oxman also indicates the importance of tacit knowledge in architectural knowledge.[52] For understanding 'tacit knowledge' and its operations in an architects mind, a classification of its eight different characteristics is going to be made, the information for which is gathered from various works of Polanyi.

As clearer with this definition of tacit knowledge by Polanyi, tacit knowledge stands as the major evidence for the necessity to consider all the experiences of an individual architect as part of his/her personal knowledge. He expresses the function of practical exercises depends on the "… [reliance] on the pupil's intelligent co-operation for catching the meaning of the demonstration."[53] This resolution is going to be referred more explicitly to the creative transition of the students of architecture from the secondary education to first year in an educational institution on architecture in the following chapters.

1.5.1. Characteristics

The *first* characteristic of tacit knowledge is its *a-critical nature*, which according to Polanyi disables the opportunity of critical reflection of explicit knowledge.[54] This characteristic is related with the critical reflection of an architect's personal knowledge, which is not the case for tacit knowledge. If it is possible to be critical about an architect's knowledge in a comprehensive sense, it can only be by being critical about his action; but not his knowledge of action. This fertilizes the discussion about the value of the effort for explication of the tacitly known. Schön identifies a problem in agreement with this requirement: "Architects

[50] Polanyi, "Knowing and Being." (1969: 165).

[51] A. P. Gomez, "Introduction to Architecture and the Crisis of Modern Science." *Architecture Theory since 1968* (New York and Massachusetts: The M.I.T. Press, 2003: 462).

[52] R. Oxman, "Towards a New Pedagogy." *JAE* (Blackwell, 39.4, 1984: 22).

[53] M. Polanyi. *The Tacit Dimension*, (Gloucester, Mass.: Peter Smith, 1983: 5).

[54] Polanyi, "Understanding Ourselves." (1959: 7).

appear to reflect very little on their own practice of reflection-in-action."[55] The presence of this characteristic can be exemplified by a common incident experienced by the university instructors, who start to focus on the problems appear as details before noticing the lack of an attempt to achieve a comprehensive meaning in a student project.

The *second* characteristic of tacit knowledge is its *potential to vary over all levels of consciousness*.[56] Polanyi states that the subsidiary awareness of particulars can be either conscious or unconscious, while the focal awareness is necessarily conscious unless one is dreaming.[57]

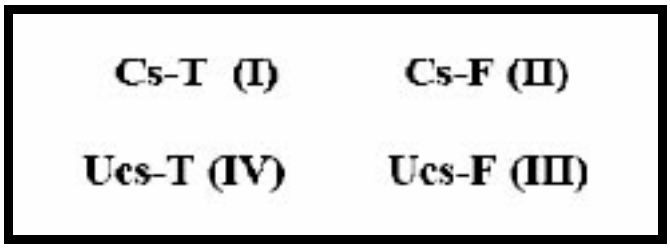

Figure 1: The 2x2 table for the comparison of the "central terms" of "consciousness" vs. "unconsciousness" and "tacit" vs. "focal" by J. A. Hall, with reference to Polanyi: "conscious (Cs) unconscious (Ucs) top to bottom and tacit (T), focal (F) left to right, this produces four cells"[58]

This means that the tacit knowledge of an architect is also not necessarily unconsciously possessed by him. This can be exemplified by how he reads the tectonic qualities of a building by being subsidiarily (or tacitly) aware of the physical characteristics of its

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[55] Schön, *The Design Studio: Architecture and the Higher Learning in Exploration of its Traditions and Potential*, (1985: 52).

[56] According to Polanyi, tacit knowledge is what renders the particulars meaningful subsidiaries of a comprehensive whole. Therefore it is what makes these particulars subsidiary and us subsidiarily aware of them. (Polanyi, "The Calling of Man." (1959: 44).

[57] J. A. Hall, "Three Explorers: Polanyi, Jung, And Rhine." *Tradition & Discovery: The Polanyi Society Periodical* (Polanyi Society, 27.1, 2000: 18).

[58] In "Three Explorers: Polanyi, Jung, and Rhine" (2000: 18), Hall explains the four different sets of consciousness and awareness relations as he derives from Polanyi's Personal Knowledge theory:

> Quadrant II is our ordinary waking consciousness. Quadrant I contains elements in consciousness of which we ordinarily have only subsidiary awareness (eyeglasses, microscopes, and telescopes are examples.) Quadrant III represents such things as dream "consciousness," which is unconscious only in comparison to the consciousness of Quadrants I and II. Quadrant IV, both tacit and unconscious, is the absolute unconscious, known only by inference from its derivatives, which are always symbols pointing to a reality unknowable in itself.

construction and materials. Similarly, students of architecture commonly exemplify this with their tacit but conscious knowledge of the expectations of their instructors that function in their behaviors during the activity of solving a given or an asked problem.

The *third* characteristic of tacit knowledge is its *unspecifiability*, which, according to Polanyi, has two different senses as the *stronger* for that of the subsidiary particulars on focally concentrating on the comprehensive entity and the *weaker* for that of the comprehensive entity by its *dismemberment* on focally concentrating on its details. [59] In the studio, when the instructors cannot specify an attempt for a comprehensive meaning of an architectural student's project even when they try; it is quite possible to expect they directly focus on what is specifiable to them.

As the *fourth* characteristic, Polanyi identifies the *incommensurability*[60] of tacit knowledge.[61] In architecture, this characteristic seems to be a danger for developing and maintaining an ethical insight for the architect.[62] It prevents architect's tacit knowledge from being evaluated with a certain parameter. Similarly, it would be because of the incommensurability of tacit knowledge if the laypeople cannot notice whether the architect is clearly aware of what s/he is proposing or pretending to be so. Related with this, R. J. Sullivan states that the "architectural aesthetics during design" is essentially related with professional ethics.[63] Moreover, according to D. Cuff, the *ethos* of a profession is born in schools. She continues: "Tacit knowledge – the unspoken assumptions, interpretations, expectations, and conventions – may be more important to learn than explicit knowledge or skills. Such tacit

[59] Polanyi, "The Calling of Man." (1959: 45).

[60] We see this character as also identified by Paul Feyerabend. Feyerabend states that his belief in the *incommensurability* of theories, which are changed after the change of the world by the paradigm shifts (as Kuhn explains), is a parallel approach with that of Kuhn. Here we should remember that as stated above Polanyi's point in scientific research is a close approach with that of Kuhn. (P. K. Feyerabend, "Consolations for the Specialist." *Criticism and the Growth of Knowledge* (London: Cambridge University Press, 1970: 219)).

[61] The incommensurability character of tacit knowledge is a consequence of its lacking a system of references by which we can make a systematic comparison for its presence in two individuals' minds as Polanyi expresses in his "Knowing and Being", *Knowing and Being*, (1969: 164). Like the incommensurability of Kuhn's scientific paradigms, in man's mind, it is also a consequence of the irreversible change in world view of men, like the paradigm shifts irreversibly change the general world views of a scientific community.

[62] T. Spector, has already reminded of this danger in T. Spector. *The Ethical Architect: The Dilemma of Contemporary Practice*, (New York: Princeton Architectural Press, 2001: 81).

[63] P. J. Sullivan, B. L. Wassrman, and G. Palermo. *Ethics and the Practice of Architecture*, (New York and Washington: John Wiley and Sons, Inc., 2000: 87).

knowledge is the substance of a professional ethos, affecting both espoused theory and theory-in-use."[64]

As Duffy states, a large portion of architectural knowledge is practical.[65] Therefore the dominating way to acquire it is either learning by doing which is the trial error method, or learning from a master.[66] With the primer one it looks possible that one can learn both how to do something and how to pretend doing something; but with the latter, one cannot deceive his/her master; since the blank behind what is explicated would immediately be noticed.[67] Therefore, the 'incommensurable' for the layman may be 'commensurable' for the experienced architects, who have developed tacit design powers. As a natural consequence, it is a common argument that usually the instructors immediately sense whether there is idea fabrication and the truth behind the explicated evidence of the student about his/her work, as the student focuses on hiding it.

The *fifth* characteristic of tacit knowledge is its *decisive power*. Polanyi states that "our tacit powers decide our adherence to a particular culture and sustain our intellectual, artistic, civic, and religious deployment within its framework."[68] What Polanyi calls as the 'tacit powers of mind' are mainly these decisive powers which have a fundamental role in the development of personal knowledge. It also seems to be very important for the architect; since, it appears that the more an architect gets experienced, or in other words possesses tacit knowledge, the more free s/he would feel to choose a problem; because of the feeling of comfort about the existence of its solution. Related with this characteristic, P. A. Johnson states that "tacit knowledge or professional know-how are not 'things' to be legitimated, they are processes of thought, they are what architects and designers are, and practical wisdom

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[64] D. Cuff. *Architecture: The Story of practice*, (Massachusetts: M.I.T. Press, 1991: 43).

[65] F. Duffy, "Education in Architecture." *Educating Architects* (London: Academy Editions, 1995: 120).

[66] This is how Polanyi identifies practical learning, which is going to be explained further in 3.3 "Operations of Tacit Knowledge in Architecture."

[67] P. Van Meiss reminds that architectural design has been learned through master-pupil relationship for thousands of years. He states that it is still common in the United States that "good" architects teach part time in the master-principle approach (the method of learning from master to apprentice) in: P. V. Meiss, "Design in a World of Permissiveness and Speed." *Educating Architects* (London: Academy Editions, 1995: 110).

[68] M. Polanyi, "The Logic of Affirmation." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 8: 1, 1962: 262).

accumulated with experience is the controlling agent."[69] The explication of this characteristic enables a discussion based on the behavioral patterns of the first year students of architecture on identifying their decisive priorities as learners.

Polanyi also mentions that the tacit dimension *keeps wholes meaningful* as comprehensive entities, which may be regarded as its *sixth* characteristic.[70] The subsidiary particulars of a comprehensive whole are *adhered* to each other with the tacit knowledge of their comprehensive meaning they possess within the whole.[71] Related with this, as Umberto Eco states, architecture communicates more than a precisely and conventionally denoted meaning;[72] because, as Norberg-Schulz argues, the major purpose of architecture should be to achieve a new meaningful whole.[73] At this point it is also needed to refer to A. Rapoport according to whom meaning is very important especially for the built environments;[74] and M. Gandelsonas who suggests that the conception of meaning in architecture is one of the primary discussions in our century.[75]

A *seventh* characteristic of tacit knowledge is its *irreversible development* within the act of comprehension and by this way its ability to *irrevocably enlarge man's world*[76] so that s/he never sees the world as s/he did before.[77] This is the key idea behind the conception of continuity of personal learning. It is necessary to be careful about it that the act of learning is

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[69] P. A. Johnson. *The Theory of Architecture: Concepts Themes and Practices*, (New York: John Wiley & Sons, Inc., 1994: 161).

[70] M. Polanyi, "Knowing Life." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 12: 1, 1962: 380).

[71] Polanyi, "Knowing Life." (1962: 380).

[72] U. Eco, "Function and Sign: Semiotics of Architecture." *Structures Implicit and Explicit* (Philadelphia: The Falcon Press, 1973: 137).

[73] Norberg-Schulz, *Intentions in Architecture*, (1965: 179).

The existential phenomenological point of C. Norberg-Schulz is going to be discussed further in detail in 4.1: "The Interpretation of Personal Knowledge Theory with Regards to Tacit Knowledge in Architecture."

[74] A. Rapoport. *The Meaning of the Built Environment: A Nonverbal Communication Approach*, (Tucson: The University of Arizona Press, 1990: 13).

[75] Gandelsonas, "Neo-Functionalism." (1998: 9).

[76] M. Polanyi, "Intellectual Passions." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 6: 1, 1962: 143).

[77] The change in the worldview of man as a consequence of the act of comprehension is going to be discussed further in 1.5.4: "Tacit Knowledge within the acts of Understanding and Comprehending in Architecture."

only possible by the existing personal knowledge of an individual in order to enlarge his/her world from what it was before the experience in concern. The need for the feeling of comfort about the solution of the next problem must be the reason for an architect to ask different questions each time and evolve his tacit knowledge and his worldview.[78]

An *eighth* characteristic of tacit knowledge is, as Polanyi states it, its role of *predominating all knowledge*. He extends this argument by stating that this characteristic also means that tacit knowledge "represents … at all levels man's ultimate faculty for acquiring and holding knowledge."[79] Because the major portion of architectural knowledge is practical knowledge, which is acquired by personal experience, it is quite understandable how tacit knowing predominates explicit knowledge in architecture. This means that the attitude of considering its predominance vs. the attitude of ignoring it, as holding all of the past experiences of the individual, have a remarkable difference between each other. This becomes more reasonable when the explicability of what is made, how, and why for an architecture student in his/her beginning experiences in design thinking is considered. The explications can only be his/her free-associated decisions as his/her skill to verbalize concepts permit; unless they are repetition of what is subsidiarily left from the preceding conversations with the studio instructors as information that has not been internalized or indwelled within an experience; and converted into knowledge yet.[80]

Considering these characteristics, it is easier to distinguish the difference between tacit knowledge and explicit knowledge. Polanyi states that tacit and explicit knowledge are not sharply divided; because, tacit knowledge predominates *all* knowledge:

> While tacit knowledge can be possessed by itself, explicit knowledge must rely on being tacitly understood and applied. Hence all knowledge is *either tacit* or *rooted in tacit knowledge*. A *wholly* explicit knowledge is unthinkable.[81]

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[78] A very convenient example for the evolution of the architect's mind can be given as Le Corbusier's story of life who has taken his triggering question one step further each time (J. Baltonas. *Walking Through Le Corbusier: A Tour of His Masterworks*, (London: Thames and Hudson, 2005).

[79] Polanyi, "Understanding Ourselves." (1959: 25).

[80] The concepts of 'internalization' and 'indwelling' are borrowed from Polanyi and going to be explained in 1.5.4: "Tacit Knowledge within the acts of Understanding and Comprehending in Architecture."

[81] Polanyi, "Knowing and Being." (1969: 144).

On the other hand, according to Polanyi, man's ability to explicate knowledge provides additional opportunities for him when compared with the primitive mind; such as interpretation. States he, tacit knowledge is the kind of intelligence that is situated behind the barriers of language; and therefore, *inarticulate*. Explicit knowledge is the kind of knowledge that is *articulated* by man.[82] Together with the derived characteristics of tacit knowledge mentioned above, *articulation of knowledge* constitutes on of the major discursive grounds of this thesis; especially with its interrelation with the theory of reflection in action for the *reorganization of personal knowledge*. It is possible to open it through the structure of tacit knowledge and tacit operations of mind as Polanyi explains them.

1.5.2. Structure

Polanyi states that the act of knowing is a personal performance, which shapes all factual knowledge.[83] As he says, his theory supports that all knowledge including scientific, academic, interpretive, and practical (and therefore architectural), is dominated by tacit knowledge, and is *personal*. In line with this, what we call 'architectural knowledge' should have the same characteristics with personal knowledge as Polanyi defines it.

Polanyi explains the structure of tacit knowledge with the relations between subsidiary and focal awareness, and distinguishes three distinctive aspects of it. The first is the *functional* aspect, related with the function of bearing on the awareness of the subsidiaries on comprehending the whole. The second is the *phenomenal* aspect, where a *quality* is present in the fusion of the subsidiary images and not in the sole presence of the subsidiaries. The third is the *semantic* aspect, related with the particulars' bearing on what they mean in a comprehensive whole.[84] Within these distinctive aspects, Polanyi particularly stresses the *semantic* aspect of tacit knowing.[85] Despite the informal character of tacit knowing, he suggests that the "structure of tacit knowing" possesses a characteristic pattern; the formation of which he calls is to "create meaning".[86] Indeed, he suggests that, "… the

[82] Polanyi, "Understanding Ourselves." (1959).

[83] M. Polanyi, "Objectivity." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 1: 1, 1962: 17).

[84] Polanyi, "The Structure of Consciousness." (1965, 1969: 212).

[85] Polanyi, "The Structure of Consciousness." (1965, 1969: 212).

[86] Polanyi, "Knowing and Being." (1969: 181).

structure of tacit knowing is manifested most clearly in the act of understanding …" where a person tries to reach the meaning of a totality with the subsidiary particulars that help him to complete this act of understanding, which he calls "comprehending". [87]

On identifying the subsidiary and focal awareness within architectural knowledge, it is needed to understand how the architect can be subsidiarily aware of the parts on achieving a meaningful focal awareness of a comprehensive whole. Despite being an educated professional, the architect cannot have the thorough knowledge of the built environment. However, s/he has to improve his/her practical skills of designing and communicating with laypeople as well as specialists.[88] This is correspondent with developing his/her own means in order to produce meaningful architectural totalities.[89] Because, 'creative act' in architecture ends up with a meaningful comprehensive entity that is materially inexistent and imprecise during *the problem solving phase*;[90] all knowledge of the architect as his/her own world is *potentially subsidiary* for the act of comprehension both in terms of his/her imaginary subsidiaries, and material subsidiaries. This means that the *functional* and the *phenomenal* aspects of the (tacitly known) subsidiaries in architectural knowledge are found in their comprehensive meanings within the architects' creative act.

This proves the importance of the *semantic* aspect in architectural knowledge. In *the problem solving phase* of the architect; how s/he is able not to lose the comprehensive meaning on looking in detail at the subsidiary particulars is related with the particulars' bearing on what they mean in a comprehensive whole. As Rapoport explains, the reason for meaning to be very important is that "… people react to environments in terms of meanings the environments have for them." His argument that how people react to their environments is

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"creation of meaning" is going to be discussed further in Chapter 2. Indeed this aspect is the fundamental idea that has a direct connection with the 'creative act' in architecture.

[87] Polanyi, "Understanding Ourselves." (1959: 28).

[88] This is also how Francis Duffy explains architectural knowledge in his *The Idea of a Profession: Architectural Knowledge*, (1998: xv), in collaboration with Les Hutton.

[89] Related with this, Norberg-Schulz states that in order to understand his own relatively specialized knowledge within the vast amount of "knowledge of all the facts furnished by historical and actual research in architecture", the architect has to possess a methodical insight as well as an integrated theory of architecture for experiencing, producing and analyzing architecture in Norberg-Schulz, *Intentions in Architecture*, (1965: 217).

[90] This phase is going to be explained as the period where the heuristic act takes place as Polanyi calls it. A detailed explanation is going to be given in 1.6.2. "Attending to Creative Act in Architecture from the Personal Knowledge Theory."

"… more a matter of overall affective response than of a detailed analysis of specific aspects,"[91] shows that he also emphasizes the meaning of the comprehensive whole. It is believed that also the creative act in architecture is based on the purpose of *creating meaning*; which is also the formation of the characteristic pattern of the structure of tacit knowledge.[92]

1.5.3. Operations

Polanyi explains the tacit operations of mind as occurring within the acts of *practical learning* and *reorganizing personal knowledge* within skillful performances.[93] He states that 'practical knowledge' for competency on a skillful performance can be acquired only through experiencing either from a skillful master or by the method of learning-by-doing; the rules of which are not explicable in either case.[94] Related with this C. Abel states that, rules and principles of architectural design are usually kept implicit.[95] This is parallel to the way that Polanyi explains the fact that no prescription for 'art' exists. He states that the hidden rules of any skillful performance can be assimilated only through being *a-critical* about imitating them.[96] He also adds that the combination of skill and practical knowledge, which he names 'connoisseurship', can only be communicated by example; not by precept. [97]

Polanyi thinks that when personal knowledge is articulated with the means of communication (as maps, graphs, and books), it gives the opportunity to *reorganize* knowledge from new points of view. He says that "this reorganization is a tacit performance,

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[91] Rapoport, *The Meaning of the Built Environment: A Nonverbal Communication Approach*, (1990: 14).

[92] Polanyi, "Knowing and Being." (1969: 181).

[93] M. Polanyi, "Skills." *Personal Knowledge: Towards a Post-critical Philosophy* (New York and Evanston: Harper Torchbooks, 4 1962: 49-50).

[94] The most common example for skill learning that is possible only by 'learning by doing' is the example of knowing how to ride a bicycle as Polanyi gives it in his "Skills", *Personal Knowledge*, (1962: 49-50). He states that a man can know how to ride a bike without an explicit technical knowledge of this skill, while he cannot learn this skill only with its technical information.

[95] C. Abel. *Architecture and Identity: Responses to Cultural and Technological Change*, (Oxford: Architectural Press, 2000: 109).

[96] This reminds us the *a-critical* character of tacit knowing; because in accordance with Polanyi's theory, the act of imitating a behavior becomes subsidiary for a higher purpose. Related with this, the transmission of the traditional is going to be discussed in 1.6.3.1: "The Responsible Act within the Creative Act."

[97] Polanyi, "Skills." (1962: 53).

similar to that by which we gain intellectual control over our surroundings at the pre-verbal level and akin therefore also to the process of creative reorganization by which new discoveries are made."[98] This means that the *creative act* is also a means for the *reorganization* of knowledge.

The tacit operations of mind in terms of both practical learning and reorganization of knowledge seem to be important concerns for both architectural education and professional practice. The reason for this is that in both, the architect continuously develops his/her tacit powers, which in turn changes the way s/he thinks and behaves as a consequence of the reorganization of his/her personal knowledge.[99] As F. L. Wright states, architecture can nether be learned in schools, universities; nor from history or tradition; but from within man himself by way of the nature of new circumstances or new materials.[100] Parallel to this idea, states W. Gropius, the intentions of the Bauhaus School are attempts to let the architecture student gain his/her creative freedom.[101] However, it seems that École des Beaux-Arts has a closer approach with the idea of the development of tacit powers with its whole process of the "four indispensable steps which are 'learn, assimilate, forget, create'" as summed up by J. Labutut, who was a student of École des Beaux-Arts in Paris.[102]

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[98] Polanyi, "Understanding Ourselves." (1959: 24-25).

[99] This argument is going to be discussed further in the following part concerning the irrevocable change in man's mind and world. The reorganization of architectural knowledge is by the internalization of the new information of the developments in design theories, building and construction technologies, changing demands of users and employers, and economical concerns of the market. Since, reorganization of architectural knowledge is acquired by **experiencing architecture,** it also includes what Polanyi calls as **practical learning** in nature, which is the **getting hold of skills** by acquiring practical knowledge.

[100] F. L. Wright, "The Architect." *The Works of the Mind* (Chicago and London: The University of Chicago Press, 1947: 55).

[101] W. Gropius. *The New Architecture and the Bauhaus*, (Cambridge Mass: The MIT Press, 1965: 79).

According to Walter Gropius, the personal experience and self-taught knowledge are the only means for realizing the "natural limitations" of one's own creative powers. It was his intention in the Bauhaus school to allow the pupil to "liberate his individuality" by allowing him to acquire these natural limitations (Gropius, *The New Architecture and the Bauhaus*, (1965: 71)).

Gropius also states that the forms of "creative work" could be achieved only by the method of learning form master to apprentice, which was a necessary method in Bauhaus school in which "every pupil and apprentice had to be taught by two masters working in the closest collaboration with each other." Gropius, *The New Architecture and the Bauhaus*, (1965: 75).

[102] J. Labutut, "History of Architectural Education through People." *JAE* (Oxford and Melden: Blackwell Publishing, 33.2, Beginnings, 1979: 23).

1.5.4. Tacit Knowledge within the Acts of Understanding and Comprehending in Architecture

According to Polanyi's theory of personal knowledge, all operations of mind occur within the task of *understanding* subsidiary particulars[103] in the process of *comprehending* the meaningful whole.[104] He states that understanding is an act of *indwelling*[105] in our subsidiary awareness of particulars, where tacit knowledge is of primary importance. The reason for this is that the comprehension of a meaningful whole necessitates the subsidiary knowledge of all of its particulars, without intentionally ignoring a certain part of them in order not to collapse the meaning of the whole; which as he states is the problem of strict empiricism. [106]

Here, it is understood that the tacit powers of mind serve for the conversion of information into personal knowledge. Polanyi states that this is the *internalization* of information as a result of experiencing with exterior subsidiary things, which is primarily possible by perception.[107] He adds that a significant portion of what is subsidiary for the comprehension of a whole is the joint weight of our memories that is effective.[108] It is important to remember that according to Polanyi, man irrevocably enlarges his world with the act of understanding and comprehending as a result of the *reorganization of personal knowledge*.[109] At this point, he defines the *problem solving process* where creativity is of concern as the *heuristic act*[110], which is a personal acquirement of meaningful knowledge of the educated man as an irreversible act.[111] For an architect it is also proper to accept that the act of

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[103] Polanyi, "Understanding Ourselves." (1959: 21).

[104] Polanyi, "Understanding Ourselves." (1959: 28).

[105] Polanyi defines the process of comprehension as an attention *from* a thing *to* its meaning, which he also calls as *internalization* of that thing by *dwelling in* it, in his "Knowing and Being." (1969: 146).

[106] Polanyi states that strict empiricism ignores the personal part of the act of comprehending, which according to him is fundamental for the meaning of the whole, in his "The Calling of Man." (1959: 65-6).

[107] Polanyi, "Knowing and Being." (1969: 127).

[108] Polanyi, "Knowing and Being." (1969: 165).

[109] Polanyi, "Understanding Ourselves." (1959: 12-13).

Also related with this, Nevzat Sayın states that he believes that he constructs himself by constructing the buildings ("Yapıları kura kura kendimi de kurduğuma inanıyorum.") in T. Korkmaz. *Nevzat Sayın: Düşler, Düşünceler, İşler 1990-2004*, (İstanbul: Yapı Kredi Kültür Sanat Yayıncılık, 2004: 28).

[110] The term 'heuristic act' is going to be explained further in the following chapter together with the terms 'heuristic passion' and 'heuristic process' as borrowed from Polanyi.

[111] Polanyi, "The Calling of Man." (1959: 44).

comprehending the totality is indeed his/her heuristic act to solve the problem that s/he has selected; which Polanyi calls the "creative act." Moreover, it also makes possible to think that the creative act as it reorganizes personal knowledge is a means of continuous personal knowledge development.

1.6. Personal Dimension in Architectural Creative Act

1.6.1. Attending to Cognition in Architecture from the Personal Knowledge Theory

Most commonly, as F. Duffy does, architectural knowledge is defined as the knowledge of skills: the skills of design thinking, which is practical knowledge. Related with this idea says K. Frampton: "Architecture is posited as a craft, that is to say, as the practical application of established knowledge through rules of the different levels of intervention."[112] Duffy states that most architects do not feel comfortable with the word "knowledge" for it sounds like something limited to books and libraries; and decision-making in practice requires much more than the written and articulate information.[113]

On explaining the interactions between the individual and the outside world in the Western epistemology, Mark Gelernter criticizes the inductionist approach of the two poles of the Western design theory one of which completely excludes the personal dimension like behaviorists, while the other explains the whole thing as the results of the personal inner resources. According to him, phenomenology tries to overcome these results of the subject-object dichotomy by means of *intentionality*, which has been reflected within the concept of the 'heuristic passion' in Polanyi's theory[114]; and which has also been adopted by Norberg-Schulz.[115]

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[112] K. Frampton. *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*, Ed. J. Cava, (Cambridge and Massachusetts: The M.I.T. Press, 1995: 3).

[113] Duffy, *The idea of a profession: Architectural Knowledge*, (1998: xiii).

[114] The concept of 'heuristic passion' is going to be dealt in detail in 1.6.2. "Attending to Creative Act in Architecture from the Personal Knowledge Theory."

[115] Gelernter, *Sources of Architectural Form: A Critical History of the Western Design Theory*, (1995: 270).

Based on the existential phenomenological influence on Polanyi, the phenomenological point of C. Norberg-Schulz[116] appears supportive for attending to cognition in architecture. His viewpoint about the architect's understanding of life is a consequence of his similar belief with Polanyi concerning the *personal dimension* as the "intangible phenomena" as a part of "our everyday life-world".[117] Concordant to Polanyi's idea that intentionally ignoring a certain part of the subsidiaries collapses the meaning of the whole[118], he rejects the idea of architecture on a merely objective foundation and offers that a 'theoretical basis' for architecture is the solution for analyzing its totality as a whole with its intuitive dimensions.[119] He states that proportional, spatial and structural orders[120] should only be accepted as parts of the integrated theory for the totality of architecture[121], which Polanyi identifies as the comprehensive whole and which Norberg-Schulz calls the "intermediary object."[122]

Norberg-Schulz states that the "intermediary objects" are the consequences of personal judgments of the observed external objects. According to him, these objects may be *perceived* as conditioned to their specific aspects and their environmental conditions, which as in Polanyi's theory is because of the tacit powers that direct judgments about them.[123] He states that what is perceived as a meaningful whole is the sum of personal experiences.[124]

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[116] Christian Norberg-Schulz (1926-2000) is a Norwegian architect, architecture historian, and theorist.

[117] He states that the real concern of the architects and planners ought to be this "everyday life-world", which according to him, can only be possible by the method known as "phenomenology." (C. Norberg-Schulz. *Genius Loci: Towards a Phenomenology of Architecture*, (New York: Rizzoli International Publications, Inc., 1980: 6-8)).

[118] Polanyi, "The Calling of Man." (1959: 65-6.).

[119] In fact, he suggests that his book *Intentions in Architecture* is based on this idea (Norberg-Schulz, *Intentions in Architecture*, (1965: 210)).

[120] These orders are parts of the standards that the architects as 'educated man' act responsible for. The 'responsible act' is going to be discussed further in 1.6.3. "The Responsible Act in Architecture."

[121] It is believed to be important to keep in mind that when looking through the point of Polanyi's thoughts it is clear that the presence of these orders keeps architecture from being a merely subjective act as it is in any kind of profession.

[122] Norberg-Schulz, *Intentions in Architecture*, (1965: 101).

[123] Norberg-Schulz, (1965: 33).

[124] Norberg-Schulz, (1965: 29).

Related with this idea says he: "As an intermediary object the work of architecture does not *describe* the world, rather it unifies some of its aspects in a new meaningful whole." [125]

Therefore, as a consequence of the parallel thoughts of Polanyi and Norberg-Schulz, which at the same time build up the viewpoint of this study, the major purpose of an architectural experience is to achieve a new meaningful whole.

Regarding the position of personal dimension in architecture, Norberg-Schulz has defined the problems of the post-medieval epoch in architecture, reasoned by ignoring the personal coefficient in the architects' design knowledge.[126] As he defines it, the building activity of the modern movement has aimed the criterion of providing logical and practical forms while staying away from creating works of art and from everything that has inherited from the past.[127]

As a response to this purely rationalist conception of functionalist architecture, in which man is no longer a part of a meaningful totality,[128] as Norberg-Schulz states, it has been started to be questioned recently with a general doubt; with an attempt to go beyond existing limits.[129] At this point, he states that "meaningful architecture" begun to be of primary importance rather than the "functional".[130] Similar to him, Mario Gandelsonas tells that the early functionalist architecture had an underdeveloped conception of meaning and identifies the "… introduction of the problem of meaning within the process of design in a systematic and conscious way" as the "neo-functionalist approach" in architecture.[131] Moreover, Rapoport

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[125] Norberg-Schulz, *Intentions in Architecture*, (1965: 179).

[126] Like Norberg-Schulz, Christopher Alexander also defines it as an illness of modernism that it's being merely interested in what can be explicable in C. Alexander. *Notes on the Synthesis of Form*, (Cambridge and Massachusetts: Harvard University Press, 1964).

[127] Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 17).

[128] Norberg-Schulz, (1988: 11).

According to him, the problems of modern society that are also its characteristics are the losses of fellowship, care and meaningful expression, which he thinks to be concluding with loss of hope and belief.

Rapoport in his *The Meaning of the Built Environment: A Nonverbal Communication Approach*, (1990: 15) also agrees Norberg-Schulz as he says: "…in spite of the apparent importance of meaning … it is fair to say that the meaning aspect of the environment has been neglected in the recent past … and continues to be neglected."

[129] Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 22).

[130] Norberg-Schulz, (1988: 22).

[131] Gandelsonas, "Neo-Functionalism." (1998: 7-8).

argues that, "… meaning is not something apart from function, but is itself a most important aspect of function."[132]

According to the findings of Norberg-Schulz the idea of *meaning* in architecture is older than the modern movement in architecture. In spite of the general characteristics attributed to certain epochs, he has been able to find examples of architecture that have acquired the meanings of their own wholes.[133] Perez-Gomez appears to agree this idea as he states, "[o]nce it adopted the ideals of a positivistic science, architecture was forced to reject its traditional role as one of the fine arts. Deprived of a legitimate poetic content, architecture was reduced to either a prosaic technological theoretical problem process or mere decoration."[134]

According to Norberg-Schulz, the fact that we should have a comprehensive meaning of the architectural totality does not mean that we can articulate all the formal knowledge of its components.[135] As he states, the important thing is not only the conscious control of physical or formal means like light or color, but also the creation of an intended atmosphere,[136] where the interrelations between these means are decided by the personal decisive powers and choices of the architect within the act of creation of a place. Likewise, Gelernter states that there are other unexplainable influences by the theory of function on the buildings' forms.[137] As an example to this idea, as S. Drake analyses the Kiasma building, Steven Holl's arrangements of the imaginary subsidiary particulars in an inexistent meaningful whole,

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[132] Rapoport, *The Meaning of the Built Environment: A Nonverbal Communication Approach*, (1990: 15).

[133] In *Architecture: Meaning and Place* (1988), he has discussed the meaningful totalities of the works of architecture from 'history', 'modern' and 'postmodern' periods. Despite the well known characteristics of modernism, some avant-gardists are from the modern period and as Norberg-Schulz states, Bauhaus is an example for this: "When Gropius talked about "functions of life," he did not primarily have in mind the measurable aspects of human actions and material resources, but rather the meaning of each life-situation as part of a totality", (Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 174)).

[134] A. Perez-Gomez. *Architecture and the Crisis of Modern Science*, (Massachusetts: MIT Press, 1983: 12).

[135] Norberg-Schulz, *Intentions in Architecture*, (1965: 188).

[136] Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 134).

[137] M. Gelernter, *Sources of Architectural Form*, (Manchester University Press, Manchester and New York, 1995: 7).

were his conscious attempts to give his intended comprehensive effect to the visitor of the museum.[138]

In line with this, how Wright explains architecture is significant because of the clues in his words for the necessity of improving the tacit power for understanding architecture. It is significant because, Wright's statements were more or less at the same time that has been specified by Norberg-Schulz for the revival of the personal dimension in architecture.[139]

> Until you learn to see and decide independently [improve your personal decisive power] and take the inner nature of the very thing [indwell, interiorize the object that you are interested in] you yourself are into account, you are nobody Architecture knows and cares about.[140]

1.6.2. Attending to Creative Act in Architecture from the Personal Knowledge Theory

According to Polanyi, the 'creative act' as a form of comprehension is composed of three major phases as the selection of the 'right' problem, a passionate 'heuristic act'[141], and a successful solution as a meaningful totality, which has the potential to include a discovery or an invention.[142]

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[138] Scott Drake analyses the Kiasma building (Museum of Contemporary Art, Helsinki) with a theoretical base from Merleau-Ponty's phenomenology. As Drake states, the circulation that gives access to galleries enables people to experience them in an intriguing way; such that, light varies for each gallery until only the combined effect is noticed, which also proves the Merleau-Pontian idea that a space can only be liberated from being meaningless and abstract (Cartesian) by being participated. (S. DRAKE, "The Chiasm and the Experience of Space. Steven Holl's Museum of Contemporary Art, Helsinki." *JAE (1984-)* (59.2, 2005: 57)).

[139] The time specified by Norberg-Schulz is the end of the 2nd World War. Here it is significant to note that indeed he mentions that this new interest in architecture which starts to reject the pure rationalism of early functionalism is not necessarily a consequence of the 2nd World War as he states in :Norberg-Schulz, *Architecture: Meaning and Place: Selected Essays*, (1988: 22).

[140] Wright, "The Architect." (1947: 55).

[141] Polanyi explains the term 'heuristic act' for "the articulate level of intelligence [which] falls distinctly apart from mere routine applications of established knowledge" for "they are the acts of the inventor or discoverer, which require originality." This is also more or less how he explains 'creative act', which is a different heuristic act than that of the ordinary level of intelligence (Polanyi, "Articulation." (1962: 76-77)).

[142] Polanyi explains how "creative scientists … cross the heuristic gap which lies between problem and discovery" inPolanyi, "Intellectual Passions." (1962: 143).

He asserts that hitting upon a problem requires knowing more than you can tell from you; while the act of discovery or creativity needs a passion for solution.[143] He adds that, hitting upon an original problem requires a special gift to see the hidden behind the accessible and convince oneself that the solution is possible, which can only be a feature of the *educated mind*.[144] Related with this, states he "I am merely referring to the important fact that you cannot discover or invent anything unless you are convinced that it is there, ready to be found."[145]

'Heuristic passion', as Polanyi explains, sustains and guides for selecting the right problem for the creative act. He argues that the personal *problem solving phases* of the *educated men* with a heuristic passion is creative act, which changes the world as they see it, by deepening their understanding of it.[146] Having this *cognitive value*, this passion is the belief for achieving what he calls the "higher purpose", the purpose of creating a new meaningful whole. According to him, in order to produce a surprising idea man must go far beyond the anticipatory powers of current conceptions. Says he, "[t]he interpretive framework of the educated mind is ever ready to meet somewhat novel experiences and to deal with them in a somewhat novel manner."[147] This novelty is the explanation for the *educative function* of the creative act.

On this ground, it is understood that the tacit decisive powers can be developed by education including a high degree of practical training. As Polanyi expresses, within a creative act the

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[143] Polanyi, "Knowing and Being." (1969: 131-2).

Related with this, Hammond expresses that Polanyi accepts the "act of commitment" to personal beliefs (which we may interpret as the "heuristic passion") as the requirement of the imaginative power. He defines what Polanyi calls "belief" as the belief that "the experts are to be trusted and that there is meaning to be *discovere*d." He continues: "Commitment starts with the appreciation that there is a problem capable of *solution*. Commitment to a problem acts as a *heuristic field*, which draws the explorer to a solution of the problem ..." in P. Hammond, "Personal Knowledge and Human Creativity," (2003: 27).

[144] Polanyi, "Knowing and Being," (1969: 131-2).

Polanyi expresses that the production of original ideas is the work of the gifted man who has the capacity to go beyond the current conceptions. It is important to note that what Polanyi calls as "gift" is believed to be a necessary part of creativity; and has more chance to occur in the mind of the educated man He says that it is the attitude of those who do not believe in scientific gift and the powers of scientific discovery to insist on finding a formal procedure of induction as he states in his "Knowing and Being," (1969: 167).

[145] Polanyi, "Understanding Ourselves" (1959: 35).

[146] Polanyi, "Intellectual Passions" (1962: 143).

[147] Polanyi, "Articulation." (1962: 124).

dynamics of tacit knowing are of primary importance; since according to him, a creative man is supposed to understand an imaginary thing to be constructed in his mind the subsidiary clues of which are not readily available to him.[148] He also states that if the hidden guiding rules of art were precise prescriptions, it would only be a process of manufacture and not the act of creation in terms of imagining the necessary subsidiaries for ending up with an original idea of a comprehensive meaning either in science or in arts.[149]

Although his theory has certain prospects for the creation of arts as expressed above, it is clear that Polanyi has specifically dealt with the scientists' creativity, whose passion is reaching the universally acceptable. Nevertheless, for studying architectural creativity a discussion based on a broader definition of human creativity is needed. In line with this, as P. Hammond expresses that the 'human' dimension is lacking in Polanyi's theory concerning the 'creative act',[150] and A. Koestler[151], who is a friend of Polanyi, has expanded the discussion on creativity to this lacking dimension. However, the influence of Polanyi on Koestler is so apparent that, Koestler's *The Act of Creation* may be regarded as an extension of Polanyi's work.[152] Therefore, before carrying the discussion of creativity to the field of architecture, it is believed that looking at what Koestler offers in addition to Polanyi's theory would be beneficial.

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[148] Polanyi, "Knowing and Being." (1969: 199-200).

[149] M. Polanyi, "Background and Prospect." *Science, Faith and Society* (Chicago: The University of Chicago Press, 1964: 14).

[150] P. Hammond's argument about the lack of human dimension for the concern of creativity in Polanyi's theory (P. Hammond, "Personal Knowledge and Human Creativity." (2003: 24)) seems to be agreeable; however, only for the period until Polanyi re-dealt with the creative act in his essay "Validity in Art" published in *Meaning* in 1977 where he had decided to compare how meaning was achieved in science and technology with how it was achieved in the works of art (:M. Polanyi and H. Prosch, "Validity in Art." *Meaning* (Chicago and London: The Iniversity of Chicago Press, Paperback, 19751977: 95)). However, it is important to point out that Polanyi and Koestler seem to look form the same point of view concerning the structure and operations of tacit knowledge.

[151] Arthur Koestler (1905-1983) is a Hungarian-British novelist, journalist, and social philosopher best known for his novel *Darkness at Noon* (1940).

[152] Koestler, as he also refers to Fichte, Freud, James and Polanyi, makes the same distinction between what Polanyi calls as *focal* and *subsidiary awareness* and extends the discussion by seeking how two types of awareness interact to assist mental creativity. In A. Koestler. *The Act of Creation*, (New York: The Macmillan Company, 1964: 159) says he: "The existence of an intermediary region between the 'limit case' of sharp, narrow focal awareness and the vast unconscious regions of the mind has been recognized for a long time Fichte (and later Freud) called it pre-conscious (*das Vorbewusstsein*), James called it the fringe; Polanyi 'subsidiary awareness'…"

Different than Polanyi, Koestler mentions "the period of incubation"[153] as a novel concept for the heuristic act. In this period man's 'mind' is in a state of receptivity for the profits from any casual hint after hitting upon a problem.[154] With this concept, Koestler explains the act of creativity as breaking with the 'code of rules'[155] by the help of an opportunity of a casual hint while trying to solve a particular problem. As David Bohm also states, creativity, both for scientists and artists, is the discovery of a unity in a broad range of phenomena as a totality or wholeness,[156] which is indeed the act of comprehending a new meaning. What is incubated must therefore be this intended meaning together with the selected problem in mind.

This proves that selecting the right problem is very important in the creative act. What G. Broadbent states shows that the 'creative act' defined by Polanyi fits the concept of architectural design for the point of problem selection. He states: "Architectural design is not simply a matter of solving problems. It is a question, first of all, of finding what the problems actually are."[157]

In this viewpoint, hitting upon a "beautiful" problem in architecture requires the qualification of having the capacity to go beyond the current conceptions. What Polanyi expresses as the "problem" that is believed to be solved by the heuristic act is called as "the central idea" by B. Lawson that is expected to be clarified during the design work of an architect.[158] In accordance with Lawson's idea, this unclear presence of the 'central idea' can be interpreted

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[153] Koestler makes the definition of the 'period of incubation' as "the mode of absent-mindedness", where the knowledge of a particular problem remains active on some level of the mind, even when the focal attention is on somewhere else (Koestler, *The Act of Creation*, (1964: 119).

[154] Koestler, *The Act of Creation*, (1964: 119).

[155] By the 'code of rules' Koestler means the set of matrices on one's mind applied to similar problems in the past. However, he also believes that the code of rules should be eliminated for no situation can be identical with a previous one if creativity is in concern. Koestler also states that creativity appears when we hit upon a problem which cannot be solved by our present code of rules that we have gained in our pasts (Koestler, *The Act of Creation*, (1964: 209).

Koestler's discussion about the 'code of rules' is similar to Polanyi's discussion on the 'human responsible act' whic is going to be explained in 4.3.1: "The Responsible Act within the Creative Act."

[156] D. Bohm, "On Creativity." *Structures Implicit and Explicit* (Philadelphia: The Falcon Press, 1973: 69).

[157] Broadbent, "Architectural Education." (1995: 23).

[158] B. Lawson, "Creative Thinking." *How Designers Think: The Design Process Demystified* (Oxford: Architectural Press, 9: 4, 2006: 191-2).

as being processed by the tacit coefficient, which gives the courage to the designer to hang on to 'understand the idea and make explicit its notion'.[159] Similarly according to Norberg-Schulz it is necessary to articulate the problems of the architectural work; such that architects should be able to consciously clarify the problems to define the "*building tasks* and the *means to their solutions*."[160] This idea makes it possible to think that the creative act includes a struggle for *articulating* the tacitly known.

Likewise, according to Lawson's findings, the heuristic passion of the architect appears as the courage to understand and explicate the central idea.[161] In addition to Lawson's term 'courage', also what Norberg-Schulz calls as 'intention'[162] appears to be related with Polanyi's idea of *heuristic passion*, which is the will to grasp the meaning of a comprehensive whole.

This passion provides the decisive tacit power for the architect, which is an opportunity for him to keep the central idea meaningful. Keeping the central idea meaningful becomes possible by the subsidiary awareness of it together with the architects beliefs, collective weight of his/her memories, and the internalized information of his perceptions. In this concern, the statement of Norberg-Schulz seems very significant: "It is more important for the result to put correct questions than to give correct answers to wrong questions."[163]

It is also possible to think that the architects, on dealing with their design problem may experience an 'incubation period' until hitting upon a casual hint on looking for a solution with the existing 'code of rules' of their previous experiences. If this is the case, it seems that the architects' potential to hit upon a casual hint for the solution of their problem or the procession of their central idea, which is in Polanyian terms, seeing the hidden behind the visible, would be related with their creative powers. For architecture, the 'code of rules' may be interpreted as what has become ordinary for solutions, which F. L. Wright calls as the "enemy for the architecture of the mind."[164] Understanding the creative powers of an architect reasonably requires a parameter to think on, which becomes impossible to

[159] Lawson, "Creative Thinking." (2006: 192-3).

[160] Norberg-Schulz, *Intentions in Architecture*, (1965: 21).

[161] Lawson, "Creative Thinking." (2006).

[162] Norberg-Schulz, *Intentions in Architecture*, (1965: 29).

[163] Norberg-Schulz, *Intentions in Architecture*, (1965: 130).

[164] Wright, "The Architect." (1947: 65).

determine as creativity requires a change in the 'code of rules'. Indeed, it is exactly the *incommensurability* characteristic of tacit knowledge, which constitutes a fundamental problem for the ethical concerns by means of providing the basis for extreme individual autonomy.[165] It seems that it is possible to overcome this problem only with *external coaching* for learning, where as M. Bandini states "communication is based on analogical patterns of thought,"[166] and where the means constructed by the apprentice in the heuristic act as new 'code of rules' are noticed by the master.

1.6.3. The Responsible Act in Architecture

It is mentioned that intentionally ignoring a certain portion of the subsidiary particulars renders our comprehension of the whole meaningless. Accordingly, as the personal component of architectural knowledge cannot be ignored; the part that objective knowledge plays in the architect's mind also cannot be ignored. At this point, both Polanyi[167] and Norberg-Schulz[168] share the idea that science, based upon the criterion of objectivity, provides common standards to act responsible for. Here, it is important to distinguish this responsible act from applying precise prescriptions for making art, which excludes the personal dimension. On the contrary, the common standards become a part of personal knowledge by being tacitly known in the heuristic act. Related with this B. Lawson mentions that design in any form "deal with both precise and vague ideas, call for systematic and chaotic thinking, need both imaginative thought and mechanical calculation."[169]

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[165] R. Landau, "Architecture, Ethics, and the Person." *The Education of the Architect: Historiography, Urbanism and the Growth of Architectural Knowledge (Essays Presented to Stanford Anderson)* (Cambridge, Massachusetts, London: M.I.T. Press, 1997: 419).

[166] M. Bandini, "The Conditions of Criticism." *The Education of the Architect: Historiography, Urbanism and the Growth of Architectural Knowledge (Essays Presented to Stanford Anderson)* (Cambridge, Massachusetts, London: M.I.T. Press, 1997: 428).

[167] Polanyi, "The Calling of Man." (1959: 41).

[168] Norberg-Schulz, *Intentions in Architecture*, (1965: 51).

[169] B. Lawson, *How Designers Think: the Design Process Demystified*, Fourth ed. (Architectural Press, Oxford, 2006: 4).

Related with this, states John Whiteman: "…when theorizing architecture we must inevitably theorize its construction of the subject, the self: the idea that architecture's effects are effects in and on the self. This play of concerns is threatened if architecture is treated either as a purely pragmatic endeavor or else as a purely theoretical one." (J. Whiteman, "That Scepticism Might Be a Place." *Perspecta: The Yale Architectural Journal* (New York: Rizzoli International Publications, 27, 1992: 46).

1.6.3.1. The Responsible Act within the Creative Act

According to Polanyi, in all that is produced, "… there is present a personal component, inarticulate and passionate, which declares our standards of values, drives us to fulfill them and judges our performance by these self-set standards."[170] He stresses that these personal values constitute a part of the educated man's superior knowledge[171] that is subject to his acknowledgement of the superior knowledge of his own culture.[172]

Polanyi states that the educated man is engaged in responsible decisions under a firmament of universal obligations, moral/civic and cultural codes that he accumulates from his superior knowledge. As he speaks for the scientists "[t]he shaping of knowledge by the knower can lay claim to universal validity by submitting a strict sense of responsibility."[173] He also states that scientific merit transmits from generation to generation by the affiliation of individuals in the same way as artistic, moral or legal traditions are transmitted; that is by means of the responsible act.[174] According to Polanyi, the transmission of the traditional, which was intended to be hindered by the modernist thought,[175] is the only means to preserve a society's fund for personal knowledge.[176]

It is possible to derive from Polanyi's theory that the educated mind acts responsible for certain standards and values including the 'code of rules' that s/he tacitly knows in the

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[170] Polanyi, "Intellectual Passions." (1962: 195).

[171] Polanyi defines 'superior knowledge' as a part of the personal knowledge, to which one feels responsible for. In this definition, he states that "[It] *will be taken to include*, therefore, beside the systems of science and other factual truths, *all that is coherently believed to be right and excellent by men within their culture* (Polanyi, "Knowing Life." (1962: 375)) ."

[172] M. Polanyi, "The Logic of Achievement." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 11: 1, 1962: 375).

[173] Polanyi, "The Calling of Man." (1959: 41).

[174] M. Polanyi, "The Republic of Science: Its Political and Economic Theory." *Knowing and Being: Essays by Michael Polanyi* (Chicago: The University of Chicago Press, 1969: 66).

[175] Landau, "Architecture, Ethics, and the Person." (1997: 414)

As Landau also cites; Hegel argues that the rejection of history (which is the claim of modernism) could only lead to emptiness (G. W. F. Hegel,Trans. A. V. Miller. *Science of Logic*, (London: George Allen and Union Ltd., 1969)) and Baudelaire claims that the rejection of history would only allow the anti-ethical behavior in architecture (C. Baudelaire "De l'héroïsme de la vie moderne", *Salon de 1846,* XVIII (1846)).

[176] This is also related with the discussion about ethics in the master-apprentice relationship in architecture, which is also a means to transmit the tradition.

heuristic process, while the problem that s/he deals with incubates in his/her mind. It may also be true that an architect has to act responsible for certain standards and values concerning subjects like technology, history and theory, communication, urban design and planning.[177] Moreover, in practice, it is known that rapidly changing environmental conditions with changing interfaces of clients, municipality, users and their changing demands are of an architect's concern of responsibility related with his architectural know-how. Concerning the responsible act, Gropius states that art and architecture cannot be considered as merely depending on individual accountability. He states that even if art cannot be taught or learned, the knowledge of its principles or know-how (or what he calls as "sureness of hand," which is apparently the tacit practical knowledge) can be. According to him the knowledge of both principles and skills are as necessary for the genius artist as it is for the ordinary artisan.[178]

1.6.3.2. The Difficulties and Dangers of Responsible Act

Polanyi expresses that there are difficulties and dangerous situations concerning the responsibilities including those for the 'superior knowledge' of universal, moral/civic and cultural obligations, and for personal unrevealed tacit *code of rules* which are also adoptable for discussing the responsibilities in an architectural experience as creative act.[179] The difficulty of the responsible act for the readily available 'code of rules' is being passionate at the expense of them. This task is difficult because it necessitates the creation of new personal means for the heuristic act, where available means that are remembered from previous experiences are insufficient. In architectural practice, when the risk of this difficulty is not taken and the *problem solving phase* is not passionate, the danger is the loss of *quality* and the inexistent *meaning* in the work by being bound to previously applied solutions; although their success to function are guaranteed. It is important to remember for once more that Wright calls this situation as the "enemy for the architecture of the mind."[180] Moreover,

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[177] J. W. Robinson, "The Form and Structure of Archietctural Knowledge: From Practice to Discipline." *The Discipline of Architecture* (Minneapolis: The University of Minnesota Press, 4 2001: 65).

[178] Gropius, *The New Architecture and the Bauhaus*, (1965: 58).

[179] Polanyi, "The Calling of Man." (1959: 41).

[180] Wright, "The Architect." (1947: 65).

Louis I. Kahn states that the imagination of the architect should span by setting the architect's hands and feet free from the bounds of strict design rules and proportions.[181]

Keeping the self-set standards and values untouched is a remedy for feeling confident and avoiding the difficulty of the 'heuristic act' by eliminating the passion that is necessary for creativity. Such an attitude, which can also be identified as 'cognitive dissonance'[182] or *conformism*, endangers the existence of the personal dimension of the architect, his/her tacit powers and heuristic passion at the expense of the comprehensive meaning for the sake of his/her confidence. To consider the same danger for the knowledge development process of the architect is quite possible, who intentionally limits his/her reorganization of knowledge by not acting passionately and therefore creatively.

Related with this dilemma between meaning and confidence, E. Manzini reminds another facet of the problem concerning the architects' difficulty on dealing with the increasing mass of information that is permitted by technology. States he, "… the multiplication and continuous transformation of forms, colors, and textures of objects can lead to the impossibility of "reading" any real difference and any real meaning in them."[183] This facet is also related with the architect's responsibility for solving each problem that he faces in practice. The noteworthy number of these problems initiates the difficulty to keep consciously the image of the comprehensive meaning on mind because of the necessity to deal with every problem in detail. The same explanation is compatible with the idea of preparing the simplest form of experience in the first phases of learning how to design.[184]

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[181] -, "Interviews with Louis I. Kahn – Clearing." *Structures Implicit and Explicit* (Philadelphia: The Falcon Press, 1973: 158).

[182] The online *Britannica Concise Encyclopedia* explains 'cognitive dissonance' as a consequence of "[t]he mental conflict that occurs when beliefs or assumptions are contradicted by new information. …" which gives the impression that it is indeed the need to feel confident.

"cognitive dissonance." *Britannica Concise Encyclopedia*, (2006). *Available:* Encyclopædia Britannica; ADDRESS: http://www.britannica.com [Accessed: 12 December 2006].

[183] Manzini also states: "Immersing ourselves in an uncontrolled number of signs is impossible because doing so results in a new kind of pollution: "semiotic pollution," caused by the confusion, loss, and distortion of meaning and by the generalized production of semiotic refuse."

E. Manzini, "Promethus of the Everyday: The Ecology of the Artificial and the Designer's Responsibility." *Design Issues* (Cambridge, MA: The M.I.T. Press, 9.1, Autumn, 1992: 7).

[184] The role of the dangers of the responsible act is going to be expanded in the following parts of the dissertation.

Moreover, according to Polanyi, within the essence of moral responsibilities, there lies the difficulty of subscribing the knowledge shaped by political impulses that includes struggle for power and profit in nature.[185] Polanyi also states that the human responsibility is liable to failure as a danger; with a nature subject to "lust, pain and pride," and adds that "[f]or only by staking our lower interests can we bear witness effectively to our higher purposes."[186] Although this issue is going to be discussed in detail in the following chapters, the students' primary concern for grade and for being praised is a proper example for these lower interests. It is clear that the dangers and difficulties in concern threaten the comprehensive meaning of the whole, and therefore the development of the skills for creative act. Indeed, what Polanyi means by the "higher purpose" is this purpose of achieving meaning; which can be endangered by the lower purposes.

1.7. Chapter Conclusions:

Regarding and agreeing with Polanyi's theory of personal knowledge, this thesis adopts that *creative act* in architectural phenomena necessitates an imaginative power and skills to think freely and to see the hidden behind the ordinarily available for the selection and explication of an *original problem*. Moreover, it adopts that the creative act in architecture applies a *heuristic act*, which necessitates a belief and a confidence that a solution of the problem is hidden but achievable. The creative act entails a courage to construct ones own *'code of rules'*, and the skill to *articulate* them to reflect on when those acquired by similar experiences in the past are not sufficient. In all its essence, the creative act necessitates and at the same time develops the tacit powers by *enlarging* the personal world in the comprehension of a new *meaningful whole*, each time a design work is experienced. The *tacit powers* of an architect develop each time s/he internalizes information of *subsidiary particulars*, be they imaginary or material, by understanding them within a *comprehension* of a new meaningful totality. This is the *irrevocable reorganization of personal knowledge,* which becomes possible through the *articulation* of what is understood by the subsidiaries. This is the viewpoint that is adopted throughout the dissertation for comprehending the issue about architecture education.

[185] Polanyi, "The Calling of Man." (1959: 43).

[186] Polanyi, "The Calling of Man." (1959: 67).

Agreeing in these opinions, states C. Abel: "New research should be focused on the function of tacit knowing in architecture, both in the process of design and in the role of architecture as a place-making activity."[187] What this dissertation does is focusing on the function of tacit knowing specifically in an architect's reorganization of knowledge.

On the same grounds, it is accepted that similarly in other branches of art, the imaginative power of mind necessitates the development of the tacit powers. The sculptor A. Faggi stresses that an artist has to accumulate as much knowledge as possible to make the imagination ready; since he has to have "… all the elements for the articulation of the composition already created in mind …." [188] It is therefore apparent that Faggi acclaims that for the improvement of the mental skills and reorganization, articulation of what is known is a necessary task. Similarly, Guilford believes in the encouragement of the development of the creative skills, which according to him can be made by explicating the personal knowledge of the individual.[189]

McCombs and Miller's book constitute an evidence for the function of the explication or articulation of the tacitly known in educational purposes. Especially concerning reorganization of knowledge, they argue that the more the self explicates about how s/he likes to learn, the more s/he is able to see his/her eagerness and competence in the act of learning.[190] This connection is based on the connection between the behavioral pattern and the *decisive power of tacit knowledge*; which means that the components of our personal knowledge also form the components of our decisive powers and therefore determine our level of creativity in action.

It is evident that articulation and reorganization of the tacit powers of mind is of vital importance also for improving creativity in architecture. Considering the entailment of articulation, the task should enable the one who is involved in the architectural design act be consciously and explicably aware of this importance. This task involves in its essence the aim of bringing into notice the powers of personal knowledge of the individuals' previous

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[187] Abel, *Architecture and Identity: Responses to Cultural and Technological Change*, (2000: 113).

[188] A. Faggi, "The Sculptor." *The Works of the Mind* (Chicago and London: The University of Chicago Press, 1947: 48) .

[189] J. P. Guilford, "Creativity." *American Psychologist* (USA: American Psychological Association, 5.9, 1950: 448).

[190] B. McCombs, and L. Miller. *The School leader's Guide to Learner-Centered Education: From Complexity to Simplicity* (London: Corwin Press, 2009: 2).

problem solving experiences and decisions. So that an individual intending to become a designer, may notice the range or scope of what s/he is capable of and what s/he has to improve in his/her skills in comprehension and creative act. This task may also be characterized as a process of making the designers' mind up to educate themselves with their personal objective to feel competent and confident in the design act.

In fact, the discussions carried up to this stance include a message about the *self-education of the architect* as a consequence of the adoption that since all knowledge is personal; knowledge development is a personal task. This is self-education and inevitably a continuous process following the *continuous reorganization of personal knowledge*. It is possible to identify two means of reorganization.

The first one is the comprehension of a new meaning of an external object (a product of a previous articulation), through which the information of the object is internalized and converted into personal knowledge by reorganizing that meaning with other subsidiaries gathered through previous experiences of the individual. This reorganization is a consequence of the personal articulation of the comprehended meaning and reflection on it. This task can be writing a review on an experience of comprehension, making a commentary on an art object, or diagramming or mapping a set of ideas followed through reading a book; and then again, comprehension of what is articulated.

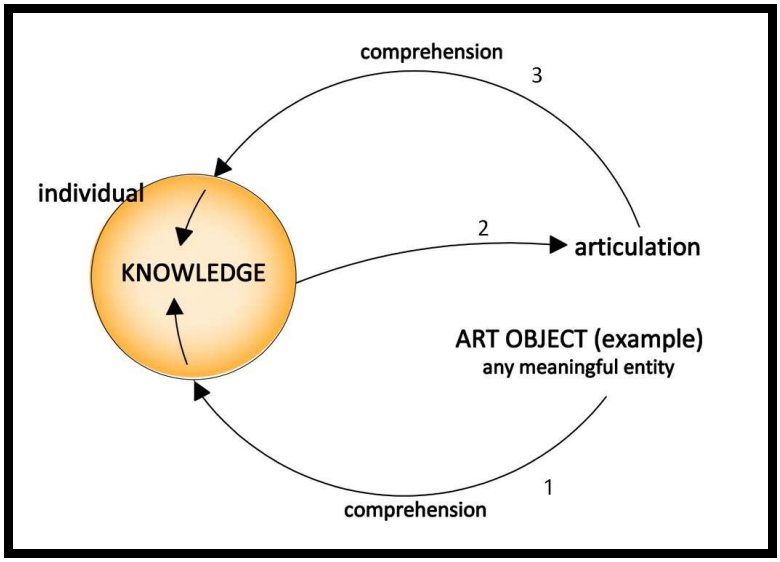

Figure 2: Reflecting on the act of comprehending the meaning of an external object as the reorganization of personal knowledge

As it is visualized on the figure above, the reorganization of knowledge is a cycling procedure, which does not necessitate an external object to transmit meaning to the individual. This cycling can be possible through the skill of articulation of personal knowledge, which can be regarded as the second means of reorganization. This is more related with the act of production; production of a new meaningful entity through articulation. Articulation is the totality of means for transmitting the meaning of an incubated idea, which enables self-reflection on the previous experiences of the individual. The below figure is constructed to represent the cycling relationship between the individual and his/her articulation. For those who are beginning architecture education and unfamiliar with the personal dimension in their knowledge conceptions require an external support for being trained in articulating the internalized; a support that is advanced in the skills of articulation in order to struggle with the *a-citical* nature*, incommensurability* and *unspecifiability* characteristics of tacit knowledge.

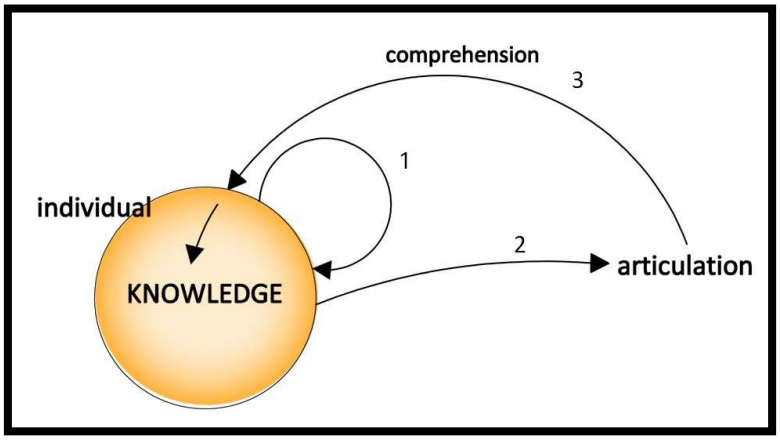

Figure 3: Self-reflection as reorganization of personal knowledge

In the design act, there is continuous sustenance from both means of reorganization. The design is a process of solving a self-determined design problem, the requirements and context of which constitute the external objects of comprehension. Personal knowledge reorganized by them provides the means together with the knowledge of previous experiences of the individual as subsidiaries to reach a meaningful articulation, as a production of new meaningful entity: a design work. The processes of the selection of an original design problem, its incubation in the designer's mind, the production and trials of

alternatives, and all other phases of solving a design problem employ internalized knowledge of the previous experiences of comprehension.

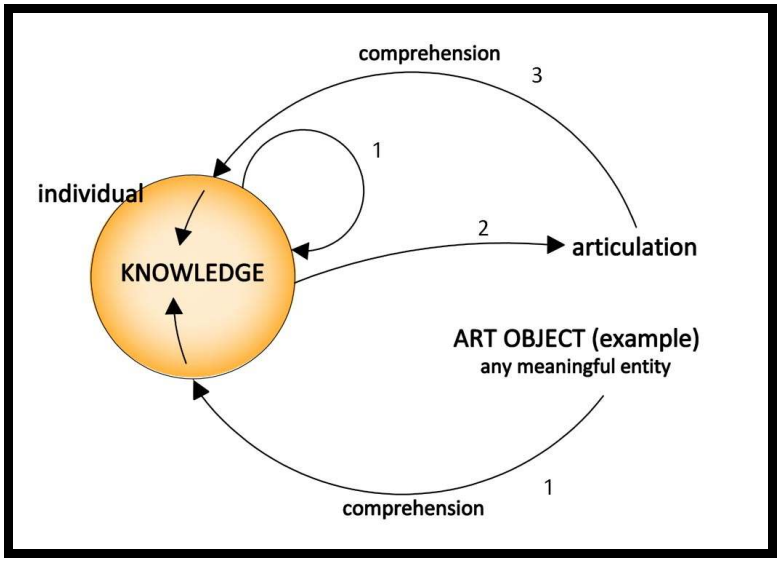

Figure 4: Design act as the simultaneous existence of both sources of reorganization of knowledge

These three cycling charts represented above indicate possible modes of personal knowledge development, through reorganization. They display the structure of education as an inevitably self-conducted act because of the necessity to comprehend the meanings of the wholes through the means existent in the personal knowledge that is acquired until the moment of comprehension. Regarding *comprehension as the only means for reorganizing knowledge* towards becoming skilled in architecture, Norberg-Schulz states "… the student has to be trained in the creation and understanding of *architectural totalities*, and nothing else."[191]

The only problem left untouched by these charts is the *passionate heuristic act*. The rest mentioned above appear as reasonable for explaining learning by doing; however, the question about the actual motives for an individual to perform these acts remains inarticulate through these charts. If the individual does not have passion to comprehend provided by the skills acquired in his/her previous experiences, what is the additional part of the structure to

[191] Norberg-Schulz, *Intentions in Architecture*, (1965: 222).

enable this? In other words, what can be the *external support* to help an individual find it meaningful to acquire the skills of comprehension and articulation?

It is evident that in order for a student of architecture to recognize this meaning, s/he has to experience an act of comprehension, the setting for which can be designed and controlled. This is the question about the external support for architectural education; its reasons, motives, and role in the reorganization of a student's knowledge. However, as it is clear in the cycling procedure of the reorganization of knowledge, education in architecture is a personal task and carries on as long as the comprehension of new architectural totalities continues. This is the reason why architectural education is adopted as a continuous task that lasts for an architect's lifetime; and therefore, the improvement of the powers of mind of the architects and architectural education cannot be limited with the school years, or with the help provided by the schools of architecture.

As a time-limited external support for architecture education, the problem of the schools of architecture is to support students on learning how to design as creative act for a new meaning in architecture; or in other words, their due is to support students develop their own means and methods for continuing their self-education. One facet to deal with this problem is about the assumptions for the existing qualifications of the students' personal knowledge, their developed or underdeveloped skills, capabilities, and motives. Another facet is about the means, modes, and amount of articulation that is preferred and used to enable the reorganization of the students' knowledge.

This requires to be discussed through the same taxonomy with the *difficulties and dangers of the responsible act* that threaten the creation of a new meaningful whole, either an architectural totality or the articulation of ideas for approaching the passionate sensibilities of the students of architecture. On designing the appropriate setting for the students to experience the act of comprehension, an *intention to transmit a meaning* is necessary, which requires developed tacit powers that *keep the whole meaningful*, in the stronger sense of their *unspecifiability*. The danger is the students' missing the necessity of meaning when their focus move from this higher purpose to other lower interests. This can be explored with the structure of personal knowledge by discussing how the *subsidiaries* from the students' past learning habits *function* on comprehending what they focus on; and for providing a guide to test whether this function holds the *semantic* aspect of tacit knowing.

Also for the instructors' side, this is a greater responsibility than the issue of a single setting design for student experience. The issue is about a comprehensive meaning in the whole task of course conduction. This meaning is a consequence of the overall viewpoint of that external support about architecture education. If such a viewpoint does not exist, then it is expectable that the effort to practice the act of comprehension might remain meaningless.

These possibilities provide a variety of unstable parameters that hinder a coherent discussion. This is the reason why the tension mentioned in the problem statement of the study is narrowed into the tension between the two subjects of the first year design studio; one pole of which is going to be represented by the *conformist attitudes of the students*; while the other pole is represented by the *attempts of the instructors to emancipate the students*. This tension is expected to trigger the major discussion of this dissertation that is going to be concluded through the selected examplary data.

The following part of the dissertation continues with the criteria of the adopted definition of creative act, on the articulations of intentions and applications to prepare the proper settings for the students to comprehend new meaningful totalities. This is the method of this dissertation the sources, limitations and prospects of which are going to be expanded in the following chapters.

CHAPTER 2

CONTINUOUS REORGANIZATION OF ARCHITECTURAL KNOWLEDGE THROUGH CREATIVE ACT

2.1. The Creative Act as a Means for Architecture Education

The idea of experiencing creative act as a learning instrument makes it necessary to consider the theory of learning through experience. The current discussions on the idea is commonly adopted to date back to Johann Heinrich Pestalozzi,[1] who has shifted the educational aims and procedures of his time to a point where human personality development has gained a primary importance.[2] However, long before Pestalozzi, as Read states, Plato has not only dealt with the idea of learning in action but also learning by artistic experience.[3] Plato has also been referred by Polanyi for the conversation between Meno and Socrates, not only for

[1] "Johann Heinrich Pestalozzi, born , Jan. 12, 1746, Zürich, Switz. died Feb. 17, 1827, Brugg; Swiss educational reformer. Between 1805 and 1825 he directed the Yverdon Institute (near Neuchâtel), which drew pupils and educators (including Friedrich Froebel) from all over Europe. His teaching method emphasized group rather than individual recitation and focused on such participatory activities as drawing, writing, singing, physical exercise, model making, collecting, mapmaking, and field trips. Among his ideas, considered radically innovative at the time, were making allowances for individual differences, grouping students by ability rather than age, and encouraging formal teacher training."

Encyclopædia Britannica Online. 2007. *Pestalozzi, Johann Heinrich*. *Available*: Encyclopædia Britannica Online. ADDRESS: http://www.britannica.com/eb/article-9374994 [Accessed: 14 November 2007].

[2] W. H. Kilpatrick, "Pestalozzi as Educator." *The Education of Man: Aphorisms.* (New York: Greenwood Press, Publishers, 1969: vii – ix).

[3] H. Read. *Education Through Art*, (New York: Pantheon Books, 1956).

displaying the awareness of tacit knowledge; but also for referring to the idea of knowing by discoveries that are made by solving problems.[4]

Friedrich Froebel's philosophy, similar to Pestalozzi, discusses the necessity of learning through experience as personal self-education.[5] In addition, Guilford states that up to the time that his essay "Creativity" was published in 1950, there had been an apparent neglect of the study of creativity. As a commonly cited theorist studying the improvement of creativity in education, he also emphasizes his belief that "creativity and creative productivity extend well beyond the domain of intelligence."[6]

Pestalozzi explains learning through experience as a matter of continuous lifetime learning. States he: "Life shapes us, and the life that shapes us is not a matter of words but of action – it is reality."[7] He also mentions about the struggle with the existing code of rules. In relation to this, he states that,

> … [i]gnorance is better than knowledge that is but prejudice, a glass through which to view the world. To arrive at knowledge slowly, by one's own experience, is better than to learn by rote, in a hurry, facts that other people know, and then glutted with words, to lose one's own free, observant and inquisitive ability to study.[8]

It is evident that he relies on man's personal will as the most valuable decisive authority for his own behaviors. However, he strongly underlines the danger of the personal decision for not to scrutinize but to adopt an external code. Regarding this, states he: "The greatest victory a man can win is victory over himself."[9] This statement of Pestalozzi is directly related with the self-confidence of the students, which when low, disables the courage and belief in the process and a valuable product of outcome on jumping into a problem. This is recalled from Polanyi as one of the basic handicaps on achieving the creative practice.[10]

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[4] Polanyi, *The Tacit Dimension,* (1983: 21).

[5] W. T. Harris, "Editor's Preface." (1970) in F. Froebel. *The Education of Man*, (New York: Augustus M. Kelley, Publishers, 1970: vi).

[6] Guilford, "Creativity." (1950: 445).

[7] Pestalozzi, *The Education of Man: Aphorisms*, (1969: 37) .

Further discussion can be made considering his closeness with Rousseau who is another naturalist.

[8] Pestalozzi, *The Education of Man: Aphorisms*, (1969: 35).

[9] Pestalozzi, *The Education of Man: Aphorisms*, (1969: 13).

[10] See 1.6.3.2. The Difficulties and Dangers of the Responsible Act.

It is also possible to see that Pestalozzi, as an educational reformer, has put emphasis on the students' willing participation in the act of learning. Pestalozzi touches the relation between **heuristic passion** as defined by Polanyi and **play instinct** the features of which may be cited from Huizinga[11]. States he: "Learning is not worn a penny when courage and joy are lost along the way."[12] This statement overlaps wit the idea that the learner must have his/her own individual reason to be in an experience in order to comprehend it wholly.

A small discussion on theory of learning through experience makes it possible to sense the relevance of the personal knowledge theory with the fundamental idea that it possesses. Similarly, the theory of reflection in action and the recent discussions on creative act seem to rely upon the same idea behind the educational shift held by Pestalozzi and his experience based education theory.

2.1.1. Comprehension in Architecture Education

It has been discussed that learning through experience is the fundamental means for the development of architectural knowledge. It is necessary to understand what experiencing in architecture would mean in this respect. On referring back to Polanyi's idea of the act of comprehending a meaningful whole and understanding the particulars that s/he unites in the creative act, it becomes clear that an architectural experience has to be practiced as an act of comprehending the meaning of an existent whole. Polanyi connects the tacit process of comprehension with the process of education that brings human mind into existence.[13] Such an experience may be the comprehension of a work of art, by the meaning of which the architect enlarges his personal knowledge or world.[14] It is important to keep in mind this cognitive value of the act of comprehension.

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[11] J. Huizinga, *HomoLudens: A Study of the Play Element in Culture* (Boston: The Bacon Press, 1955).
A deeper discussion on Huisinga's theory on the play element in human being is going to be made in the fourth chapter, especially for focusing on the play like character of the design activity considered as an instrument for experiential learning.

[12] Pestalozzi, *The Education of Man: Aphorisms*, (1969: 33).

[13] Polanyi, *The Tacit Dimension,* (1983: 45).

[14] Related with this James O. Young states that art has cognitive value, and explores what can be learned through it in J. O. Young. *Art and Knowledge*, (London and New York: Routledge, 2001).

Based on this idea, it is decided to refer to Donald Schön[15], who agrees with Pestalozzi and argues that the design act as a skill can only be learned through experience.[16] The term that Schön uses 'learning by doing' has the same meaning with that of Polanyi's enlarging personal knowledge by the act of comprehension. Schön, also agreeing to John Dewey[17], refers him for his emphasis on learning by the support of experience.[18]

John Dewey had a pragmatist philosophy on art education; however, in relation to Polanyi's and Norberg-Schulz's existential phenomenological point of view, the experiential emphasis of Dewey's educational philosophy appears to be quite relevant with the scope of this study with its concern on learning through experience and the existentialist idea of self-making.[19] It stands helpful for understanding the concept of continuous self-education. Furthermore, although David H. Bell warns about the way approached to Dewey's "pragmatic optimism" about the individual and the society for the concern of architectural education, he agrees to Dewey's ideas about continuous learning as he quotes his statement supporting that education is "a process of living" rather than a "preparation for future living."[20]

Dewey's discussions are a convenient source for understanding the importance of learning through experience as a means for improving the tacit powers. Regarding his definition of

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[15] Donald A. Schön (1930-1997) has developed the theory of Reflective Professional Learning and was influenced by John Dewey.

[16] D. A. Schön. *Educating the Reflective Practitioner*, (San Francisco: John Wiley & Sons, Inc., 1987: 157).

[17] John Dewey: (born Oct. 20, 1859, Burlington, Vt., U.S. — died June 1, 1952, New York, N.Y.) U.S. philosopher and educator who was one of the founders of pragmatism, a pioneer in functional psychology, and a leader of the Progressive movement in U.S. education.

"John Dewey." *Britannica Concise Encyclopedia*, (2007). *Available:* Encyclopædia Britannica; ADDRESS: http://www.britannica.com [Accessed: 12 April 2007].

> Progressive Education: movement that took form in Europe and the United States during the late 19th century as a reaction to the alleged narrowness and formalism of traditional education. One of its main objectives was to educate the "whole child"—that is, to attend to physical and emotional, as well as intellectual, growth. The school was conceived of as a laboratory in which the child was to take an active part—learning through doing.

"progressive education." *Britannica Concise Encyclopedia*, (2007). *Available:* Encyclopædia Britannica; ADDRESS: http://www.britannica.com [Accessed: 12 April 2007].

[18] Schön, *Educating the Reflective Practitioner*, (1987: 16-7).

[19] See the reference for Sartre's opinion about self-making in 2.2 The Concept of Continuous Learning in Architecture, from Sartre, *The Imaginary*, (2004).

[20] D. H. Bell, "Reflection." *Journal of Architectural Education (1984-)* (Association of Collegiate Schools of Architecture, Inc., 41.4, Summer, 1988).

experience as the consequence of " … a transaction taking place between an individual and what, at the time, constitutes his environment …", Dewey argues that it takes place in a "situation," which he defines as an "interplay" between external ("objective"), and internal conditions (1938, p.48).[21] According to Dewey, experience is the adaptation of man to his surroundings and it widens his purposes and allows him to discover new means for even wider purposes. He terms this widening of purposes as "growth," which can be regarded as the growth of man's world remembering what Polanyi discusses for the enlargement of man's world irrevocably. It is apparent that this is the improvement of man's tacit powers.[22]

On the other hand, what Dewey means by "learning to see things" appears to be equivalent to what Polanyi discusses for the act of comprehension. Dewey, like Polanyi, suggests that being a personal act "learning to see things" requires the interaction of the whole personality with the things about what one sees.[23]

The development of what Dewey calls "the whole personality" or what Polanyi calls "man's world" is understood to be a continuous process. As Albert C. Barnes expresses John Dewey's philosophy of education rests on the idea that "the student needs to know … how in the world that his own eyes show him he can discover more and more of what lends color and zest to what he does from day to day."[24] This explains why he asserts the danger of wrong experience as he argues that "not all experience is educative." States he, "… any experience is mis-educative that has the effect of arresting or distorting the growth of personal experience."[25] The narrow sighted, word to word memorization based, formal educational experience is what he addresses to be mis-educative, which makes it evident that what he means by education is very close to the development of creative skills.

In the school years, the student of architecture deals with his/her coach in experiencing design making and the coach supports him/her in the process of experiencing the creative act. On the other hand, the architect deals with other actors and has to act like his/her own coach to have a holistic core idea, believe it to be developable and convince other actors for

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[21] J. Dewey, *Education and Experience* (New York: Simon & Schuster, 1997: 48).

[22] J. Dewey, "Foreword." *Art and Education* (Penna: The Barnes Foundation Press, 1954: 4)

[23] Dewey, "Foreword." (1954: 7).

[24] A. C. Barnes, "John Dewey's Philosophy of Education." *Art and Education* (Penna: The Barnes Foundation Press, 3, 1954: 9).

[25] Dewey, *Education and Experience* (1997: 25).

it. It is evident that such a skill cannot be gathered through the master apprentice relationship within the student's design act in the studio. The reason is apparent as the method for learning is considered as experiential; experiencing architecture without a coach and with others who do not seek a point to reflect on the architect's design act is the task of the practicing architect. This constitutes just a small facet of the big portion of architectural knowledge that is left untouched in the school years. This is why architectural education has to be considered as a continuous process and that one must develop his/her method for learning.

2.1.2. Tacit Knowledge in Architecture Education:

As the dominating principle of the theory of personal knowledge and consequently of this study, it is necessary to refer to the powers of *tacit knowledge* for the concept of personal development of skills in architectural comprehension. It has already been discussed that tacit powers decide the meaning, which adheres the particulars within a whole that is more than the sum of them. The use of tacit powers within the act of comprehension is also dealt by Dewey who supports the idea of seeing things with an interaction of the whole personality with them. This explains that the comprehension of a whole and therefore understanding its particulars within a holistic meaning cannot be possible merely by reaching the available information (explicit data) about the object of experience; because, the act of comprehension necessitates the personal knowledge of his/her previous experiences and feelings.[26]

In the discussion of the powers of tacit knowledge in architecture education, Schön defines tacit knowledge as the gap between description and action; which can be filled by the student's engagement in the act of designing. [27] The term Schön uses for personal knowledge that is dominated by tacit knowledge is "*repertoire,*" which he explains as the "*repertoire* of examples, images, understandings, and actions." According to him, this repertoire of an

[26] A. C. Barnes and V. de Mazia, "Method." *Art and Education* (Penna: The Barnes Foundation Press, 3, 1954: 13-4).

The discussions of Barnes and de Mazia are also based on the same "growth" idea of Dewey.

[27] Schön, *Educating the Reflective Practitioner*, (1987:161).

architect includes "… sites he has seen, buildings he has known, design problems he has encountered, and solutions he has devised …."[28]

Related with this, Sigfried Giedion's emphasis on seminars and discussions, rather than lecturing as he references from his own experiences for architectural education, represents his concern for the internalization of information within the act of comprehension. Giedion asserts that, as an example to this idea, such a learning of proportions in architecture with all of its historical references can be a backbone for the coherence of parts in relation to the whole in the design works of the students.[29]

As pointed out by A. Perez-Gomez, architecture, like other forms of art, is the embodiment of the inexplicable, by what he calls *meaning* similar to Polanyi, without the limitations of any formal language. He states that today although the architects have much information about a vide variety of subjects; they seem to be extremely limited with the knowledge as the normative framework of their *praxis*, which is necessary for *meaningful* architectural solutions that are not purely mechanical.[30]

2.1.3. Aesthetic Experience in Architecture Education

The skills that are expected to be developed for the design act of an architect includes all aspects of the built environment that are used for transmitting a holistic meaning that s/he comprehends starting form the core idea to the selection of the right problem, the heuristic act and production of relevant solutions. These aspects of the buildings are not other than that of the architect's world, by which s/he originates the core idea and the holistic meaning in its comprehension within the being of the work of architecture. These aspects are not only

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[28] Schön, *Educating the Reflective Practitioner*, (1987:67).

Such a definition of tacit knowledge corresponds with what has been discussed for the act of comprehension as the enlargement of man's world with reference to Polanyi's theory of Personal Knowledge. It is important to remember Polanyi's definition of tacit knowledge as basically the inexplicable knowledge that is acquired over a long period of time with the joint weight of personal memories of observations and experiences.

Polanyi, *Knowing and Being: Essays by Michael Polanyi*, (1969: 165).

[29] S. Giedion, "History and the Architect." *Journal of Architectural Education (1947-1974)* (Association of Collegiate Schools of Architecture, Inc., 12.2, Summer, 1957).

[30] A. Perez-Gomez, "Architecture as Embodied Knowledge." *Journal of Architectural Education (1984-)* (Association of Collegiate Schools of Architecture, Inc., 40.2, Jubilee Issue, Winter, 1987: 57).

the functional and material features of the design problems that have to be fulfilled by the architect but also the design of the holistic meaning that is transmitted through the perceivers' experience with them. This design includes the harmonious collection of the aspects of the architect's world, which in its essence aims the aesthetic experience. The architect's world, therefore, should include his/her experiences about the feeling of scale, the feeling of intended movement within the designed space, or other aspects necessary to fulfill the transmission of meaning to the perceiver.

Schön's definition of architecture conveys this idea precisely: "On the one hand … [architecture] … is a utilitarian profession concerned with the functional design and construction of settings for human activity; on the other hand, an art that uses the forms of buildings and the experience of passage through their spaces as media of aesthetic expression."[31]

Dewey states that the meaning that is transmitted by architecture or by another branch of art cannot be expressed as it is in any other tongue.[32] If we consider art and the image transmitted for the consciousness of the meaning of art as a form of explication, we would agree that it is possible to share or transmit the tacit knowledge of the particulars of a comprehensive whole by means of art. Indeed, in architecture, this has to be the case; because, as Dewey would agree it would not be complete architecture without the experience of others than the architect with the work of architecture.[33]

The relation between art and architecture can be reconsidered on the grounds of personal knowledge theory. The heuristic passion and the selective perception through this passion is a skill that an architect has to posses in his/her creative act. Wassily Kandinsky[34] explores

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[31] Schön, *Educating the Reflective Practitioner*, (1987:45).

[32] J. Dewey. *Art as Experience*, (New York: Capricorn Books, G. P. Putnam's Sons, 1958: 106).

[33] Dewey, *Art as Experience*, (1958: 106).

[34] Wassily Kandinsky (*b* Moscov, 22 nov [4 Dec] 1866; *d* Neuilly- sur- Seine, 13 dec. 1944). Russian born painter, printmaker, designer, teacher, and writer, who became a German citizen in 1927 and a French Citizen in 1939, one of the most important figures in the development of abstract art, as a theoreticial as well as practititoner. […] in 1922 he accepted an offer to take up teaching post at the Bauhaus, where he remained until it was closed bythe Nazis in 1933. His painting of this period became more geometrical, but in addition to circles and triangles he used arrow like forms an wavy lines in a manner that ran counter to the typical Bauhaus concern with the geometrical purity (*Swinging*, 1925, Tate, London).

creativity as a kind of making. According to him, the selective perception of the artist in his/her creative work originates from the "principle of internal necessity." He explains that this internal necessity originates from three elements. The first is the artist's demand of expression as the element of personality; the second is the artist being impelled to express the spirit of his/her age as the element of style, and the third is the artist's service for art as the "constant" quintessence of art. He continues that all three elements are harmonized within the inevitable desire to express the artist's *objective* as the "internal necessity".[35] This is the way Kandinsky explains how the artist uses the external form of any particular period as a stepping stone for achieving a development of form, the force of which is gathered by the inner powers of the artist that are the elements of expression and serving for art. Looking at Kandinsky's point of view makes it possible to see the clues that he is also referring to an internal passion which necessitates a meaningful product at the end of the process, which is the 'heuristic passion'.

If the primary medium for the expression of meaning in an architectural work is aesthetics, then the aesthetic perception of an architect is also a skill that has to be improved. Related with this, Barnes and de Mazia explain the basic difference between the artist and the layman; with artists being much more sensitive to the aesthetic possibilities of things. They also add that the "… work of art is … a coherent record of the sensitivity and individuality of [the artist's] perceptions."[36] According to Kandinsky the artist must watch his inner demands of internal necessity as his/her sensitivity and sensibility[37] to transmit through the creative act.

Sensitivity and sensibility is also another feature of the power of tacit knowledge, which also develops with the personal experiences and acts of comprehension through the lifetime of the architect. Sensitivity and sensibility of the architect is an aspect of heuristic passion, which manipulates the tacit powers and skills in a sensitive refinement for the sake of the core idea. It is the feeling that is transmitted through the holistic meaning of the work of architecture,

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I. Chilvers, "Kandinsky, Wassily." *The Oxford Dictionary of Art and Artists*. (New York: Oxford University Press Inc., First ed. 1990, 2009: 321-22).

[35] W. Kandinsky, "The Doctrine of Internal Necessity." *Creativity in the Arts* (New Jersey: Prentice-Hall, Inc., 1964: 51-3).

[36] A. C. Barnes and V. de Mazia, "Learning to See." *Art and Education* (Penna: The Barnes Foundation Press, 3, 1954: 158).

[37] Kandinsky, "The Doctrine of Internal Necessity." (1964: 53).

which enables the consciousness of the meaning that tacitly connects the particulars of a whole. For instance, as Barnes and de Mazia suggest, getting excited as an outward sign of emotion of experience is a kind of a state of becoming conscious.[38]

Understanding the aesthetic properties of an artwork in an act of comprehension is the comprehension of the hedonic value as the meaning is transmitted through these properties. The cognitive value of this act of comprehension of an artwork's meaning is in its expanding personal knowledge and changing the way man sees his/her world irrevocably. Young discusses the value of art and its commonly adopted parameter as aesthetical value. According to him, art has a cognitive value and the merely relativist aesthetic value cannot be the only parameter for understanding it.[39] Young's discussion about this subject shows that considering aesthetics of an artwork as the means for transmitting sensibility and a comprehensive meaning, explains how an art work can be cognitive in terms of transmitting the tacit meaning, which can be internalized and reorganize the personal knowledge of the observer by means of the powers of aesthetic creativity. He explains this situation as the *cognitive* value that is achieved by the *hedonic* value; which he entitles as "aesthetic cognitivism."[40]

It is evident that architectural creativity is not merely a concern of aesthetic creativity, as it can be supposed for other fields of art. Aesthetics in architecture is a problem of a holistic solution of an architectural problem with all the technical, functional and sensual aspects. The deduction derived from this for the heuristic act is that on dealing with all the minor problems of an architectural problem, the architect has to keep his/her sensitivity and incubate the meaning that s/he tends to comprehend within the whole design work.

2.2. The Concept of Continuous Learning in Architecture

Dewey deals with the education of professionals through experience. Regarding the concept of continuity, Dewey defines it as a big fallacy to assume that a person learns only the content of the particular thing he is studying at the time. Indeed s/he learns how to behave with that particular content and its similes in the following experiences as Dewey calls it

[38] Barnes, "Learning to See." (1954).

[39] Young, *Art and Knowledge*, (2001: 114).

[40] Young, *Art and Knowledge*, (2001: 114).

"collateral learning" and argues it to be more important than the given content.[41] States he for the continuity of learning through lifetime:

> What … [an individual] … has learned in the way of knowledge and skill in one situation becomes an instrument of understanding and dealing effectively with the situations which follow. The process goes on as long as life and learning continue.[42]

Parallel to this point of view, the idea of the development of architectural knowledge within practice as a personal act comprises the concept of self-education, which reminds the existential phenomenological ground of Polanyi's discussions. It is apparent that Polanyi holds the idea of self-making in his discussions about the self-educative power of the act of comprehension and its reciprocal relation to the personal knowledge development and the development of skills in the act of comprehension.

2.2.1. Reflection as a Means for Continuous Self-Education

At this point, the acritical nature of tacit knowledge, which disables critical reflection in the sense that explicit knowledge enables, opens up a question about the means for enabling the explicability of tacit knowledge. It should be made clear that the idea of refection in Schön's theory of reflection-in-action is not a direct opposition to the theory of personal knowledge, because it only defends that media should be found to reflect on tacit knowledge on the same assumption as Polanyi makes, that it cannot be reflected in the sense that explicit knowledge can be.[43]

For understanding this question, it is essential to refer how Jean-Paul Sartre makes it clear what it means to reflect. He states about the reflective act as: "The image as image is describable only by a second order act in which the look is turned away from the object and directed at the way in which the object is given."[44] It is understood that in order to reflect on something one has to have an image of it which is formed by his/her own consciousness of it. According to Sartre, the images are the elements of consciousness and we reflect on our

[41] Dewey, *Education and Experience* (1997: 48).

[42] Dewey, *Education and Experience* (1997: 44).

[43] Polanyi, "Understanding Ourselves." (1959: 7).

[44] J. P. Sartre. *The Imaginary*, (New York: Routledge, 2004: 4).

images of our consciousnesses of the objects, but not on the objects themselves.[45] This is highly related with the self-constructed personal knowledge of these objects, which is the result of personal past experiences.

The essence of the image is what is explicated through the image. For the architect, image is an explicatory medium for the core idea. This core idea is what George Howe calls "objective" and "high purpose." States Howe: "…in training and especially in practice we need an objective, a high purpose, to keep the fires of imagination blazing during the slow daily grind of negotiation and production and to light each line drawn and each brick laid with its glow."[46]

Sartre also agrees that the problem of consciousness can only deeply be grasped from the phenomenological point of view. He states that the phenomenological point considers consciousness to the extent that knowledge can be reflective.[47] In line with this, it is understood that the point of Schön is also phenomenological for he constructs his theory of education on the concept of reflection-in-action. Regarding the point of Schön, the reflection of tacit knowledge triggers an argument that would find its scope through looking at the means of reflection. Design experience as a means for reflection-in-action opens up a path for discussing the reflexivity of tacit knowledge as 'knowing-in-action'.

The reflection is not always possible by the verbalization of the tacitly known. As Sartre's idea about the relation between consciousness and imaginary directs, it is possible to think that the design act of the architect is a form of explication, which makes the tacit powers possible to be reflected by the architect. Designing as reflection-in-action makes it possible to scrutinize the personal decisions as well as the powers that enable these decisions. This proves that the architect, with an obligation to improve his/her knowledge, skills and ideas by reflection in action, has to have a certain capacity to explicate his tacit decisive powers.

The design act may be reflected on either by designer him/herself or by a critic. In the case of reflection-in-action as an external support, the problem of inexplicability is also a matter of concern. According to Schön, master and apprentice in the design studio use the language

[45] Sartre, *The Imaginary*, (2004: 57).

[46] G. Howe, "Training for the Practice of Architecture: A Speech Given before the Department in September, 1952." *Perspecta* (Yale School of Architecture, 1, ., Summer, 1952: 4).

[47] Sartre, *The Imaginary*, (2004: 179).

of drawing and talking together for the transmission of ideas, aesthetic insight, meaning and other tacit awareness.[48] States Schön, the communication between the master and the student is not by talking about the design act but through his/her ability to design, and adds: "Words are very poor approximations to visual things."[49]

According to Schön knowing in action is tacit but what is reflected in action appears when an unexpected outcome is achieved by the available means that have been gathered through previous experiences as the 'code of rules'.[50] This can be exemplified by the design act by means of drawing as experiment. Keeping in mind how many sketches and drawings an architect produces for the development and evolution of his/her design work, one can recognize how many times s/he can reflect on the design act, its core idea, and methods of solving its particular problems.[51]

Schön calls reflection on a previous reflection as secondary reflection in action. As he defines it, it is the act of rethinking the ready solutions as "rules, facts, theories, operations," and in Koestler's terms, 'code of rules' when they are not sufficient for transmitting core idea at the end of the design act. Schön states that the task should be to "work back and forth between unit and total." Adds he, such a continuous approach initiates a "ladder of reflection" for the sequence of reflections that develop the design solution as well as the design knowledge.[52] Reflection enables reframing the problem, or in other words, the *core idea*. This reframing yields personal development of new solutions as discoveries, which call for new reflection-in-action.[53]

Another definition of reflection-in-action made by Schön is that it is usually the tacit processes of self-making through practice.[54] Here it is understood that Schön also agrees the incommensurability character of tacit knowledge but argues different than Polanyi that it can be reflected only in action, which may be explained by the decisive characteristic of tacit

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[48] Schön, *Educating the Reflective Practitioner*, (1987: 45).

[49] Schön, *Educating the Reflective Practitioner*, (1987: 96).

[50] Schön, *Educating the Reflective Practitioner*, (1987: 28).

[51] See Appendix A for Cuff's reference concerning 'drawing' as a medium for reflection.

[52] Schön, *Educating the Reflective Practitioner*, (1987: 115).

[53] D. A. Schön. *The Reflective Practitioner: How Professionals Think in Action*, (Vermont, USA: Gower Publishing Company., 1991: 132).

[54] Schön, *Educating the Reflective Practitioner*, (1987: 31-6).

knowledge that dominates the heuristic act. It is quite possible to think that one can be conscious of such a decisive power for the reason that tacit knowledge may vary in the levels of consciousness. In this respect, reflection in action must be possible in the extent that one is conscious about the decisive powers of his/her core idea. In addition, such a consciousness must be concordant to the extent that one is passionate about the solution of the primary design problem. This explains the reason why Schön discusses the patterns of knowing in action with the support of referring to the personal repertoire of past experiences. It is therefore, evident that Schön principally agrees with Polanyi's theory of personal knowledge and more or less bases his discussions on the ideas that are parallel to that of Polanyi.

Indeed, Schön refers to Polanyi on building up his ideas about studio education in architecture by reflection-in-action. His theory about the reflective practitioner is notably relevant with the key idea of this study about exploring the improvement of the creative powers of the students of architecture. He explores the act of knowing-in-action on the same dominating ground as Polanyi's theory, which is tacit knowledge. He applies Polanyi's view on understanding the students' knowledge development.[55] This development is a continually evolving system of implications that evolve by the help of trial-error method, where the error is faced by reflection in action.

As Schön suggests reflection in action is stopping and thinking about the errors on trials, which is a continuous lifetime learning process.[56] Reflection is not merely a consequence of a criticism on the core idea, but it may also result from the architect's relation with his/her client where s/he can manage to be critical about his/her problem.[57] The concept of 'reflective practitioner' means the professional who has improved skills of reflecting on his/her ideas with the help of any impulse touching the meaning of his/her work. According to Schön, reflection in action and improvement of the design skills are cycling from one to another reciprocally, the task of which he calls as "the learning circle."[58] Different than

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[55] Schön, *Educating the Reflective Practitioner*, (1987: 87).

> It is apparent that Schön adopts Polanyi's interpretation of Gestalt ideas: "…the designer must oscillate between the unit and the total." (Schön, 1987: 64) Also states he: "Although a larger design problem can be broken into parts, the total solution is not a sum of the smaller parts." According to Schön the students must experience it in order to understand what a coherence of a design process is (Schön, 1987: 159).

[56] Schön, *Educating the Reflective Practitioner*, (1987: 62).

[57] Schön, *The Reflective Practitioner: How Professionals Think in Action*, (1991: 295).

[58] Schön, *Educating the Reflective Practitioner*, (1987: 165).

Schön, on referring to Polanyi's idea of the enlargement of man's world irrevocably, it might be integrated not as a circle but as a spiraling development of architectural knowledge. Related with this point, Andrew Higgot stresses the need for a long-time working in order to learn how to reflect on his/her ideas, methods of communication, materials of presentation and the like.[59]

This argument has the assumption that design work of an architect is the fundamental educatory tool of him/her to educate him/herself by the artistry of reflection in action. This assumption would legitimate both Schön's emphasis on the role of experience in learning to design and Dewey's emphasis on the power of "learning to see things" in the "growth" of man's mental powers.

It has been explained that the creative act is identified with the selection of the right problem, the heuristic act, and a solution with a new meaning. Creative act in architecture is a form of architectural experience, in which these three aspects are fulfilled. Being an experience, creative act is the primary means for an architect to improve his/her creative skills, for which reflection-in-action is necessary. New and unexpected meanings, which Schön calls as "discoveries," are likely to originate on dealing with a reflection in the design problem and redirect the moves and means to respond these meanings.[60]

2.2.2. The Development of Aesthetic Creativity in Architecture:

The decisive power, being one of the fundamental characteristics of tacit knowledge[61], has the primary role for understanding the creative skills. The development of an architect's decisive powers of mind requires a skill of selective perception that would cooperate with another necessary skill as the aesthetic insight for the act comprehension of a meaningful whole. According to Barnes and de Mazia the "selection" of personal perception from among many qualities of an object is a task, which regards the meanings of these qualities "stored up in our minds by past experience."[62] The necessity of the artist's comprehension of

[59] A. Higgot, "Teaching First Year: What do They *Need* to Know?" *Architectural History and the Studio* (London: Question Press, 1996: 185).

[60] Schön, *Educating the Reflective Practitioner*, (1987: 65).

[61] Polanyi, "The Logic of Affirmation." (1962: 262).

[62] Barnes, "Method." (1954:14).

a new meaning as a single coherent design about the "truth of the world" is also emphasized by Buermeyer, for explaining creativity in art. This single coherent design is the reworking of the "forms" that are selected by the artist, tacitly decided to be put for the sake of the new comprehensive meaning, from within the vast number of forms given in experience.[63]

Barnes and de Mazia also explain perception as a process of reconstruction. It is evident that they express experience also as a form of perception where an actual experience of personal energy and effort through a heuristic passion, is of concern. Regarding the skill of selective perception, the fundamental essentiality of the act of comprehension, which they call "learning to see," is the knowledge of what to look for and how to interpret it.[64]

Regarding the skill of aesthetic unification of particulars within a meaningful whole, Dewey makes an equivalent connection with the mind of a scientist and the mind of an artist as Polanyi does. Both Dewey and Polanyi emphasize the experiential growth of man's mind by building up his/her personal knowledge. The connection is clearer as Dewey states:

> As to the scientist, knowledge is a means to more knowledge [the personal knowledge development as enlarging the scientist's world is a continuing process], so to the artist aesthetic insight is means for further aesthetic insight [the act of comprehension enlarges personal powers of mind where the production of an aesthetical work of art is an act of comprehension], and not merely to the enhancement of life in general.[65]

He discusses fine art as a medium for the improvement of personal aesthetic insight. According to him, it functions as a "… device in experimentation carried on for the sake of education."[66]

Again very similar to Polanyi, Dewey slightly refers to the main argument of this study about the improvement of creativity with an emphasis on engendering a new meaning within experiential learning. According to him, this kind of education also provides objects, insights, and perceptions, which "sharpen our vision for new and unforeseen embodiments of

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[63] L. Buermeyer, "Art as Creative." *Art and Education* (Penna: The Barnes Foundation Press, 3, 1954: 58).

[64] Barnes, "Learning to See." (1954: 150-9).

[65] J. Dewey, "Experience, Nature and Art." *Art and Education* (Penna: The Barnes Foundation Press, 3, 1954: 29).

[66] Dewey, "Experience, Nature and Art." (1954: 31).

the truth they convey", the "magic" of which lies in itself as the "… revelation of meaning in the old effected by its presentation of the new."[67]

The act of comprehension as perception is also categorized by Barnes, in which the personal approach to a new meaning is expected. The difference between recognition and perception, is the difference between the static refreshment one's memory and "… to grow in experience by increasing the value of what one already knows through perception of new relations and values."[68] M. S. Larson also explains architectural profession, at the center of which "…there is Art, Architecture, Immortality; away from the center there is service, building, business …."[69] By this expression, it is understood that Larson also agrees with discourse that the focal concentration of the profession should be on the newly created meaning of the whole while the rest is subsidiary for it.

2.2.3. Criticism as Reflection-in-Action for Improving Architectural Creativity

Criticism is a form of reflection; as Dewey explains, it is judgment, both ideally and etymologically.[70] Discussion on criticism would enable to understand why the explication of the decisive powers in the act of creation is important; since, criticism and judgment needs a parameter to evaluate the work of architecture, which can only be derived with this explication. According to Dewey no standard for art criticism can exist, which would not cause any confusion, because it is not a matter of measurement but a matter of judgment by the artworks own parameters that can only be derived from itself. Remembering the incommensurability characteristic of tacit knowledge it is reasonable that the designer should be able to look into himself and explicate at least some of the decisive factors in order to criticize him/herself and reflect on what s/he has done. Agreeing to these ideas, Dewey suggests that criticism cannot be merely impressionistic, because criticism can only be

[67] Dewey, "Experience, Nature and Art." (1954: 31).

[68] A. C. Barnes, "The Problem of Appreciation." *Art and Education* (penna: The Barnes Foundation Press, 3, 1954).

[69] M. S. Larson. *Behind the Postmodern Facade: Architectural Change in Late Twentieth-Century America*, (Berkeley, Los Angeles and London: University of California Press, 1993: 8).

[70] Dewey, *Art as Experience*, (1958: 298).

possible by experiencing the work of art, which is the comprehension of the meaning within it. [71]

It has already been discussed that a theory that is based on the idea that "tacit knowledge is the dominant principle of all knowledge" has also a dominant principle that the development of personal knowledge is a personal act that can be 'coached' only, by external support. As G. Goldschmidt would also agree[72], instruction in architectural education for the design phase can be possible for the methods of developing an internalized architectural program, the methods to involve the personal priorities in the design act, which are all explicable information in a sense; however, instruction for identifying a meaningful independent idea has no means explicable in this sense.

The idea of learning through experience and through the act of comprehension has been discussed to be the only means to enlarge man's world irrevocably. This enlargement includes irrevocable transformations in his/her ways of looking at the world, behavior patterns in addition to the irrevocable transformation in his knowledge and skills. From this point of view, a coach's due is expected to be providing the necessary conditions for the students' experiencing the creative act, if the objective is to make the students improve their skills. According to Schön the coaches' role is "… demonstrating, advising, questioning, and criticizing …." [73]

2.2.3.1. Destructive Coaching for the Development of Creative Skills:

Remembering the discussion about the difficulties and dangers of the responsible act, the unquestioned adoption of existing standards or rules for design could be the most dangerous act of collapsing the meaning of an intended comprehensive whole. According to Vincent Tomas, creativity of an artist cannot be attained by obeying certain rules and has to achieve a novel existence. He argues that the artist has to originate his own implicit rules in order to originate something and be creative.[74] These rules can be discovered and explicated later by

[71] Dewey, *Art as Experience*, (1958: 307-9).

[72] G. Goldschmidt, "Doing Design, Making Architecture." *JAE* (Association of Collegiate Schools of Architecture, Inc., 37.1, Autumn, 1983).

[73] Schön, *Educating the Reflective Practitioner*, (1987:38).

[74] V. Tomas, "Creativity in Art." *Creativity in the Arts* (New Jersey: Prentice-Hall, Inc., 1964: 98).

the author or by the critics; however, after becoming explicated their only potential is to become prescriptive rules for the following works of art that would cause imitation and obstruct the creative potential in them. Tomas reminds that this does not mean that every thing that is different or novel is creative; because it may lack coherence as a whole that unites the particulars with a comprehensive meaning.

According to Dewey, "the matter of aesthetic criticism is the perception of aesthetic objects." If criticism in architecture has a matter of perceiving the architectural work, the explication of the designer should be his/her design work that ends up with an aesthetic work of architecture. States he, the parameter for aesthetic criticism can borrow from external partisan movements, the critics' personal interests for authority and for honorable appraisal; however, when judicial decision has a basis of general rules that can be applied to all cases, similar to Tomas and Polanyi, Dewey argues that such an attitude of the critics encourages imitation. [75] Related to this argument states Dewey: "If the artist is numb and if he does not impregnate some immediate impression with meanings from a prior rich founded experience, his product is meager and its form is mechanical. The case is not otherwise with a critic."[76] Moreover, as Cuff suggests, "… criticism is sometimes leveled without much apparent regard for the student's growth, as educators and renowned practitioners parade their own talent verbally."[77]

Another thing that the critic must avoid is imposing his own ideas to the designer unless he is the designer himself. Concordant to this, Dewey suggests, "… that the critic must discover some unifying strand of pattern running through all details does not signify that he must himself produce an integral whole." He is different from the artist because he does not have the same tacit powers and sensitivity for the whole as the criticized work's author. As Dewey expresses it would not be a criticism but a work of art if the critic created an integral whole by his own.[78] Likewise, as Schön states, the coach must be prepared not to impose his/her own ideas to the student. S/he must allow the student to find the core idea, develop a

[75] Dewey, *Art as Experience*, (1958: 298-301).

[76] Dewey, *Art as Experience*, (1958: 305).

[77] D. Cuff. *Architecture: The Story of Practice*, (Massachusetts: MIT Press, 1991: 126).

[78] Dewey, *Art as Experience*, (1958: 314).

heuristic passion, be able to reflect on his/her design act, and face his/her own challenge and confrontations.[79]

Moreover, a work of art may include more than one unifying idea some of which can be discovered by the critics although they cannot be verbally explicated by the author of that work of art. The articulation hidden within the work of art has a potential to be reflected by a critic. This needs a prevention of a reductive fallacy of the critic, which disables him/her to see the whole and focus on certain details of a work of art by loosing the sense of the whole. This is more like separating the technique from form in an artwork or the solution of functional needs from the aesthetical concerns in a work of architecture.[80]

2.2.3.2. Constructive Coaching for the Development of Creative Skills:

Having detected the destructive possibilities of coaching the creative skills it is important to examine the aspects of constructive coaching. In most of the sources of information about this issue in the literature, the ideal behavior of a creativity coach is expressed as his/her own self-reflection in action. In other words it is a common assertion that a critic, a support, or a coach should have the characters of an action researcher in his/her own field. For example as Dewey discusses, the masters themselves who support the designer, should have an insight of an apprentice who has the need to improve his/her powers of perception and enlarge his/her personal experience.[81] Like the architect, the critic also has things to learn from the communication between the architect that he criticizes and himself. He has to reflect on the conversation and judge himself for being able to reflect on the architect's act of designing. Similarly, as Schön states, the master in the architectural studio has to reflect on the theory-in-action s/he brings to the interaction between the student and him/herself.[82]

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[79] Schön, *Educating the Reflective Practitioner*, (1987: 125).

[80] Further references about the negative role of the critic or coach in the development of creative skills:

Buermeyer, Laurence. Mar.,1927. "The AEsthetic Experience." *The Philosophical Review.* Vol. 36 (2) pp: 199-200.

Schütze, Martin. 1933. *Academic Illusions in the Field of Letters and the Arts: A Survey, a Criticism, a New Approach, and a Comprehensive Plan for Reorganizing the Study of Letters and Arts*. Chicago: The University of Chicago Press.

[81] Dewey, *Art as Experience*, (1958: 301).

[82] Schön, *Educating the Reflective Practitioner*, (1987: 142).

The creative criticism necessitates an insight that would allow the critic to see the hidden potentials in the totality of a work of architecture. Related with this, Cuff states that "… the best critics find avenues for constructive instruction that focuses on the crux of the problem and the student's present solution, but this is a difficult art."[83] Seeing the primary problem of a designer and putting creative extensive ideas on it should be the primary concern of a critic, who aims to make clear the holistic meaning of a work of architecture to the designer in the design process and to the audience who perceive a completed design work. In order to do this, the critic must also have a mature tacit knowledge and enough experiences of comprehension of artworks within their totalities. As Dewey suggests the sensitivity of a critic lies in his experience with the acquaintance with the masterpieces and with less than masterpieces. [84]

According to Dewey, a critic's "…task is to convert [his predilection for the very existence of individuality (as in the artists)] into an organ of sensitive perception and intelligent insight…" A critical judgment must provide the deepening of the experience of a work of art in other people; they have to add enlarged meanings to the thing perceived, they have to show how a work of art can enlarge one's world by experiencing it. Dewey states that "… [t]he function of criticism is the reëducation of perception of works of art; it is an auxiliary process, a difficult process of learning to see and hear." [85] Regarding this he further states that, "[t]he most important attitude that can be formed is that of desire to go on learning."[86]

2.2.3.3. Self-Criticism:

When the ideas of Schön and Dewey are considered, it is understood that reflection is an instant of looking back at what the architect has started with, on a point where he is stuck with indecisiveness about the problem of comprehending a holistic meaning within the design act. Such a task may either be the architect's own reflection on his action or an external support from a critic as directly from a critic (a coach) who is interested in his work,

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[83] Cuff, *Architecture: The Story of Practice*, (1991: 126).

This is also what Schön would agree for a master in the design studio.

[84] Dewey, *Art as Experience*, (1958: 310-11).

[85] Dewey, *Art as Experience*, (1958: 324).

[86] Dewey, *Education and Experience,* (1997: 48).

or from another connection that would light a bulb in his/her mind.[87] Related with this, Goldschmidt states about the importance of group critics in architectural design studio education, for the reason that it forces the students to deal with and assess differences of opinion, and enables them to reflect on their own interpretations of the same material program.[88]

Whatever the impulses are for enabling the architect to reflect on his/her own work the actual reflection that proceeds from the design act is his/her own.[89] Reflection appears to be a criticism of one's own on his/her action. This means that the above discussions about coaching the design act are primarily concerning the designer himself, because in order to reflect on his/her work, s/he must be the coach and critic of his/her own.[90]

The architect's reflection on his work includes both criticizing himself for reflection in action and taking the advantage of others' criticisms, which is the fundamental need of collaborative learning.[91] Related with this Dewey suggests that "The individual who has enlarged and quickened his experience [improved his/her tacit powers] is one who should make for himself his own appraisal. The way to help him is through the expansion of his own experience by the work of art to which criticism is subsidiary."[92]

One important aspect of continuous self-education by means of creative act is the responsible act. The students must articulate their responsibilities in order to reflect on them. This is

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[87] This is also related with the development of the skill to derive a personal benefit from the ongoing discussions that are held in the studio. This can be exemplified by a student's ability to learn form the crit of another student.

[88] G. Goldschmidt, "Doing Design, Making Architecture." (Autumn, 1983).

[89] Related with this, Nicol and Pilling state that "[a]t the very least, students should be helped to develop and understanding and ownership of the criteria and standards against which their work will be judged. This would enable them to direct their own learning and to work knowingly in directions that will be valued by tutors."

> D. Nicol and S. Pilling, "Architectural Education and the Profession: Preparing for the Future." *Changing Architectural Education: Towards a New Professionalism* (London and New York: Spon Press, 1, 2000: 12).

[90] In agreement to this states Schön: "The work of the practicum is accomplished through some combination of the student's learning by doing, her interactions with coaches and fellow students and a more diffuse process of 'background learning'."

> Schön, *Educating the Reflective Practitioner*, (1987:38).

[91] R. White, "The Student-led 'Crit' as a Learning Device." *Changing Architectural Education: Towards a New Professionalism* (London and New York: Spon Press, 2000: 219).

[92] Dewey, *Art as Experience*, (1958: 324).

highly different from being able to take the responsibility of ones own decisions although related with it. It seems reasonable to think that the student can obtain this ability to the extent that s/he can reflect on his/her own decisions and the feeling of responsibility that is lying beneath these decisions. Dewey expresses that it is a painstaking process to eliminate prejudices, preconceptions in order to comprehend the essential meaning of a whole; a work of art.[93] The ability to go beyond the current and dominating conceptions or for the case of the architecture student's education, their unquestioned adoptions and unnecessary responsibilities that hinder their productivity of ideas and personal means for creative processes, necessitates a heuristic passion. Bilgi Denel also agrees that the architecture student should learn how to take the responsibility of his/her own choices as an individual by means of knowing how to ask the right questions[94], which has been discussed as the selection of the core idea that leads the heuristic passion. According to Hofer et al., "self knowledge" has a major part for motivating oneself. This concept has been identified as part of the reorganization of knowledge with reference to Plato in the introductory sentences of this study. As Hofer et al. claim, being aware of the personal strengths and weaknesses is an important aspect of self-reflective practice in learning.[95] This motivation must also be what convinces the student for his/her self criticism.

In this sense, what Schön calls as "self evaluation," which corresponds to Polanyian "responsible act," is separated as occurring in a threefold way; self judgment by (feeling responsible for) the normative design domains; self judgment in terms of the conformity set up by earlier moves (code of rules); and the responsibility for the new creative potentials of the new problems. Jumping into a problem necessitates a "willing suspension of disbelief" in the existing code of rules as Schön calls it.[96]

A need to jump into any problem freely is a skill that a designer has to develop. According to Schön, there can be no questioning of the first two kinds of responsibilities that he has

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[93] Dewey, *Art as Experience*, (1958: 248).

[94] B. Denel, "Temel Tasarım ve Değişim." *Temel Tasarım/Temel Eğitim* (Ankara: METU Faculty of Architecture Press, 1998: 50-51).

[95] Hofer, et al. "Teaching College Students to be Self-Regulated Learners," (1998: 69).

[96] For this phrase Schön refers to the faculty member (Quist) that he has interviewed with concerning his expectations from the students.

Schön, *Educating the Reflective Practitioner*, (1987:94).

mentioned about; if there can be no freethinking.[97] The architect has to feel free to challenge his/her core idea and have enough courage to jump into a change in it. The core idea defines an outline for the architect to build up his study on the design problem. The point is that s/he has to be able to open this outline later with the transformed knowledge of his/her experience with it. This is also how Schön defines his observations about the expectations from a student in the design studio. As he states this is possible by holding the ideas loosely in a kind of "disciplined freedom."[98] The heuristic passion in this sense is not a sense of being conditioned to the core idea but for the bigger scale, it also necessitates a sense of passion to select the right problem. Etienne Gilson's statement explains the relation between this freedom from ones own personal choices (values, strategies, assumptions) and creativity: "creativity is liberty."[99]

Being defensive for the core idea is a problem especially for the obstruction of this liberty. Concerning creativity, Young mentions about the dangers of the responsibilities for the guidelines and he adds that it may be overcome only if the guidelines are kept flexible and the artist lets him/herself experiment.[100] This danger is also a consequence of not being able to leave the initial core idea, holding it tightly instead of loosely. The criticism that the architect expects would therefore become only the approval of his/her ideas. This obstructs the need for reflection in action, which, as Schön means it, a must for designing.[101] This can also be explained by the responsible act, which primarily keeps the responsibility for the self-protection against being dishonored, humiliated and the like. The danger for the student of architecture is the feeling of being in a battle with the studio instructors that may continue

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[97] Schön, *Educating the Reflective Practitioner*, (1987: 63).

[98] Schön, *Educating the Reflective Practitioner*, (1987: 124-5).

[99] E. Gilson, "Creation - Artistic, Natural, and Divine." *Creativity in the Arts* (New Jersey: Prentice-Hall, Inc., 1964).

[100] Young, *Art and Knowledge*, (2001: 17).

> James O. Young, on discussing the relation between art and knowledge also takes the responsibilities for certain standards, which he calls "guidelines" into consideration. He discusses that the guidelines of the 16th century could not have accepted the Fountain of Duchamp as an artwork for the reason that it does not fulfill the functions of the guidelines of art of that time. He adds that there are still guidelines for art for the time being. What has changed from the 16th century to now, is the flexibility or the adoption of the variety of guidelines. What stays the same is the approach of the art world that it still needs reasons to change the existing guidelines with a new set of guidelines.
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> Young, *Art and Knowledge*, (2001: 10-16).

[101] Schön, *Educating the Reflective Practitioner*, (1987: 130-4).

to affect his/her future learning through lifetime. This is indeed a fear of being noticed with one's incompatibilities and lack of confidence, and a part of the personal lower purposes that endanger the higher purpose of achieving a holistic meaning of the design process.[102]

Schön has analyzed the possible tacit powers of the participants of the communication within the desk criticisms. For example, he has supposed some reasons behind the explicated words in that communication, as the "real" thoughts of the instructor or the student. The important thing is that he speaks too much about the defensive nature of man in a sense of unilateral self-protection in a win/lose world. He adds that this defensive nature of man "inhibits the reflection – and therefore learning – in several levels". [103]

[102] Dewey also emphasizes the same danger as Polanyi for what he calls as "growth" and what has been discussed up to now as the improvement of tacit powers. He states that "every one sided experience upon routine and mechanical habit is such an enemy of 'growth'." This enemy is the equivalent of what Polanyi discusses as the difficulties and dangers of the responsible act; primarily the responsibility for the existing 'code of rules'. Similar to Polanyi, Dewey argues that the main danger is the lack of a high purpose or a meaning in what is expressed.

Dewey, "Foreword." (1954: 4).

[103] An example of such an analysis can be found in: Schön, *Educating the Reflective Practitioner*, (1987: 135-6).

CHAPTER 3

THE FIRST YEAR ARCHITECTURE EDUCATION AS A 'TRANSITION PERIOD' TOWARDS CREATIVE ACT

3.1. The Role of Educational Institutions in Architecture Education

After dealing with Polanyi's theory, a very significant aspect of architecture education is adopted to be about the architect's continuous **self-making** with the irrevocable enlargement of his/her world through experiences. Since architectural knowledge is primarily acquired through experiences, studying the development of architectural knowledge and therefore creative skills needs to adopt that being an architect necessitates a **self-education** through experiences. Türel Saranlı points that architectural education is a period, which supports the students on building up their own identities including the way they think and approach to the problems that they are expected to produce themselves.[1]

This corresponds to the idea that the personal knowledge development as the self-making of the architects is a personal act and continues for a lifetime, which can only be supported or coached externally. Self-making of a man as an architect is usually accepted as starting with the first year design studio, but this is not the necessary case. Learning how to comprehend the meaning of an architectural entity may not necessarily start with the first-year of institutional education in architecture. The argument is that the external supports for self-education are fruitful to the extent that the learner internalizes them or finds a way proper to be involved within the conditions that are readily given. It is necessary to understand the concept of 'continuity of self-education'; because, the institutional education programs are only short periods within the lifetime of the architect, in which architectural coaching begins.

[1] T. Saranlı, "Başlangıçtan Bugüne Temel Tasarım." *Temel Tasarım/Temel Eğitim* (Ankara: METU Faculty of Architecture Press, 1998: 40).

Gropius makes it clear that learning how to comprehend architectural totalities is a continuous lifetime process:

> The teaching of a method of approach is more important than the teaching of skills. It should be a continuing process, which must grow concentrically like the annual rings of a tree. In all its stages, the scope should be all-embracing instead of sectional, increasing slowly in intensity and detail in all fields of discipline simultaneously. The integration of the whole range of knowledge and experience is of the greatest importance right from the start; only then will the totality of aspect make sense in the student's mind. He will easily absorb all further details and place them where they belong if he progresses from the whole to the details, and not vice versa.[2]

In architecture education, it is not reasonable that the instructors have an explicit method, by which students can develop their personal knowledge in connection to their own personal past experiences and tacit knowledge that was acquired through them. It is not possible for an instructor to teach a student an explicit method to internalize information within an experience; the development of this method is a personal act. Therefore, architectural learning is a personal act, and architectural knowledge cannot be taught but the students can be couched for its development. This thesis regards architecture education as a self-conducted personal act and institutional education as a time limited external support for it.

With a supportive quotation from L. Tolstoy, Schön also states that each student must have a unique form of learning method. It is possible to argue that the development of personal learning method is a ground for the continuous self-education of the architect.[3] Referring to Schön, it is understood that also this development is a lifetime process, as each time the architect reflects on his work and design act s/he develops both his/her method of learning and personal knowledge.

Relevantly, Duncan Philip[4] states that architectural knowledge is the knowledge of doing and making. This is how he explains that architectural learning is a lifetime process, which

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[2] W. Gropius. *Scope of Total Architecture*, Ed. R. N. Anshen, (New York and Evanston: Harper & Row, Publishers, 1955: 45-6).

[3] Schön emphasizes that the reflection in action as the moment of learning by doing necessitates that the students "develop new rules and methods of their own." The coaches' role on this task is to emphasize "indeterminate zones of practice and reflective conversations with the materials of a situation."

Schön, *Educating the Reflective Practitioner*, (1987: 39-40).

[4] Duncan Philip, Architect, Western Australia.

actually starts after graduation. This claim of him is grounded on the argument that the actual acquirement of architectural knowledge can only be possible by the practice with the material world. States he: "The most important issue in the de-schooling constellation of ideas is the concept of education as a life experience, integrated into the reality of practical work - a concept understood by all diligent practicing architects." [5]

Schön identifies three ways of learning by reflection-in-action that is enlarging one's world and improving tacit knowledge. These are learning by oneself; learning by apprenticeship from a master; and within a practicum, which is "… a setting designed for the task of learning a practice" as the architectural studio.[6] Learning within a practicum is something in between learning by oneself and by apprenticeship; however, has further aspects because it both enables the student to put his own problem, enlarge his own knowing in action by personal reflection and coaches the student for noticing on which point to reflect. Institutional education can be considered as the provision of the proper practicum for the students of architecture to develop their own methods for self-education. Schön puts it clearer how tacit knowledge expands and functions in learning in action. Sates he; within the learning in action the main task is "… learning by exposure and immersion, *background* learning, [which] often proceeds without conscious awareness, although a student may become aware of it later on, as he moves into a different setting."[7]

It is evident that in architectural education, the student does not know what s/he needs to learn and there is no way to discover it other than experiencing a heuristic act of design to understand it. Related with this, Schön states that architectural learning is a personal act, which is only possible by the student's educating him/herself and adds that the instructors,

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[5] D. Philip, "De-Schooling Architecture." *Journal of Architectural Education (1984-)* (Association of Collegiate Schools of Architecture, Inc., 42.1, Autumn, 1988: 59).

> According to him the de-schooling of architectural education is based on three components which should receive further attention: "the idea of education as a lifelong experience, during which a range of knowledge and skills are appropriated by the student; the ineffectiveness of building-less architectural learning; and the transfer of values which are more appropriate in a world of increasing information networking, increasing challenge to authority, increasing self-help and participatory decision-making."

[6] :Schön, *Educating the Reflective Practitioner*, (1987:37,43).

[7] Schön, *Educating the Reflective Practitioner*, (1987:38).

who are in fact design coaches, also cannot convey him/her the meaning of architectural design thinking until s/he experiences it him/herself.[8]

Based on Schön's arguments on the creative design skill development, it is possible to derive features that make the design skill learnable and the design process coachable; but not teachable. One of those features asserts "… skillful designing is a kind of knowing in action …," which apparently includes tacit knowledge. Another feature that Schön depicts is that "… designing is a holistic skill …," which means that all the design act must be practiced by the one who has the skill to keep the image of the whole, while concentrating on its particulars. This is highly related with the characteristic of tacit knowledge that is its keeping the particulars meaningful within a comprehensive whole.[9] One other feature of the skilful design act is its dependency "… on a designer's ability to recognize and appreciate desirable or undesirable design qualities …," which is directly related with the decisive power of tact knowledge[10] that has to have been developed within the design skill. Another feature of the design process asserts that, "… the description of one's own knowing-in-action is itself a skill …," which corresponds to the theory of reflection-in-action that is the only means for converting tacit knowledge into commensurable knowledge. And one other feature of the design skill and design process asserts that "… designing is a creative activity …," which corresponds to the idea that a skilful design act has to have a core idea as a personally selected original problem, a heuristic act with a heuristic passion and a solution as a comprehensive entity that transmits a new meaning.[11] The relation of these features with the characteristics of tacit knowledge makes it evident that Schön also addresses the development of the tacit powers of a designers mind.

Related with this, George Howe asserts that a University should function "…to set the student on the way to self-education, which is a life-work never ended…" and its task should be "…to fertilize imagination with experience and experience with imagination."[12] This is the cycling development of creative skills through the experience of creative act. The question is the evolving idea of university in architecture education until this assertion is

[8] Schön, *Educating the Reflective Practitioner*, (1987:93).

[9] Polanyi, "Knowing Life." (1962: 380).

[10] Polanyi, "The Logic of Affirmation." (1962: 262).

[11] Schön, *Educating the Reflective Practitioner*, (1987: 158-60).

[12] G. Howe, "Training for the Practice of Architecture: A Speech Given before the Department in September, 1952." (., Summer, 1952: 5).

achieved. It is also a question about the evolution of the idea of self-education in architecture. The following section is a brief exploration about this concern.

3.1.1. Transformations within the Institutional Education of Architecture in the Post-Industrialized Society

In order to understand today's paradigm for architecture education it is necessary to discuss the changing views and adopted principles for approaching it. Kimbell et. al. state that the design theory has evolved as the society moved from the industrial to post-industrial and from modern to post modern. According to them the opportunist designers' rationalist view of their role on the society in the modernist era are replaced by individualized values considering the relationship between the object and the user.[13] This relationship has been discussed within the act of comprehension, which is in essence a creative act. On discussing the "changing role of art education," Peter Green suggests that the art educators' responsibilities should be redefined in accordance with the rapidly changing mass industrial society. Adds he, this redefinition should be focusing on the creative and critical education of vision, the center of which should be "the process of problem solving".[14] This expression is relevant with the idea of learning how to learn from problems rather than prescribed rules of codes, in order to have the courage to jump into new ones. Similarly, Dewey criticizes the approach in what he calls as the traditional school. According to Dewey, in the traditional school the subject matter consists of "organized bodies of information and prepared forms of skill" that are explicit outcomes of some past experience, that is not related with the situation in which the student is. States Dewey that the primary concern of the traditional school is to transmit these to the new generation. He also identifies the traditional school with the approach of the educators with "… developed standards and rules of conduct."[15]

Regarding the changing needs of design education, as George Shield states, the creative act is not only necessary for the designers but also should be a part of the everyday life with regards to the changing needs of contemporary society and conditions of the contemporary

[13] R. Kimbell, J. Saxton, and S. Miller, "Distinctive Skills and Implicit Practices." *Teaching and Learning Design and Technology: A Guide to Recent Research and Its Applications* (London and New York: Continuum, 2000: 117).

[14] P. Green. *Design Education: Problem Solving and Visual Experience*, (London: B T Batsford Limited, 1974: 11-12).

[15] Dewey, *Experience and Education*, (1997: 18).

life. States he, "… life skills such as problem solving and thinking skills, the ability to work in teams, the fostering of self-confidence and similar ephemeral qualities are today heralded as essential for modern life."[16]

According to Bilgi Denel's research outcomes on the brief historical analysis of the education of creativity, 1950's constitute a turning point for the understanding of the possibility and necessity of teaching and assessing creativity for people from all ages and all professions. This confirmation proves the accordance of the personal knowledge theory and the changing needs of the post-industrial era. He states that creativity necessitates an individual intellectual background, which can be acquired through experience. According to him, only in the 1970's there has been a movement in the architectural education understanding in the World towards the importance of self-determined improvement of personal creativity especially with the adoption of the book *The Universal Treveller* by Koberg[17], which is "a guide to creative problem-solving and clear thinking" adopting that these are the guarantee for success.[18] It is important to note that the book is designed as a guide for creative act especially for the design students, and adopts the idea of reflection-in-action, in all the problem selection, idea-selection, and implementation processes of the design act.[19] However, in 1981, Denel has argued that the application of such systems of the introduction of the creative act to architecture students, as Koberg's book offers, was totally lacking in Turkey.[20]

As John Steers cites from the *National Curriculum Design and Technology Working Group – Interim Report*, which is the collected reports of a meeting of Design Education Forum held in England in 1988, it is understood that the intention was to give emphasis on "… primary education, … the importance of creativity, intuition and drawing in the design

[16] G. Shield, "Researching the Art of Good Teaching in Design and Technology." *Teaching and Learning Design and Technology: A Guide to Recent Research and Its Applications* (London and New York: Continuum, 2000: 45).

[17] B. Denel. *Temel Tasarım ve Yaratıcılık*, (Ankara: ODTÜ Mimarlık Fakültesi, 1981: 12-14).

[18] D. Koberg and J. Bagnall. *The Universal Traveler: A Soft Systems Guide to Creativity, Problem-Solving and the Process of Researching Goals*, (Menlo Park, CA: Crisp Publications, 2003: 2).

[19] Koberg, *The Universal Traveler: A Soft Systems Guide to Creativity, Problem-Solving and the Process of Researching Goals*, (2003: 78-80).

[20] Denel, *Temel Tasarım ve Yaratıcılık*, (1981: 14)

process … ."[21] He states that in the final report of the meeting, "… greater emphasis on creativity, curiosity, imagination and the aesthetic dimension …" has been determined as a point of further consideration for the national curriculum in design and technology education. It is also noteworthy to mention that the report has considered the "element of intuition," which is understood to be the tacit dimension, as an important portion of the process from the ideas to tangible designs. However, it is also visible that this emphasis has also been assigned to further discussions and studies.[22]

3.1.2. The Potential of Institutional Architecture Education

The institutional education in general, has been dealt with a critical approach for many fields and for architecture education. The main concern of the criticism is about the lack of an attempt to encourage students to develop their personal methods for learning. In this respect, Dewey criticizes the conformist attitude of educational institutions for imposing the facts and principles "learned" in isolation and obstructing a "never ending voyage of discovery."[23]

Similarly, Duncan Philip criticizes the condition of today's institutionalized schools of architecture for discouraging the student on taking responsibility for their own learning. He states that the students' appropriations of the formal teachings to their own works are neither sufficiently cared in universities nor by the students themselves. He adds that knowledge of space that is unique to each person cannot merely be learned by means of mechanical information about the act of building. [24]

Schön interprets the problems of the positivist epistemology with architectural knowledge. He states that it rests on three dichotomies as the separation of means from ends; separation of research from practice; and separation of knowing from doing, which cannot be matter of concern for architectural practice.[25] Concerned with this, Perez-Gomez argues that in architectural education rather than a reduced teaching consisted only of formulae or styles,

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[21] J. Steers, "Design and Technology in the National Curriculum: First Steps." *Issues in Design Education* (Essex: Longman Group UK Limited, 1990: 3).

[22] Steers, "Design and Technology in the National Curriculum: First Steps." (1990: 5).

[23] J. Dewey. *Art and Education*, (2007).

[24] D. Philip, "De-Schooling Architecture." (Autumn, 1988: 58).

[25] Schön, *Educating the Reflective Practitioner*, (1987: 78).

which uselessly pretends that a student magically “synthesizes” them; the architectural educators should “… point the way towards a meaningful synthesis …”, which necessitates “… asking the right questions at the right time.”[26]

As Philip also states the issue of limited demand of the students for freedom is another problem related with the expected standards from universities as teaching institutions. This may be related to another argument that Philip makes concerning the learning habits of students that they continue from their learning training in high-schools under the pressure of curriculum and examination.[27] Although Philip does not mention, the pressure would certainly involve the students’ grade fright, which takes the curriculum to primary importance for them and carry the responsibility for self-education to the lowest level. Similarly, If the comparison is made with the criterion of changing educational strategies, what Hofer et al. suggest for the transition from high school to college can be considered as parallel for the case in the transition form high school to university. As they state, "[e]ven with the disequilibrium of often receiving lower grades in college in comparison to high school, college students may not believe they need to change their strategies for learning." They explain the reason for this congestion with the difficulty of changing the students' "… implicit theory of learning in terms of their knowledge base and use of [learning] strategies."[28] Related with this, Bell argues that one objective of architectural education should be about the student’s learning how to think and value; for gaining some sense that they are fully responsible for their own further education after graduation. Bell argues that the students should be encouraged to challenge the assumptions of school and curriculum.[29]

B. Jones agrees that in architectural education creative act should be improved by improving the ability to learn and ability to apply knowledge in action and concurs that the educational curriculums should be redone in this respect.[30] Such an idea may originate a prospect for a study on the development of educational curriculums as a continuous learning process.

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[26] A. Perez-Gomez, "Architecture as Embodied Knowledge." (Winter, 1987: 58).

[27] Philip, "De-Schooling Architecture." (Autumn, 1988: 58).

[28] Hofer, et al. "Teaching College Students to be Self-Regulated Learners," (1998: 61).

[29] H. Bell, "Reflection." (Summer, 1988).

[30] B. Jones, "Design from Knowledge, Not Belief." *Journal of Architectural Education (1947-1974)* (Association of Collegiate Schools of Architecture, Inc., 17.3, The Architect and the City.The 1962 AIA-ACSA Seminar Papers Presented at the Cranbrook Academy of Art. Part II., December, Dec.,1962).

3.2. Approaching Today's Pedagogical Needs in Architectural Education

The issue about the requirements from educational institutions in architecture, a collection of the selected discussions provides a general outline in the concern. One of the discussions met is about the requirement for an engagement with the existing cultural context. Peter Renshaw argues that the creative power of the artists can only be realized when they engage with the changing cultural context. In order to cope with this issue, he encourages the attitude to create an educational environment, in which honest and open critical dialogue is respected.[31] It is understood that, following the problem of coping with the changing needs and comprehensive powers of a society, Renshaw is after an approach of being critical with every code of mind that is recalled from personal past experiences. This approach can be an interface between Itten's idea of detachment from the existing codes and Abel's criticism on this approach by discussing its impossibility. This also proves Renshaw's agreement with the Polanyian thought on creativity, which, according to him, would fit as an approach for comprehending and becoming creative within the contemporary world. It is also noteworthy to mention that Renshaw emphasizes the importance of communication that is the explication and transmission of ideas for coping with today's problem of creativity.[32]

Accordingly, the fundamental priority that Renshaw offers for higher arts education institutions is increasing the area of transmitting new meanings especially through reciprocal experience with the public.[33] This offer recalls Schön's discussions about the necessity for reflection, which may be personally or collectively experienced and individually internalized within action.

Another discussion is about the requirements of today's students of architecture. In his hypothesis for approaching a method for basic design, Denel argues that the basic design course needs to be redeveloped for today's architecture students' needs. He mentions about both the personally developed methods of the students for artistry and creativity to achieve the meaningful. There are major concerns he proposes to be essential in the development of the method. First, he states about the importance of learning from the past in order to take its

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[31] P. Renshaw, "Connecting Converstations: The Changing Voice of the Artist." *New Practices - New Pedagogies: A Reader* (London and New York: Routledge, 2005: 99).

[32] Renshaw, "Connecting Converstations: The Changing Voice of the Artist." (2005: 100-102).

[33] Renshaw, "Connecting Converstations: The Changing Voice of the Artist." (2005: 103).

advantage for coping with the needs of tomorrow. He secondly puts emphasis on the ability to comprehend the meaning of the real whole while designing with the two-dimensional means as drawings. This is related with the ability to control the complexity of the variants of spaces for achieving the meaningful whole. A third concern is the careful explication of facts, in terms of not explicating what is not present by means of using a limited vocabulary of architecture. Fourth, he mentions that it is important to understand the supremacy of "order" in terms of reflecting on action in an ordered process.[34] With the phrase "order is supreme," Denel seems to refer to what Polanyi calls as the *superior knowledge* that the designer should act responsible for in a critical manner.[35] This criticality is also recalled from Koestler by his idea of the *incubated* problem that necessitates a heuristic passion.[36] It is evident that this discussion is about the provision of the necessary conditions by the educational institutions of architecture for the development of the students' knowledge about the concerns mentioned above.

Regarding the discussion of criticality, the danger of losing the responsible act, which is a necessary part of the creative act, has also been dealt by Michael Foucault as Dallow quotes from him. With reference to Foucault,[37] Dallow states that "… there are no errors in the strict sense once one moves outside the conventional disciplinary and methodological territories – 'outside the true' – when evaluating whether findings are true or false." Adds he "… to that extent, practice-based research in the creative arts remains a risky and radically innovative mode of research activity."[38] This constitutes another facet of the relation with the context, which also requires its awareness and, which is a concern of the provided setting for the students of architecture.

Guilford in his essay "Creativity" states about the recognition of "the economic value of new ideas …" and the request of both industry and governmental agencies for leaders. He also adds that most of the college graduates, while having the mastery of the techniques that they

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[34] B. Denel. *A Method for Basic Design*, (Ankara: ODTÜ Mimarlık Fakültesi Basım İşliği, 1979: 16-20).

[35] M. Polanyi, "The Tacit Component." *Personal Knowledge: Towards a Post-Critical Philosophy* (New York and Evanston: Harper Torchbooks, 12: 1, 1962: 375).

[36] Koestler, *The Act of Creation*, (1964: 119).

[37] M. Foucault. *Archaeology of Knowledge*, (New York: Pantheon Books, 1972: 224).

[38] P. Dallow, "Outside 'The True'?: Research and Complexity in Contemporary Arts Practice." *New Practices - New Pedagogies: A Reader* (London and New York: Routledge, 2005: 141).

have learned, cannot solve problems when new paths are demanded, which also overlaps with today's circumstances.[39]

In addition to all above, it is important to note that Denel appears to be quite interested in the personal motivation in the design process; although, he has not offered any solution or proposition on developing and maintaining it.[40] On the other hand, it is evident that this is also regarded as a requirement from the provided settings for the act of learning within the educational institutions of architecture. This may both include a motivating setting design and enabling the students' personal reasons to be motivated.

The collection of the discussions about what an educational institution of architecture should offer and determine meet at the common point of the students' experiencing the creative act. Since the **creative act of the architect is both the means and the ends of architectural education,** the task could be focusing on the instillation of the creative act to architecture students. It has already been discussed that the creative design act should have a core idea in order to have a comprehensive meaning, which Polanyi discusses within the concept of heuristic passion. In order to comprehend the design act of the architecture students as creative act, first the distinct processes of the *creative design act* should be listed. For developing such a list, it is proper to refer to Goldschmidt's model on architectural design. As she agrees, the reflection is on the *core idea* of the design act.[41] The reflective and therefore usually overlapping probable processes of the *creative* design process on grounds of the personal knowledge Theory can be listed as follows:

[39] Guilford, "Creativity." (1950: 446).

[40] Denel, *Temel Tasarım ve Yaratıcılık*, (1981).

[41] G. Goldschmidt, "Doing Design, Making Architecture." (Autumn, 1983: 12).

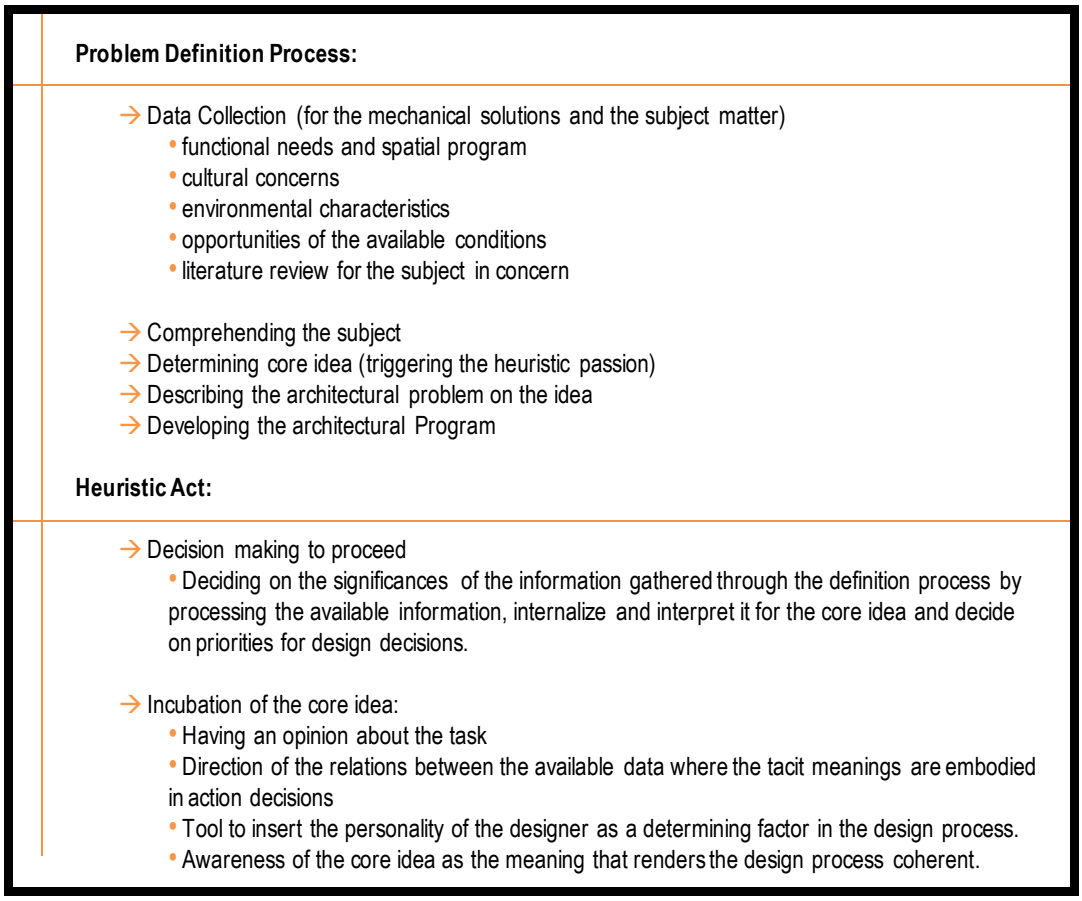

Figure 5: Possible Contents of the Creative Design Process on Grounds of the Personal Knowledge Theory

When the list is examined, it becomes evident that processes derived from the discussions on the creative act in personal knowledge theory, as the problem definition and heuristic processes are overlapping with the creative design act mainly based on the reflection-in-action theory. On the other hand, within these possible items a logical argumentation is necessary to identify what an architecture student must be capable of in order to experience creative act as a learning tool. It appears to be a primary capability to be able to *comprehend* a given or self-determined subject of research. This skill in the act of comprehension means, skill in comprehending what an external entity means for the individuals self, regarding his/her previous knowledge of past experiences. The skill of comprehension also includes, being able to see the whole without being sunk into the details that must indeed act as subsidiaries for the comprehensive meaning.

Moreover, in order to act creatively, the student must be able to take his/her own decisions without an attempt to borrow from others, or do what other people ask. S/he must also be critical about what is asked, ordered or coded. S/he must be able to internalize the subject by having his/her problem to be solved with a passion of his/her own. The most significant question is that what is the task handled in the schools of architecture, if the students are not capable of these skills? What do they do to solve the students' problems of misleading habits if there are any? How do the schools of architecture make the students ready for learning from their individual discoveries, passions to solve their problems, for their continuous self-education in architecture?

3.3. The 1st year of Institutional Education on Architecture as Transition

The search for the answers of the questions above makes it necessary to consider the existing experiential background and personal knowledge of the students of architecture. It is possible to think that a significant portion of the students' experiences is that of their secondary education. This idea makes it crucial to consider the characteristic features of the secondary education as the period that before the institutional education in architecture.

3.3.1. Characteristics of Secondary Education:

The pre-university period is an important portion on the development of continuous self-education methods of the architects. There are significant differences in the education systems of pre-university and university periods of architecture students' institutional education backgrounds. Especially concerning the central interest of this study, which is the creative transformation of the architect, the pre-university education has an exceptionally significant character of obstructing the creative freethinking of the students as T. Aytaç-Dural underlines.[42] For example as Denel states, the students face every obstacle possible to dull their curiosity for their environments that is necessary for becoming a designer.[43] Such an obstruction is very critical especially for the suppression it generates for the children at

[42] T. Aytaç-Dural. *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (Ankara: METU Faculty of Architecture Press, 2002: 14).

[43] Denel, "Temel Tasarım ve Değişim." (1998: 52).

the age of their primary and secondary education that produces unbreakable obstacles for the improvement of the creative skills of them.[44]

Such an obstruction can also be explained with reference to Polanyi's theory which underlines the necessity of learning by comprehension (which is experience in its essence), for the internalization of information as knowledge. In light of this theory, the information-based education system of the pre-university period, which generates the tendency to memorize with an overloaded curriculum by leaving no room for the student to improve creative skills, is also an obstruction for the improvement of personal knowledge. Aytaç-Dural makes inferences for the distinctions of the pre-university and university periods. They are experiencing "passive listening" rather than "active participation", dealing with "ready information" rather than "exploration"; 'evaluation' by means of "multiple-choice testing system" rather than "multiple authorities", and staying on the "safe ground" rather than "risk-taking"; focusing on "success" rather than learning from "failure"; generating the "self-centered child" rather than a "self-confident individual." These features of the secondary education can by no means be legitimate on the grounds of Polanyi's theory of personal knowledge as a convenient foundation for improving personal knowledge.[45] Indeed, none of the characteristics attributed to the pre-university education period either in school or in adults' guidance[46] has aspects to generate a confidence for selecting and jumping into a not-given problem (a problem of their own), to generate a heuristic passion to constitute a heuristic act for a solution. Dewey calls the situation in which the student studies just to pass the exams as "learning in isolation."[47] Bilgi Denel also agrees that the beginning architectural students, who are usually declined in their personality and used to accept everything that the

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[44] Related with this Gropius asserts that "Creativeness in the growing child must be awakened through actual working with all kinds of materials in conjunction with training in free design." Moreover, adds he "…[i]mperceptibly guiding the child during the very difficult transition from play to work, the teacher – besides giving it the scientific facts and technical advice – must encourage him again and again by trying to stimulate his indigenous inspiration,"

Gropius, *Scope of Total Architecture*, (1955: 44).

[45] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 16-9).

[46] As Aytaç-Dural quotes from Torrance and Denel in *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 14), according to both, adults have a tendency to obstruct the creative side of children by discouraging them from freethinking.

E. P. Torrance. *Guiding Creative Talent*, (New Jersey: Prentice-Hall, Inc., 1962: 13).

Denel, *Temel Tasarım ve Yaratıcılık*, (1981).

[47] Dewey, *Experience and Education,* (1997: 48).

instructors mention as ‘true’, are also isolated from a very big amount of knowledge and skills for acting creatively.[48] Given these common characteristics of the pre-university period, it seems that the most convenient objective for the university education for architecture is the reconstruction of the ability for creative thinking.

Dewey mentions about "progressive education" as a new movement opposing the general means and methods of the traditional education. It is important to note that Dewey gives credit to this new approach in education because of its new philosophy based on actual student experience. The traditional school that Dewey explains resembles the criticized secondary education. This is visible as he states, those who are after progressive education criticize the "old school" for imposing "… adult standards, subject-matter, and methods upon those who are only growing slowly toward maturity."[49] What he states is directly related with the impossibility of the development of the students' personal knowledge in the criticized conditions, in which the students are given no chance to reach the given body of information through experience and internalize it.

McCombs and Miller depict the features of the "failed" system that contradict with the needs of the development of creative behavior. They explain the reasons for the failure of the educational practice of the industrial age. The first reason is explained as the narrow content based curricula, the second with the test oriented manner that eliminates the possibility of two right answers which also eliminates "… meaningful creative experience…" and the third is explained with the "one-size-fits-all curricula" that disregards the students’ diverse talents and interests.[50]

3.3.2. The Differences between Higher and Secondary Education

In line with the adoption that tacit knowledge is the dominant principle of all knowledge and is acquired over a long period of time with the joint weight of all experiences; the disunity on the conception of learning between the pre-university and university periods can be

[48] Denel, "Temel Tasarım ve Değişim." (1998: 48).

[49] Dewey, *Experience and Education,* (1997: 18-19).

[50] McCombs, et al.. *The School leader's Guide to Learner-Centered Education: From Complexity to Simplicity* (2009: 2).

investigated through the identified characteristics of tacit knowledge, with reference to the structure and operations of mind.

Both for exploring the power of tacit knowledge and for understanding the basic aspects of an external support applied for regaining the creative powers of the students of architecture that are suppressed during their primary and secondary education, the period of the first year of institutional education on architecture appears to be a key period to deal with. According to Aytaç-Dural, the first year of architecture education, which she calls "a transition period," should be "… a strong foundation which a lifetime process will be constructed upon …" especially when the infertile education system of both primary and secondary education is considered.[51]

The transition in this period may be interpreted as a **re-introduction of the personal dimension** of knowledge to the students. It is apparent that the basic problem of both the primary and secondary education is that they continue to build up the students' tacit powers in a different and opposing way than architectural education requires. That period is excluding the personal dimension from knowledge and dictating the students that everybody must know everything in the same objective way. One significant evidence is the testing and examining system that is used during the secondary education, which is evaluated by a single answer key, with questions that must have only one answer that should be given in the same way by each student. It is still possible to cheat in the exams instead of memorizing the expected "only one" answer, both of which have no cognitive value at all for the development of personal knowledge of the students, especially in the way that Polanyi asserts.

Hofer et al. state about three strategies that they propose for the mentioned problem. These are, focusing on memory and learning strategies, focusing on domain-specific strategies, and motivational strategies.[52] In order to develop a strategy for introducing the personal dimension of knowledge to students, the task should be focusing on the act of comprehension. It has already been discussed that the act of comprehension necessitates the skill to comprehend the meaning of a whole without getting lost within the particulars of that whole. It is possible to interpret the distinction between educated and ordinary man's mind

[51] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 22).

[52] Hofer, et al. "Teaching College Students to be Self-Regulated Learners," (1998: 61).

as the distinction of the mind of the experienced designer and the mind of the graduate of secondary school. This distinction makes it easier to understand how the mind of the educated man is more likely to be creative than the mind of the ordinary man, after understanding the design act as the creation of a new meaning. Moreover, it is also clear that what Polanyi means by educated mind refers to experienced mind in terms of design training, which may include all forms of the act of comprehension.

Considering the discussions on the improvement of the creative powers based on Polanyi's theory the purpose of the first year architecture education should be to develop/improve the skills for comprehending the meaning of the entities in the students' environments. According to Higgot, the responsibility of the first year architectural education is guiding the students' improvement for 'understanding' rather than giving information; like teaching history as "provisional rather than exclusive." The method for this would be to make the students understand theories before giving them the historical information as a progressive list of architectural examples that are the characteristic works of their time and context. Higgot answers his primary question asking "what the architectural students *need* to know" as; they need to know how to comprehend meaningful wholes; "… most basically how to think."[53]

3.3.3. Basic Needs of the 'Transition Period'

In order to consider the first year of architecture education as an entry to the personal transition of an individual towards creative act, it is essential to articulate why a transition period is needed. The primary need of an educational program might be considered as the development of the curriculum and its contents. The contents of architectural education can be defined as the contents of the curriculum and the contents of the personal developmental activities that take place in and outside the university. The significant thing is that the content of architectural education cannot be limited with the timetabled course components and the issue of content is a discussion of all personal aspects of the act of learning within the existent context. Indeed, based on Polanyi's theory, this distinction between the personal development of knowledge in and outside the school or profession is valid for the continuous self-education of the architects. Philip's proposal especially for the first year curriculum is to prepare a strategy the objective of which "… would be to develop confidence in students;

[53] Higgot, "Teaching First Year: What do They *Need* to Know?" (1996: 185-86).

confidence not to fear failure, confidence to access data, information and knowledge by a variety of means, confidence to accept criticism, and gradually to develop self-critical skill."[54]

The aim of the beginning architecture education should therefore be the development of personal learning skills as a guide for the lifetime process of continuous self-education. B. K. Hofer, et al. stress the need for the change in the understanding from education for 'learning how to read' to education for 'learning how to learn'.[55] While Gropius discusses about the preparatory instruction in architectural education, he declares that the first task that was applied in the *Bauhaus* teaching was "[liberating] … the pupil's individuality from the dead weight of conventions and allow him to acquire that personal experience and self-thought knowledge which are the only means of realizing the natural limitations of our creative powers…"[56]

Another need of the first-year architecture education is to find the proper means for the encouragement of the personal research activities that would support the act of comprehension. It is important to point out a very significant possibility for the misinterpretation of the idea of learning through experience as a means for personal architectural knowledge development. It has already been discussed and agreed that the internalization of external information is possible by the act of comprehension, which includes the design act in architectural education. As M. Quayle asserts, "… the sources of

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[54] For the application of the life-long-learning program, Philip states about the necessary objectives for the de-schooling of students and shifting their attention towards the reality of everyday experience, by observation, improving skills to use various media to describe, analyze, evaluate, and interpret all the aspects of their living environments. Agreeing to the scope of this study, he gives the highest emphasis on the reflection upon experiences of students with their environments.

D. Philip, "De-Schooling Architecture." (Autumn, 1988: 59).

[55] B. K Hofer,. and S. L. Yu, P. R. Pintrich. "Teaching College Students to be Self-Regulated Learners," in Dale H. Schunk, Barry J. Zimmerman (eds.). *Self-Regulated Learning: From teaching to Self-Reflective Practice* (New York and London: The Guilford Press, 1998).

They explain Learning to Learn, which is an introductory-level undergraduate course offered through the department of Psychology at the University of Michigan. (p.73) The task handled in the course is explained to be making the students recognize that they should have their personal knowledge of learning and thinking experience. It is apparent that this course is based on the idea of explicating the tacitly known about the learning behavior. It is also understood that learning how to learn as a continuous habit and taking its responsibility are the goals of this course.

[56] W. Gropius. *The New Architecture and The Bauhaus*, (Cambridge, Massachusetts: The M.I.T. Press, 1965: 71).

our design knowledge are experience, reflection (exploration) and systematic research."[57] Merely designing cannot generate knowledge; because, while there can be no ready-made knowledge of design solutions, there can also be no design without knowledge. Indeed, architectural knowledge is a production of the research act, which is a part of the complete heuristic design act. When Polanyi's point is considered as the extension of man's mind by means of internalizing relevant information, the research act in the design process is also understood to be an exploration for the production of means for reaching the best possible solution for the selected design problem. The information reached by such a desire can be understood and therefore internalized, when it is decided to be appropriate as subsidiary for reaching a solution as a comprehensive whole. It is apparent that research in design is a fundamental part of the heuristic act.

Concerning the concept of responsibility in architecture education, it is important to remember the need for encouraging critical thinking to the students. The students need to know how to think critically on their feelings of responsibility. This necessitates an educational method that enables the student face different and opposing approaches to problems, where they have to behave critically on adopting or refusing one. As Bereiter puts it, educational programs that are based on the ideal of imposing "creative thinking" are "… likely to include teaching about different kinds of propaganda, accompanied by exercises that require students to detect fallacies and deceptive rhetoric in arguments of various kinds."[58] It is apparent that in order for the students to develop this skill of detection, they also have to be encouraged for improving their skills of research making, for putting their decisions on explicable grounds. Indeed, learning research appears as another fundamental skill for continuous self- education.

It is also needed in the first-year education as a transition period to let the students understand what and how to know by means of using their own interests. As Aytaç-Dural agrees, especially concerning the pre-university education in Turkey, the transition in the first-year is a process of the students' realization of the necessity to know, rather than to

[57] M. Quayle. *Ideabook for Design Teaching*, (Mesa, Arizona: PDA Publishers Corporation, 1985: 122).

[58] C. Bereiter. *Education and Mind in the Knowledge Age*, (Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 2002: 363).

memorize and recognize the difference between knowledge and information.[59] It is apparent that the 'University Exam' in Turkey and its dominance on the Turkish students' lives with its multiple-choice testing system is the major factor that increases the difficulty of succeeding in this transition process. The consequences of the students adaptation to the multiple choice testing system is also another obstruction for developing a personal habit for research on their subjects of interest. Sometimes it would be helpful to refer to a subject of interest of the student, like rock music, if the instructor coincides with it, in order to remind the student's own enthusiasm on making a research on his/her own interest. However, usually neither the instructors nor the students are that lucky on finding a common point to express their intentions. On the other hand, based on this idea of originating an interest in the students' mind to make them follow by their own research activities, another approach is to introduce them with the works of art like music, cinema, and painting and try to transmit a sensibility to them and reactivate their obstructed instinct of curiosity. Such an approach also appears to be a very important means for coaching the students on learning the act of comprehension.

The need to understand the students' interests triggers the necessity to consider another need, which is the need to understand the tacit-powers of the students that they have gathered in the pre-university period. As it has been widely discussed, the primary reason to call the first-year architecture education as a 'transition period' is the image of the pre-university education as obstructing the creative tacit powers of the students. Within this transition, it is also necessary to keep in mind that the students' preconceptions about architecture have a remarkable role in their participation in the design acts of the first-year studio. Cuff states that the reasons for the lack of confidence in learning architectural presentation techniques are primarily rooted in the students' 'false' preconceptions about the architectural culture.[60] Moreover, Dewey argues that the due of an educator is to provide an environment for the students to interact and to consider the powers and purpose of what is to be taught. According to him, disregarding the students' personal experiences "… renders the process of teaching and learning accidental."[61] He also argues that the educators are responsible for

[59] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 13).

[60] D. Cuff, "Teaching and Learning Design Drawing." *JAE* (Association of Collegiate Schools of Architecture, Inc., 33.3, Spring, 1980: 7).

[61] Dewey, *Education and Experience* (1997: 45).

understanding the needs and capacities of the individuals. Adds he, the educators must have a reason that has been derived from their communications with the students for thinking that certain materials and methods will function properly in generating an experience that is educative in a particular context.

Another need of the first-year architecture education is to encourage the students to develop their own sensitivities and sensibilities. Türel Saranlı explores his personal experiences of the basic design education and summarizes the fundamental aspects of *education* as knowing (logos), making (teknos), and being sensitive. In addition to the emphasis he makes on the undividable connection between knowing and making, he asserts that sensitivity is the aspect that unites knowing and making in a dialog between man and his environment that is of vital importance. Remembering the discussions about sensitivity and its correspondence with the heuristic passion of the architect what Saranlı states is not discordant with what has been discussed up to this point. What he adds here is therefore agreeable as he states that the beginner architecture student should be encouraged to ask the necessary questions him/herself to acquire the knowledge of design thinking, that is his/her personal knowledge. He also reminds a common approach of the first year instructors who answers the students' questions as "I don't know, you should look up yourself."[62] In its essence, this attitude of the instructors appears as a useful means for letting the student expand their personal knowledge. However, there is another necessity for the students to benefit from this attitude of the instructors. The students may not find the questions that they ask during the course worth to make a research after unless they are passionate about finding the necessary answers. This obstruction is quite possible because of habitual attitudes of the first-year design students. They are mostly not used to go after the questions that they ask to themselves, if they ask some; because, it is possible to think that they are used to having very different things to study; such as memorizing the question types of the university exam.

In the first-year architecture education, it is also needed to design the studio in such a way to lead the architecture student be the critic of his/her own. Indeed this need is quite related with the need of the development of the students' self-training.[63] The importance of self-criticism and the development of reflective practice for developing architectural knowledge

[62] Saranlı, "Başlangıçtan Bugüne Temel Tasarım." (1998: 40-41).

[63] This need is also emphasized by Salvestrini in G. Salvestrini, "The Teaching Method: More Questions than Answers." *Educating Architects* (London: Academy Editions, 1995: 43).

have been discussed; however, it is also necessary to keep in mind that these two basic needs of architecture education are also obstructed by the ready information-based education of the primary and secondary education. The instructors of the first-year studio also **need** to know how to introduce the creative design skills to the students and sophisticate them without demoralizing and/or depressing.

In connection to this, another significant need of the first year education is, as mentioned by Aytaç-Dural, understanding the psychological conditions of the students, who experience the transition period especially concerning the transition from the self-centered individual to a self-confident individual. At this point in addition to the coaching role as Schön mentions, in Aytaç-Dural's point of view, it is also very important for the instructors to act as counselors on structuring their relationships with the students.[64] This need engenders another need for the first-year education, which is to examine the relationship between student and instructor. This need triggers the issues like, being coached by the instructor or learning from a master[65]; taking the instructor as the role model; seeing the instructor as of far too big intelligence; facing the problem when the instructor does not know the answer; and the like.

3.4. The Basic Design Course as a Means for Transition

Higgot discusses the first year of architectural education in school as a basement to teach students how to enlarge their design knowledge. On a "need to know" basis all the primary elements of architectural design including the historical perspectives and personal inputs should be manipulated to give the student the impression that the basic need for architectural knowing is the personal enlargement of design knowledge. According to Higgot, the basic principle of the first year architectural education as the foundation of the continuous self-education is providing the motivation and energy to the students to feel confident about producing ideas for their personal statements by using the forms of architectural communication like drawing and verbal communication. Adds he, this is the basic point that the students should be made to understand. The exercises, therefore, should also be designed

[64] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 90).

[65] Gropius, *Scope of Total Architecture*, (1955: 43), asserts that "… successful teaching of creative design can … only be by a creative artist who is a 'born teacher'."

for enabling the students to explore the presentation materials for their ideas and possibilities for their personal statements.[66]

One of the commonly adopted means for the first year or introductory architecture education is the basic design course. Regarding the argument that beginning architecture education is a process of *creative transition*, it is possible to explore the basic design course with its function in this process. It is possible to assume that basic design is adopted as an introductory course for design thinking as the first setting to experience creative act in the institutional education period. This aspect of the course makes it necessary to explore its origins and applications from the point of the features of the creative act.

This exploration would include basic intentions behind its origins with reference to the personal knowledge of the students. It would include the intention and means for the experience of the creative act. It would also include the question whether it can be regarded as reintroduction of the concept of learning as a self-conducted act.

The intentions of the Bauhaus School of Architecture, which appears as the first institutional[67] revolutionized understanding in architecture education for the post-industrialized societies, appear as relevant with the changing understanding of the personal knowledge development. The discourse of Gropius is based on the idea that the design processes that the architects experience should overlap with the their struggle to fill the gap for their lack of knowledge to cope with the changing societies that deal with an increase in technical revolutions, social and personal needs, environmental sensibilities. Says he ,“I want a young architect to be able to find his way in whatever circumstances; I want him independently to create true, genuine forms out of the technical, economic and social

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[66] Higgot, "Teaching First Year: What do They *Need* to Know?" (1996: 185).

[67] As Özkar discusses in her dissertation, the birth of basic design education does not have to be adopted as the Vorkurs of Itten. As she states, the basic principles of the basic design education primarily aiming the development of individual means for understanding forms by focusing on the abstraction process had been adopted and put into practice by Denman W. Ross and Arthur W. Dow before basic design course emerged at Bauhaus. And she also argues that Ross and Dow are closer to the shared aim of the Bauhaus in terms of the generation and development of individual creativity by means of abstractions. (Introduction: Rethinking Basic Design Education) in

> M. Özkar, "Uncertainties of Reason: Pragmatist Plurality in Basic Design Education." (Massachusetts Institute of Technology, 20,10,2004:Sept. 2004). *Available:* http://hdl.handle.net/1721.1/28808. [Accessed: 24 March 2009].

conditions in which he finds himself instead of imposing a learned formula onto surroundings which may call for an entirely different solution."[68]

Gropius also touches the problem of education in the post-industrialized society, which *was* the attitude of leaving no room for the children's personal interpretations. States he "[The children] have lost the joyful, playful urge of their early youth to shape things into new forms and have become, instead, self-conscious onlookers."[69] According to him, rather than acquiring the knowledge of all fields the necessary aim of architecture education should be to develop the behavior to reach the harmonious whole and therefore the knowledge, which he calls "… the development of the strong character …" of the architect.[70]

Gropius obviously refers to the tacit knowledge of man gained through personal experiences on perceiving his/her surroundings. States he "if we can understand the nature of what we see and the way we perceive it, then we will know more about the potential influence of man-made design on human feeling and thinking."[71] His emphasis on the personal intellectual knowledge proves that the idea beyond the new institutional revolution is parallel with that of Polanyi's theory of personal knowledge. This parallelism is visible in his words concerning his fundamental idea that he lays beneath his theory of design education:

> *My thesis is that artistic creation draws its life from the mutual tension between the subconscious and the conscious faculties of our existence, that it fluctuates between reality and illusion.*[72]

When it comes to the intentions on the introductory design education in the Bauhaus, according to Gropius, if the whole is greater than the sum of its parts and if only 'some' parts of our personal knowledge are visible to our consciousness we must give up merely referring to them. This behavior, as he puts it, must be a fundamental aim for the basic design education. States he the design teacher must encourage the student to restore his/her unprejudiced receptivity of childhood.[73] This means that design can be an expression of subconscious (tacit) knowledge of personal experience. This is indeed defining design act as

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[68] Gropius, *Scope of Total Architecture*, (1955: 3).

[69] Gropius (1955: 40).

[70] Gropius (1955: 5).

[71] Gropius (1955: 21).

[72] Gropius (1955: 23).

[73] Gropius (1955: 24).

the articulation of tacit knowledge. He defends the idea of learning by experience, which according to him, is the means for giving the students more opportunity to "… 'find' facts by themselves [so that] can knowledge turn into wisdom."[74]

The personal discovery of knowledge is the fundamental idea behind the Bauhaus workshop. The aim is to let the students go beyond their personal knowledge by being able to make creative decisions, which are indeed momentary. States Gropius, on working with the materials in a three dimensional experiment the student starts to understand the spatial characteristics of a three dimensional volume. He also adds that this is a task of expanding personality (or in other terms enlarging one's world) rather than acquiring a professional skill. Regarding this, he also adds: "The student will then experience [and learn from] his own ability for making creative short cuts, which go beyond his preceding intellectual research."[75]

As Gropius states, Itten's preliminary course, which was developed as a preparation period for all workshops in Bauhaus school, has a chief function as a means for enabling the individual to see his/her own potentialities and limitations by making a way for personal experiences and discoveries.[76] Also when taken from the point of creative act in personal knowledge theory, the act of seeing the personal potentialities and limitations is a basic goal of the design act. According to Gropius, the attitude was to achieve this goal by liberating the individual from all conventional patterns of thought.[77] When the discussion about the necessity of the responsible act is recalled this attitude appears inefficient, since it regards the responsible act with the personal code of rules that were gathered through experiences as merely dangerous and unnecessary. When Polanyi's theory is concerned the development of personal knowledge necessitates being critical about the existing code of rules, which is called by Gropius as "conventional patters of thought." Since it is not possible to teach how to think, it also seems not possible to learn how to think by giving up all the personally constructed thinking abilities, which is the act of comprehension in Polanyian terms.

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[74] Gropius, *Scope of Total Architecture*, (1955: 41)

[75] Gropius (1955: 51)

[76] W. Gropius, "The Theory and Organization of the Bauhaus." *Bauhaus* (Boston: Charles T. Branford Company, 1952: 24)

[77] Gropius, "The Theory and Organization of the Bauhaus." (1952: 24).

Concerning the problem about the intention of total detachment, which may not be possible, Chris Abel cites Koestler and Schön concerning their theories about creativity as he states "… creativity comes about not from starting with any blank sheet, as Itten and his followers assumed, but from making new connections between previously known but hitherto unrelated ideas."[78] This idea corresponds with the inevitable function of personal knowledge for expanding itself, where a total erasure is simply impossible. Abel criticizes Itten's basic course for detaching the students form their regional contexts and therefore regional sensitivity.[79]

This discussion opens up the idea that ignoring the existing code of rules that are used for the act of comprehension may not enable the student to understand the deficiency on not giving up them for becoming creative and may not show them the necessity to construct new codes for each problem. This idea calls for the need to reconsider the task from this point of view.

Thus, as Gropius does, it has usually been discussed for the need of an intellectual education that runs parallel to manual training, which Gropius exemplifies with the use of language, where "… we must know both vocabulary and grammar."[80] There is also another important point that should be handled for a true creative experience. Continuing with Gropius' example, we must also look for the actual reason behind the will to learn a language or if there really is a will to learn the language. Considering the explanations of Alexander Dorner about the function of the Bauhaus after the post-war period, it is possible to understand that there had been a natural reason behind Gropius' not asking these questions, and rather concentrating on the problem of how to unify the passion of artistic independence and techné. For the Bauhaus school there was a collective understanding of the existing attitudes in art experience and industrialization of design as the necessity of mass production. As Dorner explains the confusion of the Post-War period, both in and outside Germany, especially those who understood that the pre-war period was dead and wanted to find a new way of life were attracted by the Bauhaus.[81] Related with this, Itten states that the students of the 1919-1920 Winter semester were from diverse educational backgrounds, most of who

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[78] C. Abel, "Globalism and the Regional Response: Educational Foundations." *Educating Architects* (London: Academy Editions, 1995: 82)

[79] Abel, "Globalism and the Regional Response: Educational Foundations." (1995 80).

[80] Gropius, "The Theory and Organization of the Bauhaus." (1952: 26).

[81] A. Dorner, "The Background of the Bauhaus." *Bauhaus* (Boston: Charles T. Branford Company, 1952: 9).

"… had attended the usual arts and crafts schools and academies."[82] The need for a unification of design thinking and mass production was obvious in the society and understandable by the individuals for convincing them for the need of a new attitude in design education. In this regard, it is possible to think that the idea behind all the works and efforts of the school was providing the excitement needed to take the responsibility of personal learning and experiencing.

Although this was the case for era of the Bauhaus, Itten's intentions for his "basic course" prove his sensitivity for the most possible participation of the students in the design act, with a passionate desire. When Itten mentions about his will as a "teacher" to touch the students' innermost core and striking a spiritual light, it is observable that he is referring to the tacit powers that operate in between the tutor and the student, especially on stressing the unrepeatable nature of the moments where tacit powers operate.[83]

Itten emphasizes the necessity for the students' readiness to learn. As a tutor, he takes the responsibility for presenting the appropriate atmosphere in the course, as he states for making the students achieve the creative thinking ability where this necessity is of vital importance. His assessment of the students' design act is based on the criterion of the ability to "find ways through their own intuition." In this regard, he primarily respects the students' natural simplicity, which he calls "naiveté." In light of this basic intention, he has several suggestions for the tutorship in a design course, which he states that he has also discovered intuitively. According to him, what a learning coach should not do in order not to avoid self-confidence and therefore the naiveté and the development of abilities are criticisms and corrections; and what the support should do is to encourage and recognize/respect the students' act and work.[84]

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[82] J. Itten. *Design and Form: The Basic Course at the Bauhaus*, (New York: Reinhold Publishing Corporation, 1964: 9).

[83] Itten, (1964: 7).

This unrepeatable nature of the operations of the tacit powers may even be regarded as another characteristic of tacit knowledge mostly related with the irrevocable personal knowledge development.

[84] Itten, (1964: 7).

This citation is discussable in light of the discussions carried in the previous phase of the study about the function of the learning coach.

Itten appears to be very sensitive about the responsibilities of teaching for recognizing the temperaments of the students.[85] This attitude seems to be Itten's respect on the students' personal knowledge for his consciousness about the role of personal knowledge maintaining the tacit connections between the subsidiaries that are used for comprehending new meanings.

It is obvious that the aim of Itten's course was implicitly encouraging the student to adapt him/herself to problems with unforeseen solutions to be tried with abstracted elements[86] of design. By this way, the experience of an act of comprehension becomes possible with the subsidiary production of personal understanding of design elements, which are abstracted from the real world and which find new meaning within the act of comprehension. This may be regarded as a valuable experience of the heuristic act. However, it is also necessary to have a heuristic passion within this act, which works with the belief in and excitement for a meaningful solution.

Moholy-Nagy on the other hand, as Alain Findeli explains, on undertaking the preliminary course of the New Bauhaus in Chicago, has followed the basic intentions of the German Bauhaus. Additionally he has introduced scientific courses into the curriculum. Findeli states that "… by transforming the art/technology polarity into the ternary system of art/science/technology, Moholy-Nagy tried to confer a scientific profile on the design process."[87] Findeli adds that the reason behind Moholy-Nagy's insist on only hiring teachers who are also artists is his belief in the personal dimension, and that the creative potentialities cannot be gathered from outside but can be developed from inside.[88] He also adds, "Moholy-Nagy found in Dewey's work the theoretical foundation and justification of his own pedagogy."[89] This proves Moholy-Nagy's interest in the act of learning in experience, which has to be *meaningful* for the individual. In this regard Findeli also expresses that Moholy-Nagy has intended to encourage the students for taking their own responsibility for learning,

[85] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 9).

[86] The abstraction from what the element has previously indicated to the individual

[87] A. Findeli, "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)." *Design Issues* (Massachusetts: The MIT Press, 7.1, Educating the Designer, Autumn, 1990: 9).

[88] A. Findeli (Autumn, 1990: 13).

[89] A. Findeli (Autumn, 1990: 14).

which is indeed the method that he offers for a designer to cope with the changing needs and opportunities of time for his/her lifetime.[90]

3.4.1. The Intentions of Itten's Basic Design Course:

Itten sets three major tasks for the Basic Course at the Bauhaus. The explication of these tasks seems to overlap largely with the criteria for encouraging and enabling creative thinking. The first task states about the primary aims of the course, which were set by Itten in accordance with his overlapping ideas with that of Polanyi and Koestler about the creative potentials of the students. He has emphasis on learning by experience. He also admires the function of personal act of comprehension in education. His phrase "courage for work of their own" has clues about his awareness about the personal responsibility of the act of learning through experience, by means of producing one's own means for one's own work and freeing themselves from the existing code of rules.[91]

The second task corresponds with the idea of the freedom of choice.[92] He admits that the student feels more comfortable for creative act when his/her skills are convenient and sufficient for his/her act of production.[93]

The third task is directly related with the responsible act for the fundamental principles of design as the objective world of design, which Polanyi calls as "the universal codes"[94] that are necessary for the creative act.[95] Nevertheless, it is understood that Itten was against a "… systematic curriculum and sequence of instruction to be imitated …," but rather he suggests the necessity of the comprehension of the essence of what basic design teaching is as he understands it.[96]

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[90] A. Findeli, "Moholy-Nagy's Design Pedagogy in Chicago (1937-46)." (Autumn, 1990: 15).

[91] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 9).

[92] Norman Sheppard, on comparing Polanyi and Popper states that for both "personal freedom of choice is essential for the growth of science" in N. Sheppard, "Michael Polanyi and The Philosophy of Science." *Polanyiana* (Budapest: Michael Polanyi Liberal Philosophical Association, 8.1-2, 1999).

[93] Itten (1964: 9).

[94] Polanyi, "The Calling of Man." (1959: 41).

[95] Itten (1964: 9).

[96] Itten (1964: 18).

Itten has generated and applied several methods for providing what he calls "the necessary atmosphere for creativity." He has applied the idea of starting the instruction with a prayer or a song in order to "… concentrate the students' wondering thoughts …" and enabling their "… mental and physical readiness for intensive work through relaxing, breathing and concentrating exercises."[97] It is understood that the intention was to make the student feel familiar with what s/he is dealing with and to engage his/her enthusiasm for the task. This attitude is highly related with the consciousness about the necessity for a heuristic passion in order to achieve the creative act.

Itten also offered a means for explicating the act of design, which he calls the "general theory of contrast." He states that he has taken the advantage of contrasting concepts of design, which has a potential to take the students attention and open a new world to them.[98] This corresponds with the idea of structuring an argumentation with the help of two opposing poles, by which the students can also develop their ideas and work on them. This appears to be related with learning how to develop heuristic passion, but this also proves Itten's consciousness about the necessity of explication of tacit decisive powers in order to work out on them, which may be regarded as reflecting on them.

Itten states about the usefulness of "studying" the old masters' works. On understanding the subsidiariness of the design principles and elements of design on *studying* an artwork, he also states about the danger of the responsible act, which might occur as falling into academic imitation. He proposes the same achievement as Polanyi for not being affected by the hazards of the responsible act: "…try to grasp the composition as a general whole…" before focusing on the measures prescribed by the author. An exercise he has proposed for achieving this goal is a reproduction process for the meaning grasped through the comprehension of a work with other means than that of the work itself.[99] He states that the innermost nature of these means is inexplicable.[100]

The idea of developing ones own rules and methods within the process is by means of leaving behind all preconceptions concerning the elements and tasks within the design

[97] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 11).

[98] Itten (1964: 12).

[99] Itten (1964: 17).

[100] Itten (1964: 130).

making. It also overlaps with the idea of comprehending the meaning[101] of the elements by means of experiencing them and therefore discovering the potentials existing in them without attaching any external significance to them. Itten emphasizes the necessity of the development of imaginative power for realizing the potentials of different possibilities, which necessitates experiencing.

All the intention clearly appears to be reinforcing the tacit powers as both for predicting potentials and for deciding on the variations and other methods to design. The sub-problem of this intention is eliminating all unnecessary particulars arriving at a meaningful whole. In order to do that the tacit knowledge of the particulars and their potentials is necessary for making decisions on them. Agreeing to this, Itten states that arriving at the simplest and clearest form necessitates a thinking ability that has to be developed through exercises. [102]

Although Denel appears to give quite much emphasis on the needs and attitudes of the creative act, he interprets it as "unfortunate in many ways" that all basic design instructors of the Bauhaus era were painters-artists, such as Itten, Klee, Kandinsky, Albers, and Moholy-Nagy. The creative act, as Denel would also agree, should be distinguished from the means for achieving a meaningful whole. Means are a part of the *subsidiary particulars* that are brought together in a heuristic act for the solution of a certain problem with a certain idea. One definition of the creative act supposes that it necessitates the construction of a meaningful relation between two or more unrelated elements.[103] However, Denel states that "plastic arts and crafts and painting" may not be together with the "usefulness of architecture." [104] This evaluation opens up an important path of discussion. It is appropriate here to cite a counter-argument to this view of Denel, from Ken Baynes, who states that "… quite clearly, the visual arts do contribute to an awareness of design," and who has worked on a curriculum development study entitled as "Extending the Art Curriculum: Design Awareness" at the Design Education Unit of the Royal College of Art.[105] It is also important

[101] Itten specifies meaning as 'essence', which appears as relevant from the existentialist point.

[102] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 80).

[103] Polanyi, "Knowing and Being." (1969: 139).

[104] Denel, *A Method for Basic Design*, (1979: 11).

[105] K. Baynes, "Defining a Design Dimension of the Curriculum." *Issues in Design Education* (Essex: Longman Group UK Limited, 1990: 52).

to note that Baynes's argument considers that "… art and design are not synonymous. They are not identical."[106]

3.4.2. The Universal Basic Design Codes

Continuing the concept of *composition*, which is a heritage from École des Beaux-Arts tradition[107], the Bauhaus has invented the codes that constitute the framework of all the discussions concerning the basic design principles. There have been explicated many headings since Itten's basic design course to deal with and discuss on the codes of design. Most of these explications have dealt with these codes with two main headings as the elements of design and the principles of design.

After studying Itten's discussions of the means of design, it is understood that he has dealt with each means in itself with its own potentials for developing the creative thinking ability, without making generalizations that are applicable to all means. Itten enumerates the design means as light-dark contrast, material and texture variations of combinations and contrasts, abstract form composition, rhythmic design, expressive forms, and subjective forms. The control of these means is skills that the students develop through experiencing. They are the grammar of the design language. They represent certain facts about representation and optic perception, which are physical features of the design act.[108]

3.4.2.1. The Use of Light-Dark Contrast

Itten explains the use of light-dark contrast as one of the most expressive and important means of design for the artist. It has a parallel idea with that of sketching as a means for design in terms of enabling the emphasis on the most important parts (subsidiaries) of the sketchers' comprehension. These parts are subsequent for transmitting the meaning that the sketcher comprehends either as an observer or as a designer. The sketch also enables one to fill the blank parts with his own subsidiaries with respect to the meaning transmitted through it. As Itten clarifies it with examples of the works of the students, the exercises developed

[106] Baynes, "Defining a Design Dimension of the Curriculum." (1990: 51).

[107] Denel, *A Method for Basic Design*, (1979).

[108] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 19).

through this use of light-dark contrast are useful for comprehending an existing artwork's meaning by means of analyzing it through tonal differences in a monochrome scale. These exercises are also useful for transmitting a meaning through simple forms of geometry without referring to an existing artworks comprehension via experience of observation.[109]

3.4.2.2. The Use of Color

In light of the principle of formulating assignments simply and clearly as Itten explains it, he has eliminated the form concern in the study of color. Such an attitude is an attempt to make the students become familiar with the possible potentials of the use of color as a means of design work.[110] It is therefore understood that the essence that Itten mentions about is the meaning transmitted through these means.

According to Itten, in order to be competent in all the potentials of the means of design the knowledge of their universal rules and orders are essential. Based on the idea of developing personal knowledge through experience he has developed exercises to enable the students to rediscover and use the given rules and orders, which are the universal codes. They may be regarded as the subsidiaries of the meaningful whole that they produce at the end of their design work, by giving them a meaning and a new understanding, when interpreted through Polanyian thinking. This interpretation appears meaningful, when Itten's exercises with the themes as "night, baptism, funeral, fair, the seasons" are considered; for the reason that they necessitate a personal knowledge within the act of the comprehension of the theme and the production of a new meaning for each by means of the expressive qualities of color.[111]

3.4.2.3. The Use of Material and Texture

As another means of design that Itten discusses, the study of materials and textures has proved to be especially stimulating because of the great value of the "sensuous grasping"[112] of the characteristic qualities of things.[113] Indeed, what Itten discusses as the *sensuous*

[109] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 19-20).

[110] Itten (1964: 41).

[111] Itten (1964: 41-44).

[112] touching, smelling, and the like

[113] Itten (1964: 45-46).

grasping is what enables the participation of the individual within the act of comprehension. Itten discusses this with material features of things that are grasped through five sensorial organs; however, within the act of comprehension another important *sensuous grasp* is the grasp of meaning that is transmitted through an artwork or else. A material transmits its texture by means of hand touching and feeling the touch in a physical automation. Sensing the meaning is not different if not more stimulating than this.

3.4.2.4. The Abstract Form Composition

As Itten explains, in the assignments on abstract form composition the aim was to improve the thinking abilities by and for experiencing design by means of working out new personal means of design, which also enable the development of personal knowledge.[114] What Itten means by abstraction is the abstraction from formalistic styles that have prescribed rules for design, which hinder the personal development of them as new means and methods.

Studying with the pure forms is the initial stage of the form exercises. The intention is to abstract forms from every possible contextual or conventional meaning and beginning to discover their own potentials that they possess within themselves, such as discovering the horizontal character of square, diagonal character of triangle, and the circular character of the circle.[115]

Denel's explanations for the use of two dimensional organizations with single forms of geometry appears to adopt it as a form of explication of a comprehensive whole, which is indeed a partial explication "… where a good deal is left to be filled by the imagination and the mental set of the observer by actively participating in exploration." Obviously, taking it for the sake of implementing the creative act, Denel states that such an approach to two-dimensional design organization is a better one than which "… the viewer is given the mere role of observer."[116] This approach is related with the act of comprehension by observation, as a creative act.

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[114] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 79).

[115] Itten (1964: 79).

[116] Denel, *A Method for Basic Design*, (1979: 22).

Denel states about the simplicity of design as a design principle, which according to him, means the "organization of complex material with smallest number of structural features." This can be exemplified by Itten's example of rediscovering the *diagonal* character of triangle or the like.. This is an "experience" of "meaning"[117] that is "coupled with interest and momentary «mood»."[118] This may be interpreted as he once more states about the necessity of personal interest (which has been discussed as a part of the *heuristic passion*) for achieving a holistic meaning.

Denel, on discussing the move from two-dimensional organization to three-dimensional space organization in design states that there are five 'rather tangible' requirements for an enclosure to be labeled as space. These are "definition," "visual structuring," "physical structuring," "light," and "scale." According to him, the "definition" of space is concerned with the limitations of an enclosed area, the design input of which is the variations of the range of enclosure. He explains the "visual structuring" of space by referring to variable relationships of shapes in two dimensional organizations, which are equally applicable to three dimensional configurations with more restricted freedom of movement for the designer that are applied to the *defined* volumes. He argues that the "physical structuring" of space is one of the most important concerns to learn for the basic design students. It is where they will have to learn about all the structural limitations and behaviors of the materials that they are engaged in their one-to-one designed volumes and spaces. The aim should be to achieve the simplest structure possible for designing a space. For the concern of "light" in space, Denel discusses about the experiential potentialities of the designed spaces by means of vision, where "light" either natural or artificial, should be controlled by the designer with the shadow effects of the elements used to form the space. He also mentions about "scale" to be controlled as a requirement to achieve a designed space, with a referential object to scale to space as an introductory step for the study of "architectural space."[119]

[117] Denel refers to Arnheim's *Art as Visual Perception*, for his explanation for the achievement of the simplicity of the design principles that result in "meaning."

[118] Denel, *A Method for Basic Design*, (1979: 23).

[119] Denel (1979: 74-91).

3.4.2.5. The Use of Rhythm

How Itten's discussion on the use of rhythm overlaps with the use of tacit powers of the design act can be understood on thinking over the following questions: What does it help? Is it a method? Is it a tie between the particulars and the unknown expected meaning of the whole? What does it teach? Why is it necessary to study and experience it? How is it possible to convince the students for the use of it? Such an attitude could also constitute a framework for the tutors' self-reflection in their act of coaching.

As Itten states, the exercises developed for understanding what rhythm is, its potentials, possibilities, within variations with contrasts and combinations, were all based on the idea of experiencing rhythm.[120] Experiencing rhythm in a design act as a subsidiary element, which can consciously be observed, enables the understanding of rhythm.

The important point is that the student should have a personal reason to deal with rhythm. Itten suggests that "… rhythm can … be explained and comprehended up to a certain point, but its innermost essence is inexplicable." He states that "essence of the automation" necessitates enthusiasm as a "rhythmic drapery" in order to succeed, which recalls the weaving of all the process with a heuristic passion.[121] A differentiation that he makes with the theoretical background of this study is that he postulates the "power of intuition" rather than personal knowledge the dominant principle of which is tacit.[122] The differentiation however, is not complete for the reason that what Itten means by *intuition* also seems to embrace what Koestler discusses as the passionate incubation of the idea that is explored personally within the heuristic act.[123]

The progressive nature of rhythmic design exercises enables the processes of comprehending motion in cooperation with form studies. The expression of motion also represents the individuals' process of thinking on forms and their variations.[124] This point of view also opens a path for understanding the act of comprehension as a rhythmic process, where the discovery of all possibilities enables a rhythmic movement in the understanding of forms.

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[120] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 129)

[121] Itten, (1964: 130).

[122] Polanyi, "Understanding Ourselves." (1959: 13)

[123] Koestler, *The Act of Creation*, (1964: 119)

[124] Itten (1964: 130).

For achieving a meaningful outcome of the exercises and for achieving a rhythmic understanding of the elements of design it is necessary to have a tacitly incubated idea beneath the study of forms and their rhythmic relations. It is therefore necessary to make sure that the student knows tacitly or explicitly why s/he deals with the design as a rhythmic study. This is of vital importance for the student to have the passion to reflect on his/her act in every rhythmic strike and examine the process that s/he has encountered. In this regard, it is also quite possible to see the relation between the development of the self-reflection in action as a skill and rhythmic design exercises.

3.4.3. The Applicability of the Universal Codes

Norman Potter, in his argument on the establishment of the design principles in the modern world, states that the design of forms should be something more than the use of these principles or producing orders of form and forms of order that is experienced concretely. He refers to Viktor Frankl[125], who in his book points out, as he has "… written from direct experience of the concentration camps, it is curiously easy to overlook, in any analysis of human motivation, the tenacious strength of the human search for meaning."[126] Frankl, in his book states that "Logotherapy, or, as it has been called by some authors, "The Third Viennese School of Psychotherapy," focuses on the meaning of human existence as well as on man's search for such a meaning. According to logotherapy, this striving to find a meaning in one's life is the primary motivational force in man."[127]

Concerning the necessity to work with principles and orders, Gropius mentions about the creative potentials of the responsible act. According to him, "… **limitation** obviously makes the creative inventive." This is the point where he supports his idea of "… a common

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[125] Potter refers to V. Frankl, *Man's Search for Meaning* (London: Hodder and Stoughton, 1963).

Viktor Emil Frankl is a psychiatrist and a neurologist who has studied on Logotheraphy, which according to him "is derived from the Greek word, "logos", which is defined as "meaning"." (Viktor Frankl Institute of Logotherapy, " Logotherapy." (Abilene, TX: Viktor Frankl Institute of Logotherapy, 2005) Available: ADDRESS: http://www.logotherapyinstitute.org/logotherapy.html [Accessed: 2 December 2007].

[126] N. Potter, "What is Good Design?" *Issues in Design Education* (Essex: Longman Group UK Limited, 4 1990: 44).

[127] V. E. Frankl. *Man's Search for Meaning; an Introduction to Logotherapy*, (Boston: Beacon Press, 1963: 98-99).

denominator for design …" as a "… common key for understanding the visual arts."[128] Regarding the abstract principles of basic design Gropius states that:

> *Order of course can never become a recipe for making art. The artist's inspirational spark transcends logic and reason. But a language of vision derived from old and new discoveries in science controls his creative act. It provides simultaneously the common key for understanding the artist's message and transforms its paradoxical contents into visible terms of expression.*[129]

Developing practical skills has already been mentioned to be by means of personal experience. As noted in the Report of the Committee on Techniques for the Enhancement of Human Performance (CTEHP), for the transfer of the knowledge of skills, in addition to the importance of concrete experience, the employment of abstract principles is defined as a 'training context' corresponding the 'design studio' in institutional education of architecture.[130] The term 'abstract principles of design' constitute a set of universal codes that the student is expected to act responsible for.

In addition to the explicated codes of the prepared basic design experiences for the introductory architectural design education, Denel states about the intangible requirements of the study of form and space in the basic design course, the aim of which is achieving a meaningful space. Regarding these requirements, he discusses about the development of the consciousness of the "social," "psychological," "economical," "mobile," "aesthetic," and "recapitulative" dimensions of design elements.[131]

Concerning the argument that Denel carries, it is understood that he generally refers to an adequate intellectual background of the students especially in relation to the intangible dimensions of the design act; however, he does not investigate how it is possible to persuade the students for their necessity or usefulness. The term persuasion here is important; because it not only indicates the understanding of the coaches' requirements, but also personally comprehending and learning the importance of these requirements in their personal knowledge development processes. It is apparent that Denel grounds the discussion on the act of learning by experience including the knowledge of these necessities. However, taken

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[128] Gropius, *Scope of Total Architecture*, (1955: 47-8).

[129] Gropius (1955: 48-9).

[130] National Research Council. *Learning, Remembering, Believing: Enhancing Human Performance*, Eds. D. Druckman and R. A. Bjork, (Washington, D.C.: National Academy Press, 1994: 27).

[131] Denel, *A Method for Basic Design*, (1979: 92-105).

from the point of the personal knowledge theory, the experience should be a creative act to have a cognitive value, which indeed means that it necessitates a personal will based on a personal reason and an idea to deal with these dimensions. It is therefore possible to mention that how to cultivate the will to be engaged in a design act has not been touched by Denel.

However, as Özkar depicts, the danger of the responsible act for the defined basic design principles and codes have been experienced. Departing from the initial objective of the Weimar, which is the freethinking creative individual, basic design had begun to be defined with norms and rules of a single code of production. For instance, the set of rules proposed for perception in the Bauhaus Gestaltist point of view, were converted into a style, later the rules of which directed the phase rather than the actual reason for the act of creation itself. [132]

Özkar's thesis is observed to rest on the idea that it is a dangerous task to explicate the principles for design thinking and prepare a collected guide book, just because it apparently holds the danger of the code of rules that is to be acted responsible for; not only individually but also collectively.[133] Agreeing to this point of view, but in a more radical manner against the possibility of applying basic design as a means for creative transition, Yürekli states, "[b]asic design as a design tool producing a closed system, and therefore introducing a style with established aesthetic values, cannot be considered as a tool to develop architectural design."[134]

Not only the codes or principles but also the methods and means for experiencing the creative act can be dangerous when applied without the sight of the meaningful whole. For instance about the abstract form composition, Arnheim states that:

> … To insist on a child's doing 'abstractions' is as harmful as forcing him to draw lifelike representations.

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[132] Özkar, "Uncertainties of Reason: Pragmatist Plurality in Basic Design Education." (2004).

Özkar, focuses on the dichotomy between the idealist modernist universalism and creative experiential plurality. As she states in its abstract her dissertation "… argues to encourage creativity in the formative years of design education …"

[133] Özkar (2004: 15).

[134] H. Yürekli, *The Design Studio: A Black Hole*, Gülsün Sağlamer (ed.). (İstanbul: YEM Yayınları, 2007: 30-31).

This is true at any level of education. ...[135]

According to Arnheim, the former forces the student, in forming his representation, to "imitate but not master" where s/he does not comprehend what s/he does. In relation to this, he further argues that "… techniques inviting visual confusion or creating excessive difficulty or complexity are destructive; so is the practice of changing tasks so often that the student cannot explore the visual characteristics of a particular medium thoroughly."[136]

3.5. Possible Means and Methods for Managing the 'Transition Period'

Within the research act of the architect, which has already been discussed as a part of the heuristic act, not only the current or historical theories of architecture, but also the position of the world should be comprehended. It should be used as a tool to generate new knowledge from a critical point of view, by means of reasoning. By this way, it would be possible to gain a skill to theorize the architecture of the time, or understand it as part of a comprehensive whole. This inevitably necessitates the skill to explicate the meaning of the work done. It is evident that the knowledge of the existing paradigm and the historical paradigm shifts in Kuhn's terminology should be *known critically* by the designer in order to build an intelligible reasoning while designing. Based on the idea of improving architectural knowledge within experience, as Bereiter would also agree, the method of education should keep the principle of concentrating on the design process more than on the product, and encouraging the student to focus on his/her learning from the process and adopt it as a way of life.[137] The reason for this is mainly the role of experience on constructing the personal codes of continuous self-education. they may not be reflected on at every instance of action, which would remain as tacit skills of action; and therefore, according to Dewey they must be constructed on 'good experience'. Dewey puts forward the question of continuity as a criterion to identify experiences as 'educative' or 'mis-educative'. States he, "… there is

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[135] R. Arnheim. *Art and Visual Perception: A Psychology of the Creative Eye*, (Berkeley, Los Angeles, London: University of California Press, 1997).

[136] Arnheim, *Art and Visual Perception: A Psychology of the Creative Eye*, (1997).

[137] Bereiter, *Education and Mind in the Knowledge Age*, (2002: 446).

some kind of continuity in any case, since every experience affects for better or worse the attitudes which help to decide the quality of further experiences … "[138]

In relation to the discussions on aesthetic experience and comprehension in architecture, the development of architectural knowledge in students has been dealt by many researchers of architectural education. For example according to D. Kunze[139], the key concept for solution of the problem of limiting architecture to only mechanic purposes is the representation of architect's ideas. This is correspondent wit the idea of articulation. He criticizes the attitude of the architectural educators for their closeness to logical positivists. He touches the problem of the lack of emphasis on *meaning* in architectural education while focally concentrating on the mechanical solutions. He explains its solution with the concept of representative architecture, which apparently regards design as articulation of meaning. According to him, human relationship with space originates a rediscovery of "space's inherent intelligibility"; [140] the idea of which in its essence has the personal development of knowledge for the meaning that constructs this relationship between men and space that is inexplicable.

For comprehending how to fulfill the needs of the first-year architecture education, it is beneficial to look at some approaches applied within the first-year design studios.

3.5.1. Studio Exercises

According to Aytaç-Dural play is a tool for creativity.[141] She discusses 'play-instinct' as a guide for realizing the pedagogical objectives in the first year architecture education, which according to her, has two extensions as; the exercises' being a voluntary activity for the students unbound with obligations and duties; and being different from the ordinary and the *real* with its own rules and principles. This discussion is based on the outcomes of the analysis of the pre-university schooling education of the children as its objective to eliminate

[138] Dewey, *Experience and Education,* (1997: 37).

[139] Donald Kunze is a faculty member of the Pennsylvania State University College of Arts and Architecture.

[140] D. Kunze, "Commentary on Architectural Education." *Journal of Architectural Education (1984-)* (Association of Collegiate Schools of Architecture, Inc., 40.2, Jubilee Issue, Winter, 1987).

[141] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 20).

the students play instinct and its imposition of an attitude on them distant from and ignorant of everything that appears unreal.[142]

According to Linda Searl architecture gaming is a method for architectural education, which completes the lack of confidence by the lack of a variety of architectural experiences with the playing experiences of the students. She argues that both playing and designing games may provide a ground for the students to understand the problem solving process.[143] For this approach developing strategies for approaching a successful end in a game may simulate the heuristic act with finding one's own means within his/her available knowledge. Exercises designed in this scope would therefore provide the necessary experiences for personal problem solving act that would help the student develop a personal method of learning to be applied in the architectural design problems. Such a process would also provide a ground for the continuous self-education of the architects.

When considered from the point of Polanyi's discussions on the creative act, the 'play-instinct' may also provide a relevant discussion area especially concerning the free thinking in problem selection and jumping into it with a heuristic passion. This relation may be explained with the detachment of the students from the real life, which would give way for them to feel a temporary confidence. However, such a confidence cannot be the same as it was in their pre-school ages for their limited play-instinct and detachment from their imaginary worlds during their primary and secondary education may lead them to resist a temporary disconnection with the real life. Moreover, this confidence may also be obstructed by the feeling of being in a class and the feeling that they will be graded according to their performances in the 'plays' as inevitable parts of the real world of the students.

The importance of grading usually may not be suppressed to a secondary position for the students for the sake of putting their heuristic passion on the primary, which is in fact 'unreal'. It is possible to think that when architectural education is imposed as a sense of 'learning to play', the students may not take it serious for their own education. They may directly concentrate on taking the highest grades possible by means of giving the instructors

[142] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 94).

[143] L. Searl, "Architecture Games." *JAE* (Association of Collegiate Schools of Architecture, Inc., 33.1, Sept.,1979: 36).

what they would like to see for achieving a high cumulative at the end of the semester, which appears to be more beneficial than what they actually learn for their future profession.

It is also necessary to keep in mind that not all the factors hindering the creative freethinking of the students disappear when they enter university. Especially the adults in the students' environment may continue to refuse the adulthood of their children. They may also compel them to deal only with what is worth to deal in the way that they think to be right. The resistance of the students to their education is also most probably fed by their parents especially when they are asked to 'play' by their instructors.

In the studio exercises, it would be beneficial to try to understand and evaluate the outcomes of those that have been previously applied and evaluated by means of their own reflections. R. White explains such an experimental exercise, which was held in the University of Sheffield, School of Architecture, designed for giving the responsibility to students for running all the exercise.[144] The aim of the exercise was to increase student participation and area of reflection. The significant point is that within the exercise program and its evaluation phase the basic concern of the tutors was to get information about the reflective potentials of the students on their design processes, which, as it has been discussed widely, includes an intention about understanding the students' level of consciousness of their tacit powers.

The exercise may be regarded as a game, where the roles are defined for each participant of the game. As White explains, the basic principle of the game was that each student had a chance to act as a critic and was obliged to give feedback to what is presented. Therefore, all students were obliged to present their own ideas, constructively criticize someone else's idea, and give feedback to the exercise. The feedback questions were for gathering and understanding the opinions of the students for the exercise's success on "increasing student participation," "encouraging skills for presentation," and "encouraging constructive criticism." Moreover, White expresses that the tutors also gave feedback of the exercise with the same questions.[145] It is quite apparent that the exercise has aimed to encourage the students to take responsibility for their own learning. This example exercise is important for this study; also because, the idea behind it asserts that the learning level of students can be

[144] White, "The Student-led 'Crit' as a Learning Device." (2000: 212).

[145] White, "The Student-led 'Crit' as a Learning Device." (2000: 217).

commensurable to the extent that they can be reflected on by means of feedbacks gathered from both the students and the tutors at the end of the exercise.

Another example for exploring the evaluation of the development of skills in first-year architectural education is the exercise that Torrington explains. The primary object of the exercise is the evaluation of the group-working skills of the first year architecture students, which is believed to be beneficial for improving the rate or reflection.[146] The method for gathering data and constructing the basic elements of the argument on communication skills is the questionnaire that is applied to the students to gather information about their opinions on their own attitudes and abilities. This method is similar to the exercise explained by White. However, one of the basic differences is that in the case that Torrington explains the application of the design project was in its third year of running, so that during its application, it had been clearly recognized that the students' past experiences had not been sufficient to provide them the necessary personal knowledge for the development of the expected skills.[147] This proves the necessity to have reliable opinions about the tacit powers of the students.

In Torrington's example case, the task had several intentions, which have close connections with the structure of the creative act. One of the intentions was to ensure that the students are persuaded and motivated to work in groups, which appears as a close approach to encourage the students to have a heuristic passion and believe that they will have a valuable outcome at the end. The second intention was to give the students the opportunity for reasoning what it means to work in a group, which appears to have close connections with the task of creating one's own means for the solution of a particular problem within the heuristic act. The third intention was to give the students the opportunity to make a reflective review of their works, which is very close to the ideal of providing the necessary conditions for the act of learning

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[146] Ledewitz states that group exercises in the design studio are more beneficial than the individual work for the explication of the ideas for the sake of achieving agreed-upon objectives and methods for design.

S. Ledewitz, "Models of Design in Studio Teaching." *Journal of Architectural Education (1984-)* (Association of Collegiate Schools of Architecture, Inc., 38.2, Winter, 1985: 3).

[147] J. Torrington, "The Development of Group-Working Skills and Role Play in the First-Year Architecture Course." *Changing Architectural Education: Towards a New Professionalism* (London and New York: Spon Press, 8 2000: 87)

This feature of the exercise is related with the self-reflection of the tutors. This attitude appears to have enabled them to recognize the students existing personal knowledge. This discussion is overlapping with the final argumentation of this study.

from experience, by reflection-in-action. The important point is that the evaluation of all these intended tasks was by the information gathered through the questionnaires applied to the students before and after the exercise about their expectations and about what they have learned, including open-ended questions. Another evaluation means was the reports the groups have prepared, which provides another source for reflecting their works and processes. It is also important to note that the observational judgments of the teaching stuff about the improvement of the students' skills have been accepted as reliable evaluation criteria.[148]

3.5.2. Studio Communication as an Educational Tool

Aytaç-Dural considers **student-instructor** communication as an educational tool. This is the attitude that is usually appropriated by the instructors is acting on the 'stage' in front of the students where different roles are distributed between the instructors for reflecting a spontaneous production and exchange of ideas that is broadcast live.[149] Such a 'passive' exercise may enable the students imitate their coaches as their role models and therefore, lead them to produce and exchange ideas and criticize each other, and themselves.[150]

In addition to Aytaç-Dural, Saranlı explains another mode of student-instructor communication as an educational tool. He states about a general approach of a group of instructors of the beginning architectural design teaching at Middle East Technical University, Department of Architecture. This approach is the role taken by the instructors as not being satisfied with any creative thinking of the students even when they manage to become speedier in producing ideas, making decisions, and producing multiplicity of choices. He asserts that this role of being unsatisfactory makes the students also become unsatisfactory with what they produce, which is indeed the aim of what he calls as the helper for the personal development of the student for improving his/her skills in creative

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[148] Torrington, "The Development of Group-Working Skills and Role Play in the First-Year Architecture Course." (2000).

[149] Aytaç-Dural, *Theatre-Architecture-Education: Theatre as a Paradigm for Introductory Architectural Design Education*, (2002: 109).

[150] Aytaç-Dural also considers theatre, which she investigates as a paradigm for introductory architectural design education, "'as a way of comprehension' to be reflected in every aspect of life."

Aytaç-Dural (2002: 122).

thinking.[151] This approach appears quite reasonable for the reason that the mode of being skeptical and unsatisfactory about the process encourages the reflective thinking in action; in the acts of producing ideas and dealing with them passionately. This method of coaching is also a means for forcing the students to discover and explicate their tacit decisive powers, which is also a means for understanding their incompetence in decision-making and therefore, making the students feel that they have to expand their personal knowledge.

On the other hand, another set of argument is based on the use of communicative articulations as reflection tools, not only of the students but also of the instructors. According to Cowan, the student feedback in architecture education is the primary means for understanding their needs, problems on learning, and rate of learning. He also states that the information gathered by this method would enable the tutors to develop their exercise methods for the better learning of students. Also for evaluating the effectiveness of the activities held in design studios, Cowan states that knowing what the students expect to learn from the activities is necessary.[152] The reason for this idea that the feedback gathered from the students would be beneficial for the design teaching process is apparently the consciousness about the effectiveness of reflection-in-action in the learning process of the students, which is stopping and thinking about how the student is designing.

Concerning the improvement of the design studio itself, which is indirectly concerned with the improvement of the students' creative skills, reflections on the feedbacks appear as inevitable for finding better means for student reflections on their act of learning.

3.5.3. Enabling the Proper Setting for Reflection

To sum up the common points in all the basic needs of the educational environment of architecture, it is necessary to keep in mind that the task should be to encourage the students to take the responsibility for their own learning. The task is difficult; because, while trying to encourage the students that they should find their own means for achieving the solutions of their design problems, at the same time it is necessary to impose them the necessity for achieving a meaningful solution at the end of a heuristic act.

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[151] Saranlı, "Başlangıçtan Bugüne Temel Tasarım." (1998: 45).

[152] J. Cowan, "Evaluation and Feedback in Architectural Education." *Changing Architectural Education: Towards a New Professionalism* (London and New York: Spon Press, 28 2000: 278).

Up to this point, the relevance of the personal knowledge Theory and the theory of reflection-in-action has been investigated. The outcomes of this investigation show that reflection-in-action is the primary means for explicating and evaluating the tacit knowledge used in the design making process. The arguments emphasizing reflection-in-action as a means for learning and evaluating design, also inevitably take the attention to the idea that the evaluation of the students' rate of learning cannot be merely by the product but most dominantly by the design process.

According to Ledewitz, the task of sharing ideas by reflection engenders the opportunity to see the design intentions and the underlying cognitive scheme of the student project, while enabling information about the status of it.[153] In addition to the idea of learning by reflection in action in a design process, Nicol and Pilling state that the students should also be supported for developing the ability to "…improve upon their own learning processes from one design work to the next …." This is possible by giving the opportunity to analyze and evaluate themselves on their learning through design activities, which necessitates proper conditions to be prepared by the tutors for the students' self-reflection.[154] This idea asserts that the students should learn how to integrate their personal knowledge of different problems and solutions.

As Cuff states, the primary tool for operating knowledge in the design works of the students is drawing. Most of the time feedbacks gathered for the evaluations of the students' learning rate and the exercises are obtained from the students' drawings. She also expresses that improving drawing skills of the students increase the rate of reflection for their ideas, and therefore, influence the imagination of the students; which asserts the idea that the ability to reflect on the ideas engender the confidence in the idea decision of the students.[155] Cuff also makes it clear that drawing is a medium where the tacit powers of both the designer and the observer reciprocally react.[156] On the other hand, it is also important to keep in mind that communication and therefore reflection in architecture education is complete with the combination of verbal explication skills with the drawing skills. In light of this fact, there

[153] S. Ledewitz, "Models of Design in Studio Teaching." (Winter, 1985: 6).

[154] Nicol, "Architectural Education and the Profession: Preparing for the Future." (2000: 12).

[155] D. Cuff, "Teaching and Learning Design Drawing." (Spring, 1980: 6).

[156] D. Cuff, "Teaching and Learning Design Drawing." (Spring, 1980: 9).

have been introduced other formative evaluation methods of the studio exercises to be applied in concordance with the evaluation of student drawings.

J. Cowan explains numerous forms of collecting feedback from students and tutors other than drawings for collecting data for formative evaluation of the design exercises and students' level of learning. Keeping the incommensurability character of tacit knowledge in mind, these approaches for feedback are important devices for generating grounds to enable a reciprocal reflection of the students and the tutors on the work done in the studios. These feedbacks are mainly concentrating on the process as short intervals in the process for gathering information about the inexplicit know-how of the students' and the tutors' acts. Related with the principle of learning through experience with the support of reflection-in-action, Cowan argues that evaluation and feedback should become a natural part of the learning process for the students and tutors rather than a separate activity.[157]

It is besides noteworthy to express that also Cuff uses the feedback evaluation method based on the comparison between the tutors' and the students' answers to the questions concerning the teaching and learning aspects of architectural drawing in order to discuss the students' improvement in drawing and design skills.[158] She uses comparative tables for the thoughts of the tutors and the students, which as she states are "… based on discussions, observations, and interviews …." It is also apparent that by means of these feedbacks, Cuff was able to verify that the students could not understand the actual intentions lying beneath the criticisms made on their drawings by their tutors.[159]

3.6. Current Condition of Introductory Architecture Education

In the case of the Bauhaus, there was an obvious agreement for the need of a new attitude in the unification of the design thinking and mass production. Remembering the problems of architecture education in today's Turkey it is clear that the case is not the same with that of the post-war Germany. There is not an intellectually supported consciousness about the

[157] Cowan, "Evaluation and Feedback in Architectural Education." (2000).

[158] See Appendix A.

[159] States Cuff: "…The instructor utilizes a broader conception of graphics than evidenced in any single project, and students find it difficult to see the underlying pattern."

D. Cuff (Spring, 1980: 8).

design thinking of our era in the students' minds such as the understanding of and opposition for the romantic individualism.[160]

As Itten explains, the "Basic Course" at Bauhaus was a trial semester for the students, after provisionally admitting all students who showed an interest in art. The preliminary condition was the *interest in art*. This means that the criterion of the selection system also affected the student profile in terms of their enthusiasm for becoming creative individuals, where elimination was possible when this was not the case. [161]

When the applications of Itten's Basic Course on today's introductory architecture education is considered, it is possible to see a neglect of this attitude of him when compared to what he calls as the universal codes of "form and color." This is indeed the neglect of the personal dimension and the necessity of the heuristic passion, although the lack of which is mostly criticized in the instructions.

As one of the most important theorists that outline current basic design education in Turkey, Bilgi Denel's definition of the creative individual is founded on the ideal of "bettering our environment."[162] However, as personal knowledge theory is considered, this may not be the only legitimate motive of a designer architect's heuristic passion. Moreover, even in the field of this altruist attitude of the architect, Denel does not elucidate how the intent to take the responsibility of "bettering environment" may turn into a passion.

As a slight proposition for the development and maintenance of motivation in design, Potter states that the motivational forces must be examined in a rational way "… with a more intimate sense of their origins, and the cost of their frustration." This statement proves his emphasis on personal motivation in design. In this concern, he adds by explaining the motivational forces as the synthesis of thought and feeling, that "… if a new synthesis of thought and feeling is to be attempted," the consideration of the social renewal must find its place in the design thinking.[163]

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[160] As Dorner explains Bauhaus was an attraction point for those who wanted to find a new way of life after "catastrophe of 1918" in contrast to those who were clung to the past. This explains that there was a strong motive for the first group because of their extreme fraction from the second in the so called "confused period of the Post-War Germany," as Dorner expresses, even for those from outside Germany in :Dorner, "The Background of the Bauhaus." (1952: 9).

[161] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 9).

[162] Denel, *A Method for Basic Design*, (1979: 5).

[163] Potter, "What is Good Design?" (1990: 49).

In *The Universal Traveler*, which as Denel suggests is not used in architecture education program in Turkey as a guide for the self-development of the creative ability; it is advised to be self-motivated to the design students. This means that Koberg and Bagnall's book considers the act of motivation for the solution of a problem, which is highly related with the argument of this study about the heuristic passion, as a responsibility of the student.[164] This consideration appears quite relevant with the undertaking of the self-responsibility for learning; however, this does not mean that this issue should not be considered in the design of the exercises by the instructors. At least the students should be allowed to understand that they are expected to motivate themselves for their problem-solving processes. The book advises the students to take every problem as a challenge for self-motivation, which is called as "the generator of the process."[165]

[164] Koberg, *The Universal Traveler: A Soft Systems Guide to Creativity, Problem-Solving and the Process of Researching Goals*, (2003: 11).

[165] Koberg (2003: 17).

CHAPTER 4

METHODOLOGY AND THE RESEARCH PROCESS

4.1. The Relevancy of the Research Question and the Research Technique

The discussion of this study that has been developed up to this stage needs to be clarified by a comprehensive whole to reflect on. Understanding tacit knowledge and the creative act has been discussed to have more potential with the educated mind. This outcome brought about the relationship between the creative act and education in architecture, where the students are supposed to learn how to act creatively.

The findings concerning tacit knowledge, creative act, and the personal dimension in the first year of architecture education are decided to be exemplified with the data gathered through a process of observation in a first year design based course of a department of architecture. The objects of this exemplifying research are the available media as the articulations of the ideas, beliefs, behaviors, and experiences of people who act in the selected example course.

However, before continuing with this exemplifying, other possibilities to utilize these media is a point of attraction. This is the question that reflects the process of seeking for the best possible research technique for this study which continued with the literature survey for the existing studies about the concern. The fundamental purpose was to clarify the internal relevancy and consistency between the approach, attitude, expectations, and reflections.

When the inspirations, thoughts and works of the investigated authors, their theories and the developmental character of this study are considered, it is possible to think that the process of gathering the necessary data for this thesis work would require qualitative research techniques and interpretation. On deciding on the most appropriate technique, the reasoning behind the selection should be very clear in order not to lose the meaning of the whole while

trying to focus on the subsidiaries. This need is also dealt by Janesick, who discusses the qualitative research techniques and asserts that a qualitative researcher, mainly the PhD students without exception, feels responsible about explaining the basic information about qualitative research to his/her committee.[1]

This sense of responsibility requires an investigation into the previous attempts to deal with the subject of tacit knowledge, before continuing with how the argument of this study can be exemplified with a first year design course. The reviewed previous studies with close topics and keywords to that of this study, provided different possible approaches on completing a research on tacit knowledge, personal knowledge development and creativity.

4.1.1. Possibilities to Complete a Research on Tacit Knowledge and Creative Act

In this section, two different example researches on the same study area are going to be explored to give the opinion about two different possible approaches. The researches on tacit knowledge are encountered in a specific area of discussion, namely 'practical intelligence'. Regarding its accordance with the decisive power of tacit knowledge and its use as a synonym with "how to" knowledge, this example discussion area appears to demonstrate different attitudes towards the personal knowledge development in the current literature. Studies on 'practical intelligence' may be discussed with its examples of the different research methods as quantitative and qualitative. Sternberg, who dealt with tacit knowledge measurement tests on the quantitative side, and Albrecht, who discussed about the individual power on creative act on the qualitative side, are the two different researchers on 'practical intelligence'.

Sternberg et. al. have a psychometric study on the measurement of tacit knowledge with quantitative methods. With a critical look at their focus on 'practical intelligence'[2], Gottfredson suggests that they "… have made an implausible claim, namely that tacit knowledge reflects a general factor of intelligence that equals or exceeds *g* in its generality

[1] V. J. Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." *Strategies of Qualitative Inquiry* (Thousand Oaks, CA: Sage Publications, Inc., 2nd ed. 2003: 62).

[2] R. J. Sternberg, G. B. Forsythe et. al. *Practical Intelligence in Everyday Life*, (New York: Cambridge University Press, 2000).

and everyday utility."[3] The term 'factor of intelligence' as a measurable entity appears to constitute its "implausibility", which has a claim to represent a wholly new intelligence distinguished from other forms of intelligence. Sternberg's work is valuable for questioning the relevancy of the quantitative means with a study on tacit knowledge and creative act, which is the next step.

On the other hand, Albrecht relates practical intelligence with creativity without any attempt to measure it with a *generalizable* factor. His qualitative research resembles to that of Polanyi as he defines the opposite mode of creativity as conformity; which is indeed the danger of the responsible act. With the help of Albrecht's definition on conformity, different types of conformity can be explained. A personal experience of his is in his third grade elementary school exemplifies these different types. One type is that the individual thinks, "I am not creative." One other type is that it is thought, "Don't try to do things differently," and another is thinking, "Just do what is said [which equals letting the teacher be right]."[4]

On his explanation of and discussion on practical intelligence, Albrecht mentions about learning through experience. It is understood that he has a parallel attitude with that of continuous self-education as this study argues, as he states: "… and it needs a 'story line', as a sense of continuity that leads us from one level of understanding to another."[5]

With reference to the novel by David Zindell, *The Broken God,* Albrecht describes four kinds of thinkers. The first one is the "simplex" type. He explains people who are in this category: "They want to know what's right and what's wrong, who's right and who's wrong, who has the right answers, and whom they are supposed to hate." The second is the "duplex thinkers," who according to Albrecht prefers to believe that there are always only two and opposite sides of every story. The third is the "multiplex" thinkers who "… value their own learning and growth more highly than their need to be 'right'." He describes the forth as the "omniplex thinkers," "… who have not only became tolerant of ambiguity and complexity but who seem to enjoy it." He compares the multiplex with the omniplex: "While multiplex thinkers may be skillful in 'connecting the dots', omniplex thinkers tend to notice dots that

[3] L. S. Gottfredson, "Dissecting practical intelligence theory: Its claims and evidence." *Intelligence* (31.4, 2003: 391).

[4] K. Albrecht. *Practical Intelligence*, (San Francisco, CA: Josey-Bass, 2007: 100)

[5] Albrecht (2007: 37).

others fail to see."[6] In his definition of these four kinds, it is clear that he agrees the increasing creative potential of the educated mind.

He deals with the problem of individual persuasiveness of oneself against the creative act. States he: "With the help of early schooling experiences, many people conclude that they have no creative appetite or talents, and they adopt a pattern of thinking and behaving that reinforces this conviction."[7]

4.1.1.1. Attempts to Measure Tacit Knowledge with Quantitative Means

After focusing on Sternberg's studies on tacit knowledge, and observing the difference of his attitude than that of Polanyi on approaching it, it becomes necessary to question the attempts to measure tacit knowledge with quantitative means in further detail. Although it is perceivable that there is an awareness of tacit knowledge to a certain extent, the question is whether it is possible to measure it. It is ironical especially when the concern is the role of tacit knowledge with its incommensurable character. Varying in different levels of consciousness may give a doubt about the potentials and form of explication of the tacitly known. The appropppriate means for articulation may not be reflected through a multiple choice written testing system. Moreover, as it has been discussed with the ethical dimension of the incommensurability character of tacit knowledge, what to articulate and when to remain tacit is also a personal decision. This introduces an inevitable subjective will into what is intended to be measured through quantitative means.

Like this study has done with reference to the personal knowledge theory by Polanyi, Sternberg et al. make a classification of the features of tacit knowledge; which they later will define as the criteria for testing whether a 'specified' knowledge is tacit or not. According to their classification there are three features of tacit knowledge, which they use as checkmarks as they explain 'for understanding whether a specific portion of information is tacit knowledge, or not'.[8]

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[6] Albrecht, *Practical Intelligence*, (2007: 107).

[7] Albrecht (2007: 100).

[8] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 129).

According to them the first feature of tacit knowledge is that it is acquired on one's own and very little is acquired through environmental support.[9] When compared with the theory of personal knowledge, this idea corresponds with the suggestion that 'all knowledge is personal'; however, obviously disregards the 'master apprentice' relationship in the process of learning by doing. For the case in this study, the environmental support in concern is including the context and the studio instructors who are both designing the exercises, and constituting the role model in the studio. This feature, as defined by Sternberg et al., also obviously disregards the development of personal knowledge as the experience of the environmental settings and the enlargement of personal world by internalizing 'environmental support' when experienced, irrevocably develops personal knowledge.

The second feature that they define is that "tacit knowledge is procedural," which means that tacit knowledge is the knowledge of action.[10] As it is understood from the text, it is explained as the knowledge of behavior; the 'how to' knowledge. This feature corresponds with the power of tacit knowledge in momentary decisions as understood from Polanyi; but has a far less range of discussion when compared. When considered from the point of the personal knowledge theory, there is not a commensurable distinction between the knowledge of action and another form of knowledge, especially in terms of tacitness or explicitness.

The third feature that Sternberg et al. state is that "… tacit knowledge is practically useful …," which appears to mean that it is not acquired through formal means but in practice.[11] Here, it is not clear what Sternberg et al. mean by 'formal means'. If it is adopted that tacit knowledge is only practical knowledge, this may also mean that the act of comprehension is not a practice, when it is reading a book or attending a lecture or the like. Such an assumption appears to deny the concept of 'incubation' and the concept of personal enlargement of knowledge.

The fourth feature is that it "…involves coherent relations among its features."[12] This feature appears to permit further discussion than these first three classified features. However, this approach keeps the character of these "coherent relations" untold.

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[9] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 107)

[10] Sternberg (2000: 107).

[11] Sternberg (2000: 109).

[12] Sternberg (2000: 110).

Different from Polanyi, Sternberg et al. claim that tacit knowledge *may* have these features to certain degrees, and attempt to measure these degrees, opposing with the incommensurability character of tacit knowledge. In Sternberg at al.'s terminology, measuring tacit knowledge is used as synonym with "measuring real-world competencies." One technique proposed for this measurement is 'critical incident technique' that is composed of 'defining the behavior', 'defining the setting', and 'defining the consequences of behavior.'[13]

Defining the behavior may validate a certain use of tacit knowledge, but may not be useful for understanding whether there is a novice solution for an existing problem, or a personal decision. At this point, one critical question about the technique is whether it disregards the personal knowledge of the person who behaves as a whole; which consists of his/her past experiences.

Another technique that Sternberg et al. express is "simulations," which is the title of an example case in this study.[14] As Sternberg et al. state, they have used simulations both as assessment tools, and as training methods. In this technique, 'assessing behaviors', which are indeed the decisions in action, means to follow the traces of the decisive power of tacit knowledge. However, is it possible to assess the decisive tacit power? Sternberg seems to have an answer to this question.

Sternberg et al. explain the simulation method to "… involve observing people in situations that have been created aspects of actual job situation." In this statement, they refer to a designed condition for people to behave "naturally". However, although it has a potential to reflect the tacit powers of the people in concern to a limited extent, it is highly questionable whether they "… represent the actual responses that individuals would exhibit in real situations." Nevertheless, as Sternberg suggests, they are "… considered to represent …" when the simulations technique is applied and can be measured via "situational judgment tests".[15] From the point of this study, in this application the assessment results would remain

[13] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 119).

[14] See Chapter 5 for the exemplifying research cases.

[15] Sternberg (2000: 121-22).

It is important to note the simulation technique of Sternberg's discussion is an example for an attempt to measure tacit knowledge through score tests. Sternberg et al. explain simulation tool with two different techniques of measurement. They also state about the level of fidelity of the applied tests. One of them is the "in basket test" as of moderate level of fidelity where the individual is asked to

on an indeterminate level for the reason that when it is certain that a major part of the individuals' past experiences, skills and decisive powers are kept hidden in an act of decision making, only the ones that find a way to be explicated can become objects of research or assessment.

It may depend on how the individuals regard the setting; however, it appears impractical to assume that all individuals also try to understand how they would behave in the actual condition. Nevertheless, it may be more probable to expect that the individuals would want to give the best possible impression especially when they are informed that they are being tested. Let us assume that they do not know and/or notice that they are being tested; is it possible to convince them that they are in an actual situation? Sternberg does not discuss about deceiving the individuals, but makes a distinction in terms of the level of fidelity and admits that the higher the level, the closer the individual behaves to his/her actual.[16]

In the structured interview technique that Sternberg et al. use for testing tacit knowledge, the interviewer asks the respondent a story from which s/he learned a "lesson".[17] As understood from the text, eliciting is looked for in the way the respondent makes sense of the story s/he tells. It seems to be very important to distinguish between tacit and explicit knowledge. It is necessary to keep in mind what would it be useful for to elicit tacit knowledge. Looking back at the research on Polanyi's theory of personal knowledge the idea behind the need to know

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respond various materials. This is indeed a method of articulating the individuals' knowledge, however, is limited with the individuals will to answer. "Situational judgment tests" are of low-fidelity level and requires a problem solution from the individual. This may however, trigger the heuristic passion of the individual if s/he is an expert, compared with the previous testing system, which contradicts with its low-fidelity. On the other hand, in this second test the problem is given together with ready answers as a multiple choice testing system, where the expertise of the individual 'could' be measured. This system seem to disregard the personal character of tacit knowledge, and its being the know-how of the individual that is inexplicable and that was exemplified by bicycle riding by Polanyi. However, they further state: "… [Tacit knowledge tests] are intended to measure both practical, experience-based knowledge and underlying dispositions or abilities that support the acquisition and the use of that knowledge." (p.124).

[16] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 121).

[17] Sternberg (2000: 122).

Sternberg et al. describe the methods they used for determining personal memories of people for the decisions they have made with the help of their decisive power of tacit knowledge; but it is questionable whether these methods are helpful for illuminating what they actually know, or how they have acquired what they know. Neither do these memories give evidence about how to behave in the future; because they are somebody else's memories and there is inevitably a very big amount of information that is remaining untold about the experience and the way and reasons behind the decision taken in that experience. Nor do they elicit what is acquired and expanded in the personal knowledge in a certain experience. Therefore, the tacit remains tacit and incommensurable.

what one knows is concerned with the personal knowledge development. These interviews explained by Sternberg et al. appear to have been developed just to measure their expertise.

The differing approach of Sternberg appears as he mentions about "success" as the signifier of the developed 'practical intelligence'.[18] However, success is related with the solution of a problem. It does not necessarily include seeing the hidden behind the visible, or finding a new meaning in an existing phenomena; on the contrary, it can be obtained directly by the way grades are taken in the secondary education, which is obeying the given predefined rules, and putting the given formulae, where they are prescribed to put. One can be successful without enlarging his/her personal knowledge, if success is defined as the required solution of an already solved problem. This might be the difference with their understanding of tacit knowledge than that of Polanyi and Schön, as Sternberg et al. apply an irrelevant technique to investigate tacit knowledge, although they refer to these two names in order to give reference to the term 'tacit knowledge'.[19]

One of the aspects that Sternberg et al. define for establishing the validity of tacit knowledge tests is the *generalizability* aspect,[20] which has two critical assumptions in itself. The first is the assumption that tacit knowledge is testable; and the second is that it is possible to validate tacit knowledge tests. Generalizing the validity of the tests is highly dependent on the testability of tacit knowledge; which means that altering forms of the test can 'generally' be applied to different contexts.

It is also critical to think that it is tacit knowledge when the respondent can answer the question about what s/he has learned in a certain practice. As clarified in the personal knowledge theory, tacit knowledge has the characteristic to vary on different levels of

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[18] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 104) Although Sternberg has numerous publications on creativity, and hence discussions concerning the relation between tacit knowledge and creativity, in his attempts to measure tacit knowledge it is understood that creativity is taken as a trump for success. For example:

> R. J. Sternberg. *Wisdom, Intelligence, and Creativity Synthesized*, (Cambridge: Cambridge University Press, 2003).

[19] Sternberg et al. state: "The term *tacit knowledge*, introduced by Polanyi (1966), has been used to characterize the knowledge gained from everyday experience that has an implicit, unarticulated quality (Neisser, 1076; Schön, 1983; Sternberg 1985a, 1988, 1997a)." in Sternberg, *Practical Intelligence in Everyday Life*, (2000: 104).

[20] Sternberg, *Practical Intelligence in Everyday Life*, (2000: 109).

consciousness.[21] Therefore, a person may be conscious that s/he is experienced or that s/he knows how to ride a bike. However, it is also clear that according to the personal knowledge theory not all knowledge can be explicated that leads one to take a decision in a problematic situation. From this point of view, Sternberg et al.'s measurement remains indeterminate.

Regarding the relevancy of the question and technique, Gottfredson, who has dealt with "dissecting practical intelligence theory", shares the criticism of this study, by means of scrutinizing "its claims and its evidence".[22] It is important to mention that Gottfredson does not discuss anything about the role of the tacit dimension as another hypothesis she would put; but she questions the research question and methods of Sternberg et al. for their accuracy and consistency. She cites the argument of the theory, which is apparently against the generalizability of academic intelligence measures, and briefly compares it with the attitude to measure tacit knowledge. Asks she:

> Recall that, although Sternberg et al. (2000) dispute any claim that *g* represents a truly general intelligence, they do accept the evidence that it is general within the realm they have labeled academic, which includes "conventional" mental tests. That psychometric generality, as limited as they view it, was established empirically via factor analyses of many batteries of diverse tests, some in representative samples of the population (Carroll, 1993). What is the analogous evidence for a general factor of practical intelligence, specifically, ''[t]he ability or propensity to acquire tacit knowledge. . . that conventional ability tests do not adequately measure'' (Sternberg et al., 2000, p. 111)?[23]

Gottfredson illuminates that the legitimacy of the two evidences of Sternberg et al.[24] for a general factor is provided again by itself.[25] As she expresses, the results of the tacit knowledge tests that are applied are evidence either for "domain generality" or for "domain specificity" where all the results come to pass as they provide either "convergent validity" or

[21] Polanyi, "The Calling of Man." (1959 44).

[22] With her cited article, Gottfredson has won the 2005 Mensa Excellence in Research Award, the information of which is available at: American Mensa. Ltd. 2008. ADDRESS: http://www.mensafoundation.org/Sites/foundation/NavigationMenu/Programs/ExcellenceinResearch/Pastwinners/20042005/2004_05.htm [Accessed: 3 January 2009].

[23] L. S. Gottfredson, "Dissecting practical intelligence theory: Its claims and evidence." (2003: 374).

[24] Sternberg, *Practical Intelligence in Everyday Life*, (2000).

[25] L. S. Gottfredson, "Dissecting practical intelligence theory: Its claims and evidence." (2003: 374).

"discriminant validity", which is interpreted by Gottfredson as a "heads-I-win-tails-you-lose" situation.[26]

She further illuminates another critical assertion of Sternberg et al., which is that practical and academic intelligences are distinct from each other, while as she also points out that it is not clear what tacit knowledge tests measure different from that of the *g* tests.[27]

4.1.1.2. The Possibility for Assessing the Creative Skills

As a result of the unspecifiability and incommensurability characteristics of the power of tacit dimension on the development and performance of the creative act, it is quite questionable to make a quantitative assessment of the creative skills, like for instance with the measurable components of intelligence. In this regard, P. Torrance agrees that creative thinking abilities, for which he has a very similar definition with that of Polanyi and Koestler, cannot be assessed by the tests of intelligence.[28] Similar to Koestler, he defines the creative process as "… the clarification of the problem," "… preparation and production of possible solutions for the problem," "… simultaneously coming out with a new idea," and "… experimentation to evaluate the most promising solution for eventual selection and perfection of the idea," which has been defined as a meaningful solution to transmit the idea.[29]

In light of this parallel approach of Torrance with this study in terms of defining the creative process, it is important to look at how he sums up the major "… deficiencies of the traditional measures of intellectual talent and personality assessment." One of these deficiencies is the measurement of technical skill development instead of originality or freethinking ability or creative thinking and behaving skills. Another one is the "… overemphasis on traditional academic values …," which, according to Torrance, means valuing the ability to memorize and repeating arbitrary information rather than creative,

[26] Gottfredson, "Dissecting practical intelligence theory: Its claims and evidence." (2003: 374).

[27] Gottfredson, "Dissecting practical intelligence theory: Its claims and evidence." (2003: 379).

[28] "I have chosen to define creative thinking as the process of sensing gaps or disturbing, missing elements; forming ideas or hypotheses concerning them; testing these hypotheses; and communicating the results, possibly modifying and retesting the hypotheses." in :E. P. Torrance, "Assessing the Creative Thinking Abilities." *Guiding Creative Talent* (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 2 1962: 16).

[29] Torrance, "Assessing the Creative Thinking Abilities." (1962: 17).

inventive, or original thinking. Another one is related with the attempt to lump talent, creativity and conformity. Assessment of a talent is highly irrelevant with the concern and scope of this research, and stays out of context; however, the concepts of creativity and conformity oppose each other totally, especially regarding the ideas of 'heuristic passion' by Polanyi and 'incubation period' by Koestler. Another deficiency that Torrance touches lies in the nature of multiple-choice testing system, the results of which have been discussed also in this study as leaving no room for different points of views and for having only one correct answer for one question; and hence, creative act. He finally mentions about the measurement of conformity as a value of intelligence, which is indeed not a criterion for creativity, and contradicts with the idea behind creativity for it necessitates going beyond the conventional conceptions and finding one's own means for the solution of an incubated problem, which has never been solved before.[30]

Similarly, Renshaw has a parallel approach with the scope of this study, and argues that any attempt to "measure" the underlying essence within any creative experience with "crude measurement procedures" would damage creativity and the acquirement of the inexplicit that renders the whole as meaningful.[31] Recognizing the tacit powers of an act of comprehension is a different thing, which would encourage the passion to learn in action as well as the passion to solve a given problem.

Guilford states that tests applied to measure intelligence, which "… have fallen into certain stereotyped patterns, under the demands of objectivity and for scoring convenience … may prevent … [the creator] … from showing what he wanted to show."[32] He adds that indicators of creative act could not be measured even for the distinguished men of history. According to him, what is measured through intelligence tests are not the demands of the creative talent. He actually believes in the concept of whole personality including all the intellectual and creative abilities, where *ability*, *interest*, and *temperament* variables operate.[33] States he, "… we must look well beyond the boundaries of the IQ if we are to fathom the domain of creativity."[34]

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[30] Torrance, "Assessing the Creative Thinking Abilities." (1962: 18-22).

[31] Renshaw, "Connecting Converstations: The Changing Voice of the Artist." (2005 112).

[32] J. P. Guilford, "Creativity." (1950: 445).

[33] Guilford, "Creativity." (1950: 447).

[34] Guilford, "Creativity." (1950: 448).

Assessment is not only the concern of the researcher but also the educator, for deciding on the educational environment. It is a method of articulating the outcomes of the tasks handled in the design studio. It is not only assessing the students' condition, but also reflecting on the designed educational environment. If assessment for design education and/or knowledge cannot be made via simple stereotype measurement criteria as argued above, what can be the means of this self-reflection of the instructors? This is a question about the qualitative methods of assessing someone else's knowledge. Renshaw, concerning the issue of mapping the criteria for assessment in institutional education, mentions about the importance of managing knowledge and mentions that, "[r]esearch in this domain is more likely to be qualitative in character, arising from the reflective practice aimed at extending the boundaries of knowledge and experience."[35]

Green takes the problem from another point of view. He states that the role of the "teacher" has to be redefined and converted from the "… critic or 'marker' to a role of educational designer …," which means that the aim should be enabling the student's self-evaluation.[36] This necessitates the redefinition of the roles of the both sides. According to this point of view, the instructor team must understand that they are responsible for preparing the necessary setting for the students' creative experience in design. Relevantly, the students must understand that the only authority to assess and judge their knowledge, expertise and success is themselves, with their personally constructed means and intentions.

As have been discussed earlier, the creative act necessitates the development of the personal idea within the design act, which direct the heuristic process and enable the individual to reflect on his/her act, decisions and rejections. The criteria for evaluation and assessment, therefore, exist within the design work itself. Therefore, Green's argument overlaps with the ideas of self-evaluation, self-reflection, and self-education. On the other hand, the question of external assessment is about the external coaching for the development of students' self-educative skills. A major portion of it is about the external reflection in action, which requires a code or strategy for assessment. Below, there are two examples of assessment strategies in the qualitative form of data gathering, with their applications in the field of education.

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[35] Renshaw, "Connecting Converstations: The Changing Voice of the Artist." (2005: 112).

[36] Green, *Design Education: Problem Solving and Visual Experience*, (1974: 14).

In a survey that Torrance carried out, he states that he has witnessed that creativity is not given much importance in secondary school. In order to arrive at such a conclusion, the employed method was the assessment criteria of Guilford's five mental operations,[37] which were asked to secondary school teachers about the high school objectives.[38] The code he borrowed from Guilford provides factors that may be explored through verbal communication with the student. It is evident that these factors of assessment are the means for exploring the genuine codes of the individual that s/he is expected to develop in his/her heuristic act.

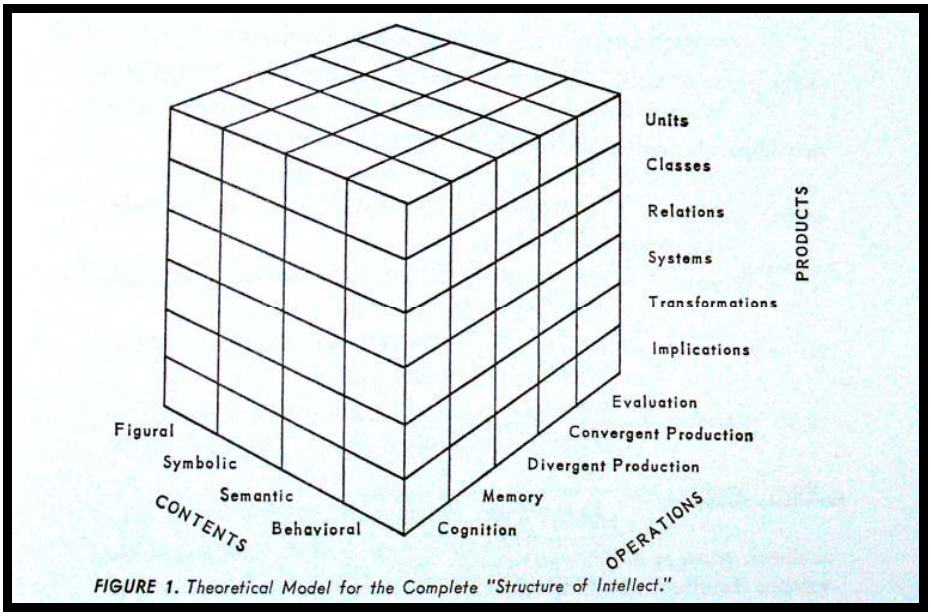

Figure 6: The assessment factors of thinking abilities that may be gathered through verbal communication that Torrance has reported with reference to Guilford.[39]

Within the factors that Torrance have listed with reference to Guilford, *the range of fluency* is related with the ability to recall the related personal knowledge that is explicable for a given particular. This is directly related with the ability to develop the highest number of ideas. *Originality*, therefore, is a consequence of the selection of one of the ideas produced

[37] Guilford, "Creativity." (1950: 444-54).

Bilgi Denel mentions that Guilford's speech he made in the American Psychological Association Congress in 1950 is a turning point for the education of creativity in :Denel, *Temel Tasarım ve Yaratıcılık*, (1981: 12).

[38] Torrance, "Assessing the Creative Thinking Abilities." (1962: 29).

[39] Torrance, "Assessing the Creative Thinking Abilities." (1962: 35-38).

and requires another ability, which is seeing the original potentials of tackling with an idea. Another factor is flexibility, which is the ability to construct the possible relations of a given object. This is indeed the ability to find and improve new ways of solution for a problem, which corresponds to the heuristic passion. One other factor for assessment is the "semantic elaboration" that is put into application by requesting the act of outlining a process with as many details as possible. The requests for figural and symbolic redefinitions are the media for assessing the ability to articulate. The semantic redefinition on the other hand is the factor to assess the observational thinking abilities such as gestalt transformations.[40]

Applying these factors, which are indeed different explications of the creative thinking abilities, has its problems. One of them is the uncertainty of which authority to decide for the originality, flexibility and inventiveness even when the fluency (number of ideas), the ability to draw an outline and the ability to guess and see all probable details can be observed and evaluated. This is a question about the possibility for assessing the creative skills.

Another example for the explicit set of qualitative assessment factors, this time for creative design thinking, is the 'design qualities' classified by Denel. These are:

a) Consistency of approach
b) Completeness within the given framework
c) In case of use of a number of orders, a hierarchy or a certain dominance of one over the others
d) Figure – ground interdependence[41]

It is important to remember that a major part of the knowledge that a tutor possesses to asses these qualities are tacit. The reason for this is the personally set codes that connect the two dimensional design elements, which is related with the tacit decisive powers of the designer. Indeed, what is transmitted through all of them is the meaning of the totality that is expected to be *created* by the designer, which necessitates an *incubated* idea and a *heuristic passion*. Therefore, these inspected features of a (creative) design act can only be followed by a person who has sufficient and relevant experience in the concern as comprehension. Still, the personal past experiences that shape up the personal assessment criteria and/or factors are tacit and vary from one person to another and from one case to another. This brings about the

[40] Torrance, "Assessing the Creative Thinking Abilities." (1962: 35-38).

[41] Denel, *A Method for Basic Design*, (1979: 24).

actual difference between even a two very similar explicable event that may occur in the same setting with the same subject but at different times.

4.1.1.3. Assessment vs. Reflection

Green, parallel to the understanding of personal knowledge theory, suggests that the criteria for assessment of the creative act is hidden in the decision making experience of the designer, which has been discussed as the tacit decisive powers of the individual.[42] Dallow agreeing to this view argues that, "[…] what is sensible, what makes *sense* in art practice, can best be assessed, initially at least, from the inside."[43]

Torrance being interested in the external assessment of the creative thinking process, inevitably mentions about the limitations for assessing the process.[44] They are the consequences of the non-reflexive and incommensurable nature of the tacit dimension in the individuals' creative act. This explains why the instructors' witnessing students' self-reflection on their works is more informative about the process and tacit decisions than the work itself. The argument about the secondary importance of the final work in comparison to the design process follows the necessity for a broadcast reflection of the student in the class in front of the instructors. This is a design problem of instructors for the educational environment.

Tony Aldrich presents a self-reflection based exercise module, the aim of which is to enable "students to make connections between their aspirations for architecture and their design process."[45] The module is entitled "Architecture and Self-Awareness," which was applied within a course on *Humane Architecture* at the University of Plymouth, UK. The intent is explained as constructing the students' self-awareness and *empowerment* for learning within

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[42] Green, *Design Education: Problem Solving and Visual Experience*, (1974).

[43] Dallow, "Outside 'The True'?: Research and Complexity in Contemporary Arts Practice." (2005: 137).

According to Dallow, within the contemporary understanding of production and creativity, "… creativity is not seen so much as producing *something* new, but as a *modality*, of and for 'newness'." States he, 'novelty' has become a "… contemporary *metaphor* for the dynamic aspect of what we experience as living (p. 140)."

[44] Torrance, "Assessing the Creative Thinking Abilities." (1962: 17).

[45] T. Aldrich, "Self-Awareness and Empowerment in Architectural Education: A Case Study." *New Practices - New Pedagogies: A Reader* (London and New York: Routledge, 15 2005: 180).

their design practice.[46] This approach collides with the intent of this study described as encouraging the students for taking their own responsibility for learning as a continuous process. It is clear that the term *empowerment* signifies the empowerment for self-education.

In the module that Aldrich explains, a technique used to explore the structure and content of personal knowledge with its tacit dimension is used, which is called 'Repertory-Grid' (Rep-Grid) and borrowed from Personal Construct theory that George Kelly had developed in 1950's by a citation from Fransella (1977).[47] Aldrich explains the technique as a tool that is expected to make the students interpret their own answers to the questions of Rep-Grid in their own terms.[48] This tool appears to have been developed for the purpose of increasing and/or enabling the self-reflection in action when cooperated with a design problem as in Aldrich's example exercise module.

As Aldrich reports, the outcomes of the exercise module applied in the given example suggest that the initial aims of the exercise that were mentioned above were met. The interesting point is that the application has collected the reflective comments of the students at the end of the exercise. According to his quotes from these reflective comments they have been able to recognize their surprises during the process, their deficiencies in their own way of designing, their discoveries about the sense of place, the connections between their 'self' and their 'design values', and the like.[49]

Looking through these outcomes, this example shows that the method of collecting reflective guides is a useful guide for encouraging the students' self-education and their process of filling the gaps in their way of design thinking. It is also useful for making them recognize the educational and self-developing value of experiencing design as well as experiencing existing architectural entities. The experience depends on the form of comprehension. It seems appropriate to mention that all forms of comprehension have such educational value, increasing with the method of self-reflection.

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[46] Aldrich, "Self-Awareness and Empowerment in Architectural Education: A Case Study." (2005: 174).

[47] F. Fransella and D. Bannister. *A Manual for Repertory Grid Technique*, (London and New York: Academic Press, 1977).

[48] Aldrich, "Self-Awareness and Empowerment in Architectural Education: A Case Study." (2005: 178).

[49] Aldrich, "Self-Awareness and Empowerment in Architectural Education: A Case Study." (2005: 182).

Another important point to mention for this exercise module is that, contrary to the existing common thought, it admits "… the student's personal knowledge and opinions as legitimate, necessary, and central academic material."[50] This approach does not ignore the student's preconceptions, which may be called as personal code of rules. Within the scope of this study, such an approach appears to be more beneficial especially taken from the point of the dangers of the existing code of rules. If it is not reasonable to ignore the danger for creative act, it can neither be reasonable to ignore what is dangerous. On the contrary, this attitude embraces the idea that the students must be allowed to recognize the danger of behaving with preconceptions and existing code of rules and the necessity to reconstruct them in each experience they have.

Within this module, it is understood that the participatory pedagogy is the means for coping with the problem of existing personal knowledge and code of rules. One important outcome derived from the module indicates that students' recognition of their insufficient personal knowledge and the method of learning through experience is a major means for motivating them to take action. Aldrich also adds that the improvement of the sense of empowerment is also beneficial for constructing the students' self-confidence and clarity of mind.[51] In other words, this is the enlargement of man's world with the act of comprehension, which would render the individual as more self-confident and courageous to jump into a problem, which is a condition for the creative act.

Another important outcome of Aldrich's evaluation of the exercise module has shown that "[g]enerally, pedagogies which adopt the strategies described above need to be utilized more widely, and *much earlier*, in student's educational experience … [emphasis added]."[52] This outcome directly supports the attitude to encourage the students' recognition of their personal knowledge and taking their own educational responsibility as early as possible. When the main concern is to construct the personal means and methods for learning through experience, the task must not be delayed to post-graduate studies. It has already been discussed that even the first year architecture education is too late and that it is very complicated and difficult for both students and instructors to handle. This idea supports the

[50] Aldrich, "Self-Awareness and Empowerment in Architectural Education: A Case Study." (2005: 182).

[51] Aldrich (2005: 182-83).

[52] Aldrich (2005: 183).

requirement for considering the first year in architecture education as a creative transition towards continuous self-education.

Concerning the research on the tacit decision making process and developing methods for increasing the creative power by means of increasing the area for reflective practice, MacLead and Holdridge have a radical argument when compared with the point of conventional academic research methods. They argue that art may be regarded as thought whilst art practice can be regarded as theory itself, on which research can be made.[53]

Regarding this point, they also state about the gap between the written and practical study carried out in the doctoral studies in Arts. In the examples of the dissertations that they have given as reflecting the process rather than imitating a research program, the rules of which were set formerly by conventional academic research methodologies, there are several questions that the authors of the theses had asked to themselves during the research process, which were written in the texts of the dissertations. In one example dissertation by Elizabeth Price in her thesis titled *Sidekick* (2000), she asks questions to herself, which she uses as her media for reflection in her research act. For instance, asks her, "Did I make it the way that I claim? Was it made in the way it appears to have been made?" It is clear from these questions that what Price sought for was honesty and consistency in her explication, and keeping her self-consciousness open.[54] This is an example of explicating the practical reflection within practice itself.

Parallel to this point of view, Walford emphasizes the existence of the researchers' personal dimension in a research act, be it qualitative or quantitative. Like Polanyi who argues that all knowledge is personal, Walford strongly emphasizes that "…all research has a subjective element …." On doing this, he defines the researcher as "the main research instrument" of the qualitative research. He apparently points the decisive character of the "… previous personal experiences and commitments."[55]

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[53] K. MacLeod and L. Holdridge, "Related Objects of Thought: Art *and* Thought, Theory *and* Practice." *New Practices - New Pedagogies: A Reader* (London and New York: Routledge, 12 2005: 143).

[54] MacLeod, "Related Objects of Thought: Art *and* Thought, Theory *and* Practice." (2005: 149).

[55] G. Walford. *Doing Qualitative Educational Research: A Personal Guide to the Research Process*, (New York and London: Continuum, 2001: 98).

The reflection questions that the authors of the doctoral theses mentioned by MacLead and Holdridge may be asked to students who are dealing with the design education and who acquire their personal knowledge in design experience. However, as it has initially been stated, the primary intention is not to give the students these readily prepared questions but to support them for wondering by their own will. Because, prescribing even the supporting questions asked for personal reflection would not give the students their real reason to reflect on what they do. With this expectation, it only carries a possibility for the students to discover that this is an external help for their personal knowledge development, which appears as quite optimistic, especially when the students are also graded for the expected reflections.[56] The similar is also valid for the instructors who – as a general rule – are used to assess the students' design behavior through personal assessment factors, which may not count the aspects of creative act for all instructors, and which is commonly called as special evaluation. The task should be to help each individual find his/her own means for a real reason to deal with the design act, which would be the same reason to reflect on it.

4.1.2. Exploring Qualitative Research vs. Quantitative Research

When Sternberg et al.'s studies appear stand on a different grounds than that of this study. They are approppriate for questioning about conducting a quantitative research on creative act and tacit knowledge. Regarding this question, it is beneficial to refer to Janesick for her discussions on qualitative research and interpretation. Especially concerned with the relevancy of the research question and the research technique she is strictly after a coherent attitude of the researcher that, according to her, would be open to threats for several reasons. An example may be cited from her as she states:

> In fact, a problem that concerns me in doctoral programs is obsession with method. For example, many doctoral students take a number of statistics classes and, for whatever reason, hire others to do the statistics for their studies and in fact the analysis and interpretation. Qualitative researchers do not fall into this trap. … This is a critical distance between the two paradigms …[57]

[56] The logbooklogbooks exercise that will be explained in the final chapter constitutes an example for the difficulty in gathering a real reflection on the design act of the students by the tutors.

[57] Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." (2003: 63).

In this statement, Janesick is understood to assert that the interpretation of the statistical data is not, in fact, interpretation. It is possible to agree Janesick from this point of view, as she states "… if someone else does two thirds of that work, what rite of passage has the student completed?"[58]

Walford gives examples from researchers who prefer to "…move away from statistical or empirical generalization from case studies, and have proposed that a wider significance of findings from a particular ethnographic study can be derived through the strength of logical argument for each case."[59] He also adds that this strength depends on theoretical reasoning that builds the connection between a particular case and a wider population.

For explaining the importance of the phase of interpretation further, Janesick refers to Moustakas' heuristic approach, which is very close to that explained by Polanyi. Moustakas explains this as "the phases of heuristic research" and examines in six phases: initial engagement, "immersion" in the setting, "incubation"[60], "illumination" as expanding awareness, "explication" of individual experience, "creative synthesis" for arriving at the meaning of the lived experience, which is the research itself, and "the validation of the heuristic research". Moustakas explains the validation phase as "The question of validity is one of meaning: Does the ultimate depiction of the experience derived from one's own rigorous, exhausting self-researching and from the explications of others present comprehensively, vividly, and accurately the meanings and essences of the experience?"[61]

When the book of Moustakas that is referred by Janesick is examined, it is understood that he is actually describing the creative act by means of explaining the discovery of a problem, the incubation period and creative solution. States he: "the period of incubation enables the inner tacit dimension to reach its full possibilities …." It is necessary here to note that

[58] Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." (2003: 63).

[59] Walford, *Doing Qualitative Educational Research: A Personal Guide to the Research Process*, (2001: 16).

[60] The term 'incubation' has been discussed previously with reference to Koestler, *The Act of Creation*, (1964).

[61] C. Moustakas. *Heuristic research: Design, Methodology, and Applications*, (Newbury Park, CA: Sage Publications, Inc., 1990: 32).

Moustakas directly refers to Polanyi on discussing the heuristic inquiry and the role of tacit dimension on it.[62]

Janesick does not cite from Polanyi in any part of her work, although she indirectly refers to his point of view and adopt it. This can be regarded as a proof for the suitability of the research question with the technique. This suitability is also visible in her defense against the quantitative research methodologies in her words: "Somehow we have lost the human and passionate element of research. Becoming immersed in a study requires passion: passion for people, passion for communication, and passion for understanding people."[63] It is apparent that the passion that she mentions abut is the heuristic passion that has been investigated by Polanyi.

Regarding her point of view, it is not surprising when she asserts, "… qualitative research design is an act of interpretation from beginning to end," which may be translated as personal knowledge development with a heuristic passion to solve an incubated problem.

4.1.3. Qualitative Research Methods

The attempt to not to lose the sight of the whole while focusing on the subsidiary particulars of the research work makes it necessary to know the possible dangers of falling into this trap. The research study, therefore, should not be for the sake of tacit knowledge, nor for eliciting the ways in which experts or students has acquired their tacit knowledge; but for collecting data on the attempts of learning how to behave creatively. In order to reach this goal, it is beneficial to know the probable paths that could be followed during the research study. Qualitative research has a number of research methods to be applied, most of which enable the researcher to complete his/her research with his/her own interpretations. This recalls the idea of developing ones own codes of rules rather than applying the prescribed ones.

Accordingly, Darlington and Scott state that in qualitative research, recording observations are less structured than quantitative research.[64] The responses to hermeneutic questions

[62] Moustakas, *Heuristic research: Design, Methodology, and Applications*, (1990: 28-9).

[63] Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." (2003: 71).

[64] Y. Darlington and D. Scott. *Qualitative Research in Practice: Stories from the Field*, (Buckingham and Philadelphia: Open University Press, 2002: 80).

which are about the construction of meanings are unlikely to be easily classified into mutually exclusive categories that could be quantitatively analyzed and even if they were, it is likely that much damage would be done to their "complexity and subtlety."[65]

As they suggest, qualitative research is mainly concerned with the meanings that people make to their lives, where "… in-depth interviewing is the most commonly data collection approach."[66] They further state that in many cases, a combination of approaches with interviewing is applied to answer different parts of a research question.[67] However, this may not guarantee that all parts and potentials of the research question can be prescribed before the qualitative research process. It is more probable that this combination occurs as an improvisation to solve the research problem; because, not all the subsidiary parts of the meaningful whole can be predetermined, rather most of them are coincided and discovered during the heuristic process.

From the point of Polanyi's theory of personal knowledge, parts are meaningful only when the whole is completed. The incubated problem and the tacit dimension forces the individual seek for new routes to follow and means to apply for the best possible solution. Similarly, Darlington and Scott agree this point of view as they imply that the qualitative researchers very often make the best choices available in the circumstances, after weighing up the pros and cons of a number of approaches.[68] This process is expected to be a part of the incubation period during the research process. Charmaz briefly sums up this discussion: "Let your research question shape the methods you choose."[69]

Janesick gives example research questions for qualitative research in order to show its distinction from quantitative research. One set of examples are "… questions related to the whole system as in a classroom, school, school district, city, country, organization, hospital, or prison." One other set is "… questions regarding the hidden curriculum or hidden agendas

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[65] Darlington, *Qualitative Research in Practice: Stories from the Field*, (2002: 7).

[66] Darlington (2002: 48).

[67] Darlington (2002: 49).

[68] Darlington (2002: 49).

[69] K. Charmaz. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (London: Sage Publications, 2006: 15).

in an organization." One other is "… questions pertaining to participants' implicit theories about their work."[70]

In her discussion on qualitative research, Janesick strongly emphasizes the necessity and importance of the researchers' personal participation in the research process. Regarding the personal dimension in the research act, Walford defines two forms of research that may be regarded as participatory. The first is what is called as "participant observation" in which all other actors are aware that the researcher is conducting a research; and in the second form, the researcher is a natural part of the setting as an actual employee in which the others do not need to be aware of the research act that is conducted by their colleagues. Walford states that this second form, "…has been encouraged among teachers and has expanded greatly in the last ten years: action research."[71]

Janesick not only emphasizes the participatory research in the data collection phase, but also the data analysis phase as interpretation. States she, "… simply observing and interviewing do not ensure that the research is qualitative; the qualitative researcher must also interpret the

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[70] Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." (2003: 52).

In this exemplifying, two questions that overlap with this study. The question of the dissertation is related with the "hidden curriculum" of the first year institutional education in architecture specifically for the design-based courses. It also addresses individual instructors' "implicit theories" or assumptions about their work. The researched cases' explanations are in Chapter 5.

[71] Walford, *Doing Qualitative Educational Research: A Personal Guide to the Research Process*, (2001: 108).

For further research on the emphasis on participatory action research for educational environments, what he states about the recent movements is considerable:

> In Britain it has become associated, in particular, with the work of McNiff (1988, 1993), Whitehead (1989), and Lomax (1990), and has become something of an evangelical 'movement' designed to change the nature of educational research such that it becomes an 'integral part of the work of teachers in schools rather than an activity carried out on schools by outsiders' (Hammersley, 1993).
>
> Stenhouse believed that teachers should systematically question their own teaching, have the commitments and skills necessary to study their own teaching, be concerned to question and test theory in practice, an be ready to allow other to observe their teaching and be open to their comments (Stenhouse, 1975). The key idea here is that the professionalism of teachers should not be based on external knowledge, but on ideas tested through their own action through continual invention and reflection. (pp: 108-110)

Walford gives the evidence that he agrees Polanyi in his idea on knowledge production as he states that self-reflection, as a structured activity, "in someways, … is the production of new knowledge. But it is a form of new knowledge that is highly specific to its context and its generator."

beliefs and behaviors of the participants."[72] Also states she, "[t]he process of reduction of data into a compelling, authentic, and meaningful statement constitutes an end goal of qualitative research design."[73]

4.1.4. Depicting a Guide for Researching the Exemplifying Data

Although there is a constructed argumentation of the study provided through the researched literature, a set of cases for exemplifying its application in an actual setting is researched in order to end up the qualitative work. The study up to this point is articulated within the structure of a continual discussion pattern. After this point, the attempt is to rearticulate the argumentation through exemplifying. The following part explains the selected guide codes that proved to be helpful on conducting the research of the example cases that is going to constitute the content of Chapter 5. They are the repertory grid technique and the grounded theory. It is important to note that as Janesick would also agree, the research required the development of its unique codes for exploration, theorization, and documentation. Below is the summary of these two different set of codes for explaining their parallel approach with that of this study and with the codes that are referred within them.

4.1.4.1. The Theory of Personal Constructs and the Repertory Grid

As it has been expressed earlier the repertory grid can be used as a tool for enabling the students self-reflection and informing the instructors about their decisive habits and knowledge. Repertory grid is the means developed through the theory of personal constructs, which has potentials to deal with the problem of assessing the creative skill.

As Kelly explains it, the repertory grid, focuses on the personal repertoire of experiences, which is personal knowledge. He connects it with the idea that life is characterized by the individual's capacity to represent his/her environment. This is a clue for a possible consciousness about the value of articulation of the tacitly known. This idea becomes clearer as he states "… both nature and human nature are phenomenologically existent."[74] As Kelly

[72] Janesick, "The Choreography of Qualitative Research Design: Minuets, Improvisations, and Crystallization." (2003: 59).

[73] Janesick (2003: 61).

[74] G. A. Kelly. *The Psychology of Personal Constructs*, (New York: Norton, 1955: 48)

expresses, the repertoire is composed of personal constructs, which are the patterns of thought constructed individually in personal experiences. Related with the constructs, he states, "… in general man seeks to improve his constructs by increasing his repertoire, by altering them to provide better fits, and by subsuming them with superordinate constructs of systems." The relevance between the theory of personal knowledge and personal constructs is recognized when Kelly mentions about the incommunicable character of these constructs. His study is focusing on the means and ways of "… making personal constructs and construction systems more communicable," which he calls as a "public construction system" for understanding other peoples constructs.[75] It is possible to think that Kelly is after articulating tacit knowledge.

The Repertory Grid can be interpreted as a means for enabling articulation for the observed cases of exemplifying. Kelly clarifies that the "[p]ersonal-construct theory approaches problems of commonality of behavior primarily from the point of the individual person."[76] He is positive about the articulation of the tacitly known as he states, "… the answer to our question about whether or not a construct can be communicated from one person to another without losing its reality is definitely yes."[77] It is understood that this can be possible by what he defines as the formal aspects of the constructs. Through his definition of these formal aspects, the gathered data from the example cases.

A part of these formal aspects is related with the meaning of the whole: "range of convenience," "focus of convenience." Another part is related with the subsidiaries that enable the whole: "elements" and "context." The rest is related with the possible relation patterns in-between the subsidiaries: "pole [polar discrimination of unlike elements],"[78] "contrast [the relationship between the two poles of a construct]," "likeness end [related with the similar elements in one pole]," "contrast end [referring to the other pole]," "emergence [the dominancy of one pole]," "implicitness [the hidden pole under the dominant pole –

[75] Kelly, *The Psychology of Personal Constructs*, (1955: 9)

[76] Kelly (1955: 94)

[77] Kelly (1955: 136)

[78] This polarity is understood to be a fundamental source for the act of understanding and connecting the subsidiary elements with their meanings in a comprehensive whole. The repertory grid technique, in this sense, takes it for granted this ability of human mind to connect the elements to each other by means of identifying their oppositions to each other.

This relation is also dealt in the achievement of theoretical coding for structuring a research on grounded theory, which is going to be explained under the following heading.

explication by opposition]."[79] It is evident that via the explication of a certain tension between the subsidiaries of a single exemplifying case, any two poles would provide the necessary motivation for explication. This opportunity provided by the theory of personal constructs could render the exemplifying phase of this study as an attempt to rearticulate the discussion.

When the nature of the basic constructs is examined, the *consistency* within the personal articulation of constructs has been taken for granted rather than their *reliability*.[80] It might be the definition of the polar tension, which provides the assessment of this consistency, and which reviews itself in every personal decision and therefore enforces the explication of the tacitly known.

4.1.4.2. The Grounded Theory

As a part of the fights against the dominance of the qualitative research techniques, grounded theory was founded by Glaser and Strauss.[81] Charmaz takes the development and evolution phases of grounded theory into account in order to present the flexibility possibilities of it. Since its founders have proposed that the strategies in the theory could be used flexibly in the researchers' own way, a development or an increased depth in the strategies is very expectable. Charmaz especially notes that grounded theory does not offer prescriptions of packages; but strategies and practices.[82] When examined closely, these strategies promise appropriate media for articulation of the discussion through example cases.

As Glazer[83] and Charmaz put it, the initial question of the data gathering process of grounded theory is "What is happening here?" according to Charmaz, grounded theory asks the researchers' discoveries with this question. This question may be broken into pieces according to the researcher's experiences and interpretations as his/her problem selection,

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[79] Kelly, *The Psychology of Personal Constructs*, (1955: 137-38).

[80] Kelly (1955: 137).

[81] B. G. Glaser and A. L. Strauss. *The Discovery of the Grounded Theory: Strategies for Qualitative Research*, (New York: Adline de Gruyter, 1967).

[82] Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (2006: 10).

[83] B. G. Glaser. *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*, (San Francisco: Sociology Pr, 1978).

which is the attempt to reveal what is hidden behind the visible. She also proposes ways to construct data that would be helpful after the act of collecting data. In this dissertation, the attitude to construct data resulted in new questions. Apart form the question "What is happening here?" the data gathering process includes ways to construct data by means of the question "Where would a person primarily look at, who is interested in the praxis of first year design education in architecture?" This question directed the research to include actual situations that are experienced in a first year design studio as an example research setting. Another emerging question was "what would happen here, if …?" This question forced the research to extend the actual experiences via process design for enabling further data. Action research was the consequence in addition to participant observation for the exemplifying research process. The researcher took action in the design of the exercise settings for *Simulation Games*, and *Logbooks*, which are going to be articulated in detail in the following chapter.

In addition to these attitudes in data construction, there are further applied attitudes that match with Charmaz's proposals as methods of data construction. For instance, "… attending to actions and processes as well as to words …" and " … [d]elineating the context, scenes, and situations of action carefully …" are applied during coding example exercise applications. Furthermore, the data gathering also included "… recording who did what, when it occurred, why it happened (if you can ascertain the reasons), and how it occurred …" and "…[f]ocusing on specific words and phrases to which participants seem to attribute particular meaning …."[84] Agreeing to the relevance of the question with method, Charmaz mentions about the possibility of new questions requiring the construction of new data gathering methods to revise the earlier ones. She states that the research participants may give the researcher new materials that are not anticipated but lead the researcher for new ideas and methods.[85]

The mentioned structuring process of the gathered data is the task of coding data. Charmaz explains 'coding' and its next phase 'theoretical integration' of the codes with the analogy of bones. She resembles coding to the bones of the analysis, while theoretical integration is

[84] Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (2006: 21)

[85] Charmaz (2006: 15).

resembled to a force that assembles the bones into a working skeleton.[86] Coding hence is understood to be the connector of the data gathering and interpretation phases. More importantly, coding is explained as a method to "… understand participants' views and actions through their perspectives. These perspectives usually assume much more than what is immediately apparent. We must dig into our data to interpret participants' tacit meanings. Close attention to coding helps to do that."[87]

Charmaz has listed four stages of coding as "initial line-by-line coding," "focused coding," "axial coding," and "theoretical coding." The task of memo writing occurs within the act of coding. This includes the comparison of data, development and classification of coding according to their relationships with one another. These stages are looping within each other through reflection on the previous phases of coding. Adds Charmaz: "… as you work with your data and codes, you become progressively more analytic in how you treat them and thus you raise certain codes to conceptual categories."[88]

In the initial coding phase, the coding techniques are namely expresses as "word-by-word coding," "line-by-line coding," and "coding incident to incident." The focused coding phase is the decision of the codes of initial phase for an analytic categorization. In the axial coding phase, the categorization of the codes is related to subcategories. This task is expressed as bringing the data back in a coherent whole. Charmaz states "… theoretical codes specify possible relationships between categories you have developed in your focused coding …."[89] For this study, these guidelines are not employed for determining a new set of theoretical coding, but to clarify the relationship between a possible coding phase in an example setting through an existent theoretical framework.

Charmaz cites the explanation of theory from Strauss and Corbin[90] to clarify what a theory is for an interpretive grounded theorist. They explain what they mean by theory as "… a set of well-developed categories (themes, concepts) that are systematically interrelated through statements of relationship to form a theoretical framework that explains some phenomenon

[86] Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (2006: 45).

[87] Charmaz (2006: 47)

[88] Charmaz (2006: 12).

[89] Charmaz (2006: 63).

[90] Charmaz (2006: 127).

…."[91] Similarly, the following task is going to be exemplifying how the theoretical framework that has been clarified up to this point can be adopted as the explanation for the phenomena of an example setting. On studying *how* the observed conditions, attitudes, assumptions and the like are related to each other in the example cases, the act of comprehension is going to be made through the perspective drawn throughout the previous chapters. This perspective constitutes the "researcher's view"[92] together with the tasks handled during the participated course.

4.2. Determining the Criteria for an Exemplifying Study

At the end of the previous section a depiction of the possible strategies for a exemplifying study was made. According to the collected set of codes to guide the task, the developed theoretical framework is going to be reconsidered, before introducing the example cases and arriving at the final discussion. The theory of reflection in action, as it was discussed in the previous phases, is able to collect the entire argument about the development of creative skills in the first year students of architecture. From this point of view, this reconsideration is going to demonstrate a questioning of the applicability of the theory of reflection in action to first year studio.

This approach is expected to illustrate the negative side of the application of the method, and make it possible to discuss the tension between the contrast ends, and the range and focus of convenience within the discussion, in terms of the theory of personal constructs. This approach would enable a discussion about the consistency within the task handled in the example cases.

The following chapter has examples of actual cases about the concern. In these cases the attitude for dealing with the negative side of the task by being aware of the dangers and difficulties and by taking certain precautions are exemplified.

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[91] A. Strauss and J. M. Corbin. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, (Thousand Oaks, London, New Delhi, Singapore: Sage Publications Inc., 2008: 55).

[92] States Charmaz: "The theory *depends* on the researcher's view; it does not and cannot stand outside of it. Granted, different researchers may come up with similar ideas, although how they render them theoretically may differ." in Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (2006: 130).

4.2.1. Applicability of the Theory of Reflection in Action to First Year Studio

The theory of reflection-in-action as it has been studied as a vital means for the personal knowledge development in the design act may also have problems on being integrated with the introductory architectural education. These problems are mainly related with the problems of coping with the prescribed code of rules and the potentiality of the students to fabricate and attach inexistent meanings to their products.

4.2.1.1. The Danger of the Responsible Act for What is Articulated

Barry Russell states that learning from the precedent approaches to design in architectural education as "a central part of the creative process," must not be made explicit. The reason that he gives for this argument is that according to him the knowledge of the design act when converted to through knowledge destroys creativity.[93] This is directly related with the danger of the use of the existing code of rules that have been gained through experiencing the design act and comprehending the whole of a design product.

As it has been discussed before, with many potentials and contributions to the creative act, reflection in action requires articulating the tacit decisive powers in design act. However, explication of decisive factors of a specific condition may easily be converted to codes of behavior, without any reflection on them. This possibility compels the discussion asking whether the explication of design decisions by the students limit the potentials of a design process. Such a question arises from the recognized danger about the ideas and acts that continue to exist only with their medium of explication but not with their meaning. The value of this danger can better be recognized when the students' inexperienced nature is considered especially in terms of visual literacy. As Green also mentions, because of the long-established traditions of literacy, especially the lack of visual literacy of the children has been seriously ignored in both society and education.[94]

At this point, it is important to remember that the aim should be to open up all the possibilities for the students to have the appropriate media for the creative act. When the

[93] B. Russell, "Paradigms Lost: Paradigms Regained." *Educating Architects* (London: Academy Editions, 1995: 34).

[94] Green, *Design Education: Problem Solving and Visual Experience*, (1974: 11-12).

objective is to increase the area of reflection-in-action, the way the explication is made to reflect on is an important concern; because, to reflect on a meaningless explication is not possible if the reasons behind the act or decision in concern are forgotten. The case is the same in applying the existing code of rules without completely questioning their relevance with the design problem. This proves that the danger that the code of rules create for the creative act is also a part of the issue of articulating the tacit knowledge. Therefore, it is necessary to recognize the importance of the selection of the media of articulation. However, most importantly the reason for articulation must have a foundation from the meaning of an expected whole.

This may be the reason behind Le Corbusier's interest in other modes of transmitting the meaning behind what he deals with or about what he incubates in his mind as a heuristic passion to solve a specific problem. It is probably not possible to prove such a relation; however, it is also not possible to disregard Le Corbusier's paintings and sculptures.

4.2.1.2. Possibility for Students' Idea Fabrication

Giovanni Salvestrini puts forward the necessity to explicate the intentions and efforts beneath the acts of decision making in a design process. States he, "[i]n order to teach architectural design, the ability to do a good project is not sufficient; one also needs to explain what architectural design is and how one designs. In order to learn design, carrying out a project is not enough."[95] He speaks about the grasping of the complexity of the design process by simplifying themes and breaking down problems. However, one important point is that expecting this articulation may be converted into a meaningless code for the students especially in the jury process.

Hence, another danger for an obligation to articulate what is tacitly known is the struggle that the students may experience when they do not know what to articulate; let alone having a reason for articulation and reflection. Students' trying to act as if there is an idea behind their finished design work, especially in the first year design juries, may well be familiar for the experienced jury members. Schön calls attention for this danger concerning the responsibility of articulation, which leads one to *constructions*, as "'facts', 'procedures', 'rules' and 'theories'" and as Polanyi, points the danger in them for originating a

[95] Salvestrini, "The Teaching Method: More Questions than Answers." (1995)

responsibility that would obstruct the free and "dynamic" nature of the development of personal tacit knowledge with their "static" nature.[96]

Such a condition would most probably be the consequence of the students' lack of a reason for the design process. It would most probably be because of the inexistent creative act of the students, which does not require a heuristic passion, or any reflection on the design process.

4.2.2. Articulation for Reflection

The conditions mentioned above display an example interface of the problems of articulation in the beginning of institutional education of architecture. What the students experience when they are asked to articulate what they think for a design problem may be different from what they experience when they are given an actual reason for the act of reflection. This is a slight difference in the setting design of the given exercise; however, appears to have a remarkable affect in the students' intended experience. Following is an example of a designed exercise setting given by Biggs and Wood. The exercise is reflection centered and uses students' reflection as its object: First, reflection on an external object as articulation; second, reflection on their own articulations.

Biggs and Wood mention about the varieties of 'exercise for reflection' that were developed for a research project focusing on the Graduate Study at the Faculty of Art, media and Design (AMD) at the University of West England (UWE). The research project is developed around a number of modules. The first module is developed with the intention for the verbal articulation of students. The intention is understood to be explicating the personal act of comprehension for both passive action as perception of "artworks, artifacts, texts and events" and active participation in an experience of "practice." The target of articulation is, however, not limited solely with perception and participation; but it is extended with the request for combining these two for expanding the area for description and presentation like describing "the creative motives, themes, interests and ideas" that they explore in other practitioners' ideas, artworks/artifacts/texts, and practitioners researched in the preceding tasks.[97]

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[96] Schön, *Educating the Reflective Practitioner*, (1987: 25).

[97] I. Biggs and A. Wood, "Creative Practices and the 'Stigma of the Therapeutic': An Issue for Postgraduate Pedagogy?" *New Practices - New Pedagogies: A Reader* (London and New York: Routledge, 10 2005: 124).

Within the project, another module is related with the "critical self-reflection" on what is articulated in the previous phase. The important subject of explication is the students' self-determined criteria and reference points within their practice. The next task is to explore the use of them. Beggs and Wood explain the idea as "[t]he programme is designed explicitly to aid students in making more of what they already have and then to develop that through the use of self-determined set of criteria and reference points."[98]

Related with the increase in the area of reflection Corine Delage and Nelly Marda argue that "… the visual expression in architecture is fundamental for … understanding …" the evolving concepts of the design thinking in addition to verbal expression. They express the lack of first year architecture students' skills for thinking spatially and architecturally. In the studio teaching method that they present for the first year program of University of Greenwich School of Architecture, the attitude was to introduce the students' different methods to research spatial qualities not necessarily starting with the orthographic drawing methods. [99]

The leading argument is that any personally developed method can be employed for articulation, when the reason behind it is reflecting on the personal idea that is articulated. Below is a medium of articulation, which may be one of the most frequently employed method of student articulation in the first year design studio.

4.2.2.1. Sketching

Birgit Cold shortly summarizes the problem of inexplicability of ideas and decisions in a design process by means of discussing the help of a tool for reflection in action; that is the sketch and the pictograms, which are symbolic images to surmount the limitations of verbal expression, as learning and teaching methods. This proves her agreement with the idea that the more the area of reflection increases the more possible it becomes to develop personal knowledge through experiences. She states about the basic aim of the teaching and learning methods as "… to develop all the potentials of a student's" by means of helping him/her:

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[98] Biggs, "Creative Practices and the 'Stigma of the Therapeutic': An Issue for Postgraduate Pedagogy?" (2005: 126).

[99] C. Delage and N. Marda, "Concept Formation in a Studio Project." *Educating Architects* (London: Academy Editions, 1995: 65).

- to develop the awareness
- to see and choose 'the essence' [which has been called as the choice of the main problem the idea of which incubates in the designer's mind and takes him/her and His/her effort to a new meaningful solution]
- to communicate with yourself and your ideas [as the reflection-in-action]
- to develop, cultivate and understand ideas [to experience the act of comprehension in both observation and production]
- to communicate concepts in a process with people [gather further reflection from other points of view]
- to play and have pleasure [to have a heuristic passion to solve the problem and enjoy the process][100]

Sketching is one of the media to be able to reflect on the decisive tacit powers. Cold explains the role and power of sketching in architectural communication as the media for transmitting "the unconscious stream" of "senses, mind, hand and paper."[101] She explains sketching not only as a reflecting media of the decisive powers but also a major tool for reflecting on all the acts of comprehension, which are collected within the personal repertoire of architecture and places. States she "… making sketches is one and perhaps the best way of increasing awareness and concentration, and strengthening the memory for building up this repertoire." She also confirms the role of developing personal knowledge through experiencing the act of comprehension as the primary condition for becoming creative in the design process: "Such a repertoire is necessary to draw on in the creative design process."[102] According to her sketches are closer to our screened perception of the real world, which represents only what is perceivable by our minds with all of its expectations and personal knowledge. These expectations materially lie in the unfinished, incomplete nature of the sketch.

4.2.3. Reflection in Action and Play Instinct

Huizinga in his investigation on the relation between man and play, remarks that for a child and for an animal play is a learning instrument. This is possible in the extent that they enjoy playing, and their freedom in play. It is possible to compare this profile with that of the responsible human being that he explains, for whom play is rather superfluous. [103] Play merely as play may seem superfluous, however, when the educative power of play is

[100] B. Cold, "Tree of the Sketch." *Educating Architects* (London: Academy Editions, 1995: 63).

[101] Cold, "Tree of the Sketch." (1995: 60).

[102] Cold, "Tree of the Sketch." (1995: 61).

[103] J. Huizinga, *HomoLudens: A Study of the Play Element in Culture* (Boston: The Bacon Press, 1955: 7).

considered for the responsible human being, it may not be comprehended merely as a 'spare time' activity.

Green uses the word game as a metaphor for design, with a clearly stated reason "… that is because specially designed games can be used for specifically educational purposes to provide an experience and environment in which aspects of design skill may be learned."[104] He mentions about an interface between design and game as he adopts design having a game like character: design games. He explores possibilities for the educative aspect of a design game with its experiential value, such as enabling the students' discovery of the potentials of team working and collaboration. Another possibility is its function in making the students face possible actual needs of design and experience a problem solving process about a given subject.[105]

Torrance's study on the creative potentials of play instinct appears to expand Green's discussion on design games. Like Huizinga, Torrance states about the infants' media for learning. States he, "[s]ince the infant does not have a vocabulary, he is limited in learning by authority. Thus, by necessity much of his learning must be creative – sensing problems, making guesses, testing and modifying them, and communicating them in his limited way."[106] This is apparently because the infant does not have to give up an exterior responsibility to take only the responsibility of the play itself. He quotes from Markey[107] who has employed observational methods to evaluate the early childhood's creative performance in a variety of standardized situations and tasks as games. According to the outcomes of these evaluations, "…the level of child's understanding and comprehension influences the type of creative response …" for the reason that they tend to define objects, animals and constructions in a more imaginary manner rather than trying to fit in realistic terms.[108] This does not mean that the early childhood is the most suitable age for the creative act; but it exemplifies how the freedom from the existing code of rules function that are developed through experiencing.

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[104] C. Green, "Playing Design Games." *JAE* (Washington: ACSA, 33.1, Gaming, Sep. 1979: 23).

[105] Green, "Playing Design Games" (1979: 22-26).

[106] Torrance, "Assessing the Creative Thinking Abilities." (1962: 24-5).

[107] Markey, F. V., *Imaginative Behavior in Preschool Children,* (New York: Bureau of Publications, Teachers College, Columbia University, 1935).

[108] Torrance, "Assessing the Creative Thinking Abilities." (1962: 26).

Such a freedom could also be utilized at the beginning architecture education. However, the first year students already have their own code of rules to act responsible for and one possibility for their experience in the creative act is by exchanging between outside responsibilities and the responsibility for the play. This is an experience for leaving the exterior responsibilities outside together with their difficulties and dangers. It could serve for the students' discovering their own creative potentials. It could also serve as a means for the students' regaining their play instinct, which was not needed in the secondary education, and which is argued to be necessary to act creatively. Huizinga introduces a discussion on the relation between aesthetic creativity and play. He states, "many and close are the links that connect play with beauty."[109] It is understood that what he means by this connection is about the possibility of aesthetic desires that lead the play instinct. This possibility may also be the potential to fulfill for introducing the aesthetic possibilities of things in the basic design education. In addition to them, States Gropius: "We must remember that the child's urge to play leads to experiment and invention, source of all sciences and of all arts."[110] Apart form them, Dallow states that "Creative work is not merely based in skills, and their application, but requires the ability to experiment and play, however conventionalized the idioms, genres or forms employed."[111]

4.3. Exercises as Designed Conditions of Comprehension

Regarding the intention to cultivate the creative thinking ability of the students and its concordance with the *creative act* defined in the theory of personal knowledge, the first year design studio can be investigated as a designed setting for introducing how to experience the *creative act*. Experiencing an act of comprehension is a problem if one is not skilled in comprehending meanings. The design exercises can be considered as the external support to complete an experience of comprehension. Regarding the criteria discussed above, it is also possible to study exercise designs that would enable the appropriate condition for this experience.

In relation to this objective, Gygory Kepes defines the plastic experience that form the unified whole as an interaction between the internal forces and external physical forces. He

[109] Huizinga, *HomoLudens: A Study of the Play Element in Culture* (1955:7).

[110] Gropius, *Scope of Total Architecture*, (1955: 44).

[111] Dallow, "Outside 'The True'?: Research and Complexity in Contemporary Arts Practice." (2005: 137).

initially examines the external forces that affect the act of perception in the optical environment,[112] which are the explicable rules of perception that are valid universally. Afterwards, he mentions about the infinite number of variations for their organization in a meaningful entity, which necessitates the internal forces. What he emphasizes within operation of the internal forces is that "[s]ubjective forces tending toward balance [a meaningful whole] are manifested in the emotional and intellectual faculties [which he decodes as the *psychological field*] as well as on the physiological level." The phrases he uses to describe and exemplify the "psychological field," as "fascination", "irresistible interest," are according to him the forces to maintain the meaningful whole within perception as a creative act, independent from the complexity and variations within the optical transformations of the visible environment.[113] This argument of Kepes demonstrates his belief in the necessity of the passion to participate, which is the heuristic passion in Polanyian terms and which Kepes calls "the psychological field."

4.3.1. Comprehension as Observation

The act of comprehension as observation has been discussed as a means for experiencing the creative act regarding the theory of personal knowledge. Related with this issue, Gygory Kepes, agreeing to the understanding of the act of comprehension within the scope of this study, states that "[t]o perceive an image is to participate in a forming process; it is a creative act." Kepes calls the act of comprehension by means of perception as "plastic experience" and implies that the word "plastic" refers to the designation of "sensory impressions into unified, organic wholes."[114]

The experience of creative act as observational comprehension may be applied as the study of observation of the visual environment. Especially studying existing works of art and architecture, which are comprehensive wholes that transmit their holistic meanings within their comprehension, has been accepted as a valuable exercise model for improving the creative thinking ability. As an example to this attitude, Itten stresses the usefulness of "studying" the old masters' works on understanding the vitality of the comprehension of the

[112] Similar to the Gestalt rules of perception.

[113] G. Kepes, *Language of Vision*, (Chicago: Paul Theobald, 1951: 16-44).

[114] Kepes, *Language of Vision*, (1951: 15).

holistic meaning and on understanding the subsidiariness of the design principles and elements for this act of comprehension.[115]

4.3.1.1. Avoiding the Means' Becoming Focal

Coping with the existing code of rules is a fundamental discussion area of this study. The reason for this is that on trying to introduce the existing examples of architecture to the students it is a difficult task to let them understand that they should be focusing on the comprehensive meaning rather than the subsidiary architectonic solutions, which may appear more exciting to them at the very beginning.

There is another danger for the first year architecture students that they might be missing the scope of the course because of the difficulty in understanding the necessity for comprehending the meaning of the design act and the works of architecture. The students may get lost in the details not only in terms of their primary expectations as higher grades; but also, in terms of the details and 'irrelevant'[116] questions that run through the students' minds during the course time; for instance the way the tutor presents the existing works of architecture rather than the works themselves.

An exercise model that Itten has proposed for coping with these difficulties is based on the reproduction of the meaning comprehended from a work of art, with other means than that of the work itself.[117] Such an exercise model also constitutes an example for enabling the students' comprehension as a design act.

4.3.2. Comprehension as a Design Act

For the cultivation and the development of the creative act, the act of comprehending a holistic meaning can be practiced in the design act. This skill is a consequence of the transition period, and is not necessarily completely developed in the first year of institutional education in architecture. However, there are steps that can be taken to trigger this

[115] Itten, *Design and Form: The Basic Course at the Bauhaus*, (1964: 12).

[116] The term 'irrelevant' is used to express the studets' fear of asking irrelevant questions that would humiliate them in the class when rejected by the instructor in front of other students.

[117] Itten (1964: 17).

development. One of these steps is providing the necessary setting for the students to have the courage to see a problem with no available solution; and jump into it.

Peter Taylor reports his research on the problem of "a lack of clear expectations about pupils' ability to work independently on a problem solving process, and about the ways in which problems could be set to match pupils' abilities."[118] Concerning this problem, he argues for the importance of several tasks. These are reflection on developing problem solving abilities, production of different possible ideas and solutions, comprehension of others' problem solving processes, group-working, critical thinking, and the improvement of the sense of purpose by linking the process to real world events.[119] Although the phrase "sense of purpose" is mentioned, believing that the link between the process and the real world events would produce a passion to solve any given problem may be a cursory attention to the heuristic passion of the problem solving, in which the belief of the pupil for the solution of the problem incubates. The reason is that the belief in the solution of a problem where no solution by the available means seems possible necessitates such an experience that should have been performed with the available media of the pupil, which s/he is familiar with, and which should have gained new meanings after the experience. In order to start learning how to think, act, and learn one should feel comfortable enough to jump freely into a problem, especially in a case where no valuable outcome or product seems possible.

This condition even has a prior condition; as the heuristic passion, the insist to solve a problem. It is possible to identify two different desires in this heuristic act. One of them is the desire to learn further, and increase this desire to learn as the learning continues in an endless cycle. The other is the desire to solve the depicted problem, in order to prove that a solution can be possible when approaches with the appropriate means. A creative individual or an expert may have both desires. For example, s/he may want to prove that s/he can solve a problem in the best possible way. Looking from the eye of the first year student of architecture, it is expectable that the former has a heavier force for the desire to jump into a problem. It is expectable that a student's will to enlarge personal knowledge should be more important than the will to solve an existing problem. On the other hand, Le Corbusier puts forward this as an assumption:

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[118] P. Taylor, "How to Develop Problem Solving in Design and Technology." *Teaching and Learning Design and Technology: A Guide to Recent Research and Its Applications* (London and New York: Continuum, 2000: 34).

[119] Taylor, "How to Develop Problem Solving in Design and Technology." (2000: 41-42).

> At the request of some of your colleagues, I am speaking to you today to establish such cordial relations as will help to level the barrier of age, so that we may dispel the many misunderstandings held by those who would have us disagree; bad faith aside, let us assume that we are equally inspired by our faith in the things we create: you with your thirst for knowledge and I, with a devotion no less great, a devotion, based on the experience of forty years, impelling me more than ever to new discoveries.[120]

Gropius in this sense, while speaking about the purpose of the Bauhaus teaching, mentions about "… a new and powerful working correlation of all the processes of creation." He also mentions about the "joy of building"[121] of the "gifted student".[122] States he "[s]ince a universally applicable method for the discovery of talent does not exist, the individual in the course of his development must find for himself the field of activity best suited to him within the circle of the community." [123] Apparently when considered from the point of the personal knowledge theory, this most suitable field of activity for the individual is the point where s/he finds the curiosity for, and passion to solve a problem within that field, which would at the same time develop his/her personal knowledge and skills in that specific field.

However, it is also possible to think that not all the students are keen on being students, neither all of them dare to enlarge their worldviews and capabilities. It is also possible to think that what is understood by studentship may have shifted in meaning, and may have become something like *the person who knows how to pass exams and get satisfactory or good grades in educational institutions*.

As it has been discussed via the problematic characteristics of secondary education, the intellectual backgrounds of today's students do not promise the theorists and tutors a natural heuristic passion to exist in them. The production of individual ideas that leads the students to follow a heuristic path with a passion necessitates a much denser and properly designed preliminary preparation process, within the first year of institutional education of architecture.

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[120] Le Corbusier. *Le Corbusier Talks with Students*, (New York: Princeton Architectural Press, 1999: 9).

[121] 'Play instinct' is a frequently cited concept by Gropius.

[122] Gropius, "The Theory and Organization of the Bauhaus." (1952: 28).

[123] Gropius, "The Theory and Organization of the Bauhaus." (1952: 28)

CHAPTER 5

EXPLORATION OF THE TRANSITION PERIOD

Integration of the headings discussed above require a medium to enable their understanding within the meanings they were attained by the focal awareness of a comprehensive whole, which is the intention of this part of the dissertation. Charmaz mentions about the data gathering and treatment phases as a whole, where the trial to integrate the gathered data in a meaningful whole also helps to code it analytically.[1] This analytical coding is embraced, this time from the whole to the subsidiaries in order to clarify their meanings within that whole. The intention behind completing the dissertation with the medium of exemplifying is illustrating the subsidiaries of the act of preparing the proper setting for the students' creative act of comprehension, which have been discussed in the previous part of the dissertation. The idea is to transmit the inexplicit content of the discussion that remain in the interrelations between the subsidiaries as they function to attain the comprehensive meaning of the example experience as a whole.

The selected setting for gathering the exemplifying data was a second semester course based on design applications. The selection of the example cases was made so as to support the argument of a holistic approach towards the task handled in the studio for a single high purpose, that is the students' experiencing the creative act of comprehension. This means that the exemplifying was for the tasks handled to overcome the problems of the tension between the students who are prone to conformism and the emancipator instructors. The inquiry within the setting was about the attitudes towards the act of articulation that required new setting designs to be explored as action research. The progress engendered exploration

[1] Charmaz, *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*, (2006: 154).

of further questions to comprehend the selected setting. Below is the diagram developed to visualize and clarify the data gathering process for the exemplifying study and its qualitative analysis.

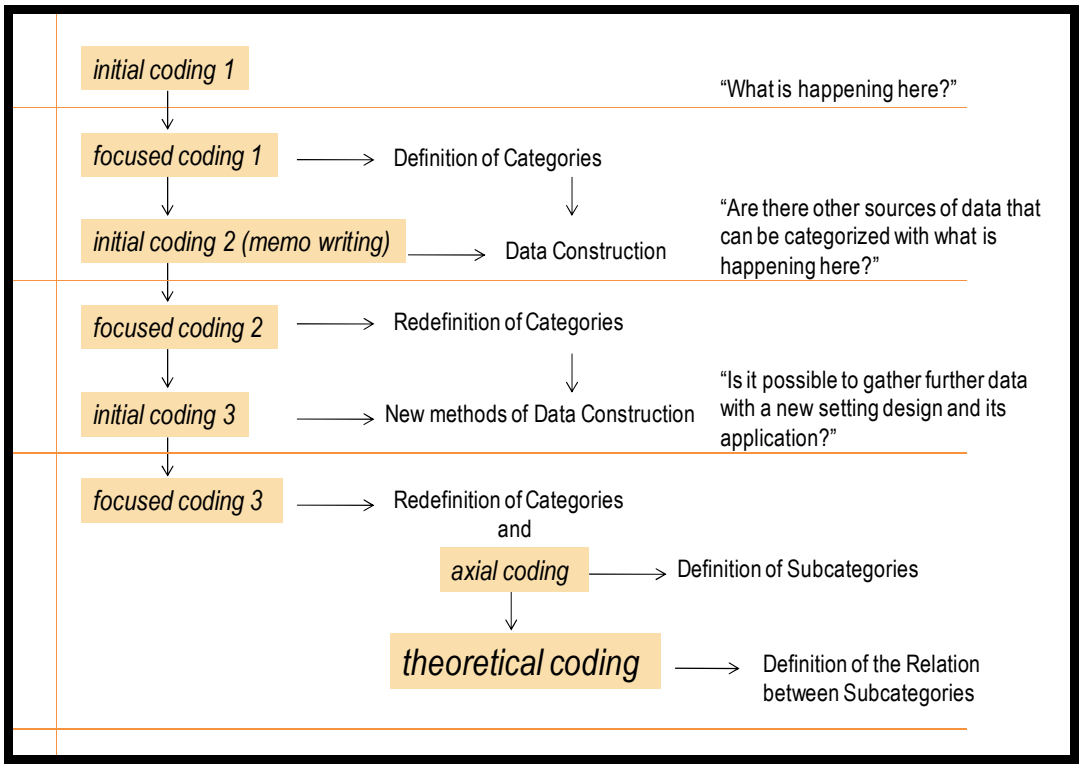

Figure 7: The data gathering process from the selected setting of exemplifying

Throughout the research process, a sort of reorganization of the articulated discussion was carried out. The following part of this chapter summarizes the criteria for selecting the example cases regarding the main discussion and introduces the selected cases of exemplifying.

5.1. The Data Gathering Process

The sources of data for exemplifying the discussion were decided to be reflecting a set of attitudes towards the problem of the students' existing personal knowledge in the actual setting of a first year design course in a department of architecture. The task is to follow the traces of the logical argumentation about the articulation of knowledge, within the outcomes of the observational data. The data includes the intentions and decisions of the course tutors

and student experiences within the designed exercises all of which is procedural information. The information is gathered for the selected exercises starting from their design phases and including the application and reflection tasks. This attempt is particularly expected to exemplify the tacit assumptions and attitudes of the instructors on developing the contents and means for the first year design experiences, which have the leading part in the process of gaining the necessary skills for the individual experience of a healthy transition period. The gatherings are expected to exemplify the designed support for creative transition and continuous self education, and about the deal with the difficulties and dangers of the responsible act for the existing codes and other lower interests. This is possible when the available information includes the expectations from the students during and at the end of the course semester, or the behaviors of the instructors for the tasks they handle in order to conduct the course.

5.1.1. The Example Setting: Observation/Participation in a Second Semester Course

The source of the exemplifying data was the participant observatory research carried in the Architectural Design II (Mimari Proje II) course at Gazi University, Department of Architecture, which was a first year second semester design based course, the content of which includes the first experiences of the students in architectural design. The research methodology included both participant observation and action research, since the researcher was consigned as an assistant instructor for the course. There were four more instructors of the course.[2] The gathered data is coded from the notes taken by the researcher during the six semesters of participation in the instructor team including the 2006-2007, 2007-2008, and 2008-2009 academic years.

During the observatory period, the structure of the course was usually holding a theme to be applied to a whole semester, with an intention to enable the students discover the relation between the segments of the continuing process. This theme was not modified from semester to semester and it dominated the whole semester, unless another idea to dominate the exercise schedule was accepted. The idea behind this theme was to trigger the play instinct of the students as they were players to learn how to play the game as the process starts and continues with the assumption that the studio members are working in an architectural design

[2] The members of the instructor team in the period of participant observation were Assist. Prof. Dr. Hakan Sağlam, Dr. Nurçin Çelik, İlhan Kesmez, Aktan Acar, and Ece Kumkale.

office. The basic intentions, attitudes, and expectations of this design office had been set by the studio instructors beforehand as the rules of the game.

This was a must course offered in both semesters of an academic year. The spring semester is its regular time as it is a second semester course. Fall is the irregular semester, where the student number is limited with the repeating and irregular semester students. The irregular semesters have different potentials and problems in nature for dealing with the problems of the students who are either familiar or unfamiliar with the course. It was observed that for the irregular semesters the task was not handled as the repetition of the previous semester but as continuing the process of transition of the students, which had started in the previous semester. The common idea behind the irregular semesters was to continue to develop the student contribution in design thinking, by adding new experiences on their previous ones. This was a reason for the instructors' creative contribution in designing exercises. They both had to act according to the purpose and produce other means than those that had already been applied. This is an attitude that exemplifies the existence of the idea of a transition period, and also of the continuity of the students' personal knowledge development. This attitude was exemplifying the conception that learning to design and the students creative transition is a continuous task that does not end at the end of an academic year.

The collected data enables distinguishing the exercise settings that were designed as exercise breaks in the routine and that took place more in the irregular semesters than the regular ones. The routine of the course can simply be summarized as the assignment announcement, assignment submission and the assignment works' presentation by the students and their criticism by the instructors. In the routine, neither the instructors, nor other students witness the personal design act of the individual student. The interaction is limited with the phases of assignment giving and criticizing the finished design works of the students. The constant common feature of them was observed to be the expectation of an original idea behind what was produced, in order to make the students notice the need for their regaining and introducing the personal dimension into their design acts. The purpose was making the students comprehend the function and potentials of the *universal* design principles and elements and the skill to be critical about them while designing with them. In these exercises, the students were also observed to be expected to represent what they had done without explicating how they had got use of these codes and merely by trying to transmit their personal idea that was expected to constitute the reason for them to deal with the design work.

On the other hand, in the setting designs of the exercise breaks, every exercise was observed to be considered with its own means for articulation with an intention to make clear the way the application was foreseen. During the applications of the exercise breaks, like the differing attitudes in the articulation of the intentions and preparations for the exercise setting, the reflections on the exercises also seemed to have required their own means, own vocabulary and own attitude different from the repeating criticism attitudes of the routine. The preferred means for the assignment announcement and criticism in the routine and the altered means of articulation proposed for the settings of the exercise breaks are going to be dealt on exemplifying the potentials of the attitudes towards articulation and precautions against the difficulties and dangers of the responsible act.

The exercise breaks were developed in a consecutive sequence, where the outcomes of the previous affected the following setting design. *Improvisations* exercise was a consequence of the experiences in the primary applications of *Simulation Games* exercise in the previous years, which was before the participated observation period. The participated and observed application of the *Simulation Games* exercise was a consequence of the promising feedback gathered from the improvisations exercise at the previous semester. *1/10 Model Making* was holding the intentions of utilizing improvised ideas of the students in a different set of problem. *Logbooks* was the consequence of an unexpected articulation on the *1/10 Model Making* exercise by one of the students of the previous semester. These exercises were observed and/or designed[3] to be the attempts to awaken the students' will to participate and make them experience their own creative act. The common attribute in almost all of them was the use of extraordinary media that the students can reach and employ their skills of them without the required dominance of the use of the principles of basic design and spatial design.

Some of these exercise breaks were designed as *pathfinders* for the students' design thinking process that would force exploration and production of personal ideas, reasons and means of design. Some included the requirement of means for the design problem of an actual event to take place in the studio as a group work. Some required the production of instantaneous decisions and their simultaneous explications in the pre-designed exercise settings. Some included attempts to make the students look at the act of spatial design from different points

[3] The participant observation of the reseracher refers to her contribution within the instructor team, which mostly regarded itself as a single authority for the exercise design and application tasks.

of view. Their idea of giving a break in the routine is also explicable with the idea of utilizing the play instinct as a motivational instrument.

A set of exercises were selected from the participated course, to exemplify the argumentation, according to their potential for illustrating the applications standing on the idea of creative transition from old learning habits towards continuous self-education. For these exercises, the intentions, application details, articulation modes and sessions, the attitudes towards reflection on the articulated stuff are the objects of exploration within the observed and participated tasks of course conduction. Moreover, the changing and stable features of the nature of exercise setting designs were included in the exploration questions. In order to achieve a final coding phase of the gathered data, the exercises selected for their varying value in exemplifying the setting design for students' experience in a creative act of comprehension are going to be introduced briefly with their intentions, processes of design and application, and outcomes.

5.1.1.1. Improvisations:

In the fall semester of 2007-2008 academic year, the idea of this exercise emerged in a preliminary meeting of the instructors with the articulation of intentions and aims. The intention was to make students' take their own momentary decisions with courage and will to find the chance to apply it as soon as they decide in front of other students and all the instructors, without an obligation for the design principles or other codes that the students act responsible for. The idea was to employ the game instinct to convince the students that they could be more active in the studio.

It was an experience design rather than an exercise design. It was decided that this experience had to be different from the others where the students were required to bring their works of design, on which they thought about how to produce something that the instructors would like. The students were not going to be given a chance to think about the instructors' expectations and what had been mentioned about architectural designing in the studio beforehand. The students were expected to use their immediate knowledge.

The exercise excluded any architectural content and tried to use the students' areas of interest to provide encouragement through the use of play instinct. During the reflections on the exercise, it was expected to persuade the students that they could adapt this mode of

behavior into the way they design. This intention was about convincing the students that they were able to motivate themselves for decision making.

In this regard, the intention appeared as designing a setting for the students to experience creative act without an obligation, and make them discover the potential of improvising. It was apparent that this exercise was intended to be an exercise break.

The setting design of the exercise was left to the students. The students were assigned to design a setting in which they were going to perform improvisation in a theatrical play. The missions were divided in between twenty students. The setting was asked to be sustained with sounds as effects and background music, which was going to be another improvised performance by four students. Moreover, the improvisations were asked to be recorded with digital video cameras by two voluntary students. The rest of the students were asked to plan their play, decide on the characters of the individual performers and the details of the setting. This provided three simultaneous channels of improvisation that would affect the entire atmosphere of the play. One rule of the game was that no body was going to know what was going to happen during the application of the exercise. All the groups had to keep what they prepared for the event as a secret and the instructors were not going to intervene into the performance. The setting of the play was also hidden from the instructors and they saw what had been prepared for the first time as the event occurred. After the performance, the video recordings were asked to be edited, assembled, and presented as a final product in the studio.

The researcher recorded the event and the studio reflections right after it with a video camera from a distant location in the studio hall.

During the performance, several occasions resulting from the students' immediate decisions were observed. For instance, during the performance one student from the video recording group suddenly decided to contribute and act in the play to increase the speaking volume of other performers. She attracted a noteworthy attention by other players, without an objection to her immediate participation in the act.

After the performance, the reflections of students were gathered through a discussion session. Almost all of them complained about the acoustical deficiencies of the studio hall. The individual reflections also commented on the discordance between the sounds as background music and the volume arrangements of the sounds. Moreover, the students criticized their own performances after collectively discussing the possibilities and potentials

of their actions, and their improvised conversations with each other. Almost all of the students requested another trial for the exercise.

In the next class, the edited and assembled form of the performance was displayed in the studio. It was observed that neither the play instinct nor the act of improvisation had been abandoned after the performance. During the editing process, because of the undistinguishable sounds and speeches of the performers in the recordings, the students have re-improvised the performances by means of writing a new story on the recordings.

It was observed to be an experience for both improvisation and reflection in action, which was the intention of the instructor team. This is a examplary experience for the positive attitudes towards the discovery of the students personal skills and their articulation as reflection.

5.1.1.2. Simulation Games:

The idea of improvising, with its relevance with the experience of the act of comprehension as a support for self-education, was observed to be influential for another exercise design for 2007-2008 spring semester. This exercise exemplified the intention to awaken the heuristic passion of the students' willingness to participate in and contribute within the studio. Another exercise break was designed as the *simulation games* exercise, which had been applied in the course long ago with a leading principle based on improvisation.

Regarding the *simulation games* as an exercise model, Zeynep Onur mentions about applications of them in Gazi University Department of Architecture since 1990, which as she states is practiced since 1960's in architecture education. This exercise model is based on the idea of improvisation. She describes the simulation games for their application in architecture education as the play of a game with roles differing in a certain social progress distributed to students to be acted in an improvised manner. In this model, the roles are previously decided and distributed to the students by the tutors.[4] This means that the context of simulation is decided by the tutors but limited with the knowledge and competency of the students on the subject. According to Onur, the exercises were helpful for the development of the students' personal knowledge about the roles of the different actors of the built

[4] Z. Onur, "Mimarlık Eğitiminde İlk Yıl." *Temel Tasarım/Temel Eğitim* (Ankara: ODTÜ Mimarlık Fakültesi Yayınları, 1998: 82-83).

environments as well as their actual viewpoints and current discussions ongoing for the existing problems.[5] Apart from the discussion of the necessary motivation of the students for experiencing a creative act, the assumptions on the students' competency of experience and knowledge of the problems of their built environments should have also been taken into consideration for being able to predict their ability to make the necessary connections with their existing personal knowledge for enlarging it. McCombs and Miller briefly explains the leading components of a student's personal knowledge, especially of the factors affecting his/her learning. They, furthermore, express about the necessity of self-motivation for learning, which as they state is possible "only when learners possess (1) choice and control about how, what, and when to learn, and (2) choice and control over what they want to achieve."[6]

For the spring semester of 2007-2008 academic year, the exercise setting was designed as another improvisation performance by which the students might both be encouraged with aspects like an entertainment, on which they have their own choices and control, and be introduced to some aspects of architectural practice by acting their everyday experiences with a simulation game. Regarding the number of the students in a regular semester, which was sixty-five, the simulation games were decided to be played by ten groups of students with different subjects of debate for each. This attitude is an example for the intention to eliminate the lack of an actual reason to improvise for the students. The decided subjects of debate for each acting group were subsequently:

1. beauty vs. function in space
2. new vs. traditional applications of traditional materials
3. accepting vs. refusing an incommensurable costumer
4. holistic space vs. split space use
5. to or not to contest in an architectural competition
6. debate between architect vs. builder about the applications
7. an architect's vs. a furnisher's priorities
8. architect's proposals vs. costumer expectations
9. cheap solutions vs. spatial sensibilities for costumer persuasion

[5] Onur, "Mimarlık Eğitiminde İlk Yıl." (1998).

[6] McCombs, et al. *The School leader's Guide to Learner-Centered Education: From Complexity to Simplicity* (2009: 5).

10. flexible vs. rigid space design

A text, prepared by the instructors, was submitted to the players for structuring the scenes and giving the necessary information for the features of the characters to be improvised. The character player match was indefinite before the submission.

For the students, this was going to be a task of reading and understanding the setting to be simulated and the features of the characters; trying to gather the convenient data concerning the act of the simulated character and converting this knowledge into action where momentary decisions had to be taken during the exercise. The previous exercise had proved that the play instinct would activate the students' passion to provide a meaningful outcome. This was another example for the use of play instinct with an intention to provide the very first experiences of the first year students about architectural profession.

The rules of the game were given beforehand. Every student had to act in a character and all of them were asked to interpret the characters by their own will. Every student had to be involved in a certain subject of discussion. All the scenes were going to be recorded and every act had a maximum length of fifteen minutes. Finding a proper place to play the game, preparing it with the proper stage design and audience seats were other tasks that the students had to handle.

Some of the characters existed in more than one play. The students were expected to act the same characters from the place that previous group of students left in the consecutive plays. This provided a chance to reflect on the previous plays and continue the interpetation or reinterpret the characters from their point of view as improvisation.

All necessary detail for the behavior patterns were articulated for the students in order to remove the anxiety of playing in front of people who know what it is they are playing and to free them from indecisiveness in their momentary decisions. This was indeed a reflection on the previous exercise *Improvisations*, in which a certain hesitation was sensed. A variety of subjects on architectural profession was included in the play text. The given information for the students was expected to provide a comprehensive feedback from them about their existing personal knowledge in the field of architecture as a profession. As it was expected, during the performance of the groups one after another, it was possible to witness that the students gave important clues about their personal knowledge on the given subjects of debate. For example, one student mentioned about the power of money in architectural

competitions, which was the articulation of a preconception. This exemplified the intention to enable student articulation in the studio as manifested in this exercise design

The arbitrary match of plays and players, which did not let the students choose what to play with whom, made it possible to witness the plays of actual debates of the given subject. Some of the players were insistently trying to convince the other side with all the means available to them at the setting. It was possible to witness the attention they paid to act the characters that they were assigned with.

On the other hand, some other students were witnessed to be less participant within a debate. They were waiting for their own decisions to let the discussion flow onto a concrete ground so that an actual debate could be simulated. It gave an opportunity to the instructor team to prove the students how their hesitant behavior prevent their creative act and make the students reflect on themselves; which was fulfilled by the instructors during the post reflections on the event.

One of the plays was designed for simulating the story of a previously applied design assignment in the studio, which can be classified as routine, as if it has been a job of an architectural office. The intention behind putting this subject into play was another example for the attempt for enabling student articulation, this time as a student-reflection on a previous exercise. The students who acted the client, the architect, the helping architect, and other characters were all familiar with the subject from that previous exercise and tried to prove their familiarity with it. It was observed that the students were willing to speak on what the instructors would like to hear about rather than improvising a debate on the given subject. The evidence was in the students' hesitant wordings and irrelevant remarks on the subject such as the necessity to be "excited" to do their design work.

Some students' attempt to misuse the exercise and turn it merely into an unserious amusement event was a part of the experience, which was the case when a few students were in the play. Although few in number, this attitude prevented many players from acting as actual debaters. Rather, some dominant characters, who both liked to control the event and do it well, used every opportunity to be amusing. This was an expectable outcome, since the instructors did not prefer to damage the game with grade threat in order not to sacrifice the play instinct. However, during the reflection session on the exercise, the inconvenience of the play and unserious player attitude was a part of the instructor remarks.

Remembering the simulation technique that has been utilized by Sternberg et. al.[7], it is important to note here that different than that application, in the simulation games and improvisations exercises, the intention was to develop a means for the students to improve their personal knowledge; but not to assess it. When it is not possible to classify, enumerate, and follow the tacit powers of the students through observation, and when it is certain that a major part of the students' past experiences and decisive powers are kept hidden, only the ones that find a way to be explicated can become the exemplifying data of a discussion.

5.1.1.3. The 1/10 Scale Model Making:

The 1/10 Model making exercise was composed of making the students build the 1/10 scaled models of the selected architectural masterpieces from different contexts and dates that were decided according to the general outline of the semesters. The exercise was first applied in 2007-2008 fall semester, and repeated in each observed semester thereafter.

One of the intentions behind the exercise model was making the students have their first experience in the act of building a 1/10 structure, together with the problems of which material to be used by which method, its rigidity, honesty, and the like. This intention exemplifies consciousness of the value of self-discovery, and learning through experience.

Another intention behind the exercise model was making the students notice and beware of the spatial qualities and the role of details within the whole space, including the use of structural elements. This appears to be a sort of dealing with the problem of unnoticeable qualities of the built environment for the first year students of architecture, which exemplifies the consciousness about their existing personal knowledge, skills and preconceptions.

It was also intended to make the students achieve an end-product, the construction phase of which was designed and put into practice by the students with the conception of 'learning by doing'. Another intention was to make the students experience a group work in the reproduction of an existing architectural masterpiece. This exercise method intended to make the students determine closer experiences of spaces to that of the actual size, as an experience on comprehending the spatial scale.

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[7] R. J. Sternberg, G. B. Forsythe et. al. *Practical Intelligence in Everyday Life*, (New York: Cambridge University Press, 2000).

In order to provide deeper evidence of these intentions mentioned above, three different applications of the exercise are going to be explored in this section. The first one is the first application of the exercise in 2007-2008 fall semester which assigned a total of twenty-five students (irregular semester) to build the 1/10 model of the Curutchet House by Le Corbusier.[8] The intention behind this first application of the exercise was preparing the students for a greater task as the experience of a whole semester, which would end up with the individual student works, as proposals for a home-office for two famous architects' working and living in, one of whom was Le Corbusier himself. Regarding the explicated purposes of the exercise in general, the instructors chose to be a part of the process for helping the students' decision-making experiences, for example with concrete proposals or provisions for required materials. The intention was experiencing the design process with the students, which included the consciousness of the potentials for articulation within the process, reflection in action, and learning from mistakes.

Before assigning the students it was decided by the instructors to assign each student for making the 1/100 scaled model of the Curutchet House individually, because of the agreement within the instructors that the house should have been comprehended by the students before starting with the 1/10 scale model and its construction problems. During this preparatory process, additional presentations and discussions about Le Corbusier and The Curutchet House, were provided by the instructors. As it was observed, the focus of intention was on the experience of the students for the act of comprehending the house in the best possible way.

After the completion of the 1/10 model of the Curutchet House, it could not be displayed in the access hall through the classrooms and ateliers of the Department of Architecture at the third floor. This was because of the inability to carry the model from the atelier at the first basement floor. The model sat on an area of approximately 1,20 x 2,90 m, and raised about 1,20 m height

In 2007-2008 spring semester, the second application was for 65 students and four projects of Mies van der Rohe; Barcelona Pavilion, Farnsworth House, Carr Chapel and Tugendhat House. The students were split into five groups, the four of which were assigned to build the 1/10 scaled models of the given buildings of Mies van der Rohe, while one of them was assigned to produce 1/10 scaled furniture of Mies van der Rohe displayed in the three of

[8] The Curutchet House by Le Corbusier in La Plata, Argentina, was completed in 1953.

these buildings. On the purpose of learning about an architect, in this semester the students were asked to represent Mies van der Rohe and his masterpieces. The students were split into groups and each group was given was given a different subject for their expected research on the architect. The intention was to introduce the students the variety of subjects on trying to comprehend an architect, his time, context, intentions, worldview, and consistency. As an example attitude about the consciousness of the students existing personal knowledge, one of the intentions was also making the students face how their old learning habits work on trying an actual architectural experience.

Regarding this intention during the students' presentations, reading from a text, which is not one of their own, was prohibited by the instructors. Although students were asked to construct their own sentences of representation, concordant with the instructors' expectations, they were observed to have recited the texts of the books or journals in order not to read from them. The presentation was immediately cut by the instructors soon after they had started for the reason that it did not make sense for improving the students' personal knowledge of Mies van der Rohe's architecture. The students were able to experience their need to reconsider their old learning habits and construct their own knowledge about what they study.

In this second application, the focus was shifted from merely the process to both the process and the product, which includes the idea to comprehend an architectural piece on the spatial characters of the finished and successful models of exhibition. Because of the common attitude of the instructors to elicit the exhibition of the models and the handicraft of the students that they reflect, the students were observed to have satisfactorily completed the mission. The final phases of the construction of the models in their places of exhibition in an access hall to the classrooms of the department were photographed by the researcher.

Figure 8: Students' final corrections of the 1/10 model of the Barcelona Pavilion just before the exhibition opening[9]

In 2008-2009 spring semester, the fourth application of the exercise model was proceeded with approximately eighty students. This application possessed remarkable differing aspects than its previous applications as the increasing mass in the produces 1/10 scaled models. The preparation phase for the exercise was also different than the previously explained two.

The seven buildings to be modeled in 1/10 scale were selected from the masterpieces of Turkish Republican Architecture. They were Exchequer Houses (1) in Ankara by Emin Onat, Indian Embassy House (2) in Ankara and Sirer Yalısı (3) in İstanbul by Sedad Hakkı Eldem, Florya Atatürk Sea Residence (4), Salih Bozok House (5), and Dr. İhsan Sami House (6) in İstanbul by Seyfi Arkan, and İsmet Paşa Kız Enstitüsü (7) in Ankara by Ernst Egli.

[9] Personal photograph archive (07 April 2008).

The construction phase took three weeks of the semester the totality of which is approximately fourteen weeks. The intention was once more completing the built models as satisfactory as it could be, this time in a more developed and structured process of model making. As an example for the idea of learning through experience, the students were expected to experience a process, which was designed, structured, proceeded and completed mainly by their own responsibility. The consequence of this intention was reflected on the exhibited models, where it was possible to observe the student interpretations of the actual building materials with the model making materials through preserving their tectonic qualities.

Figure 9: The built 1/10 model of the Exchequer Houses in Ankara by Emin Onat[10]

[10] Personal Photograph Archive (27 April 2009).

Figure 10: The built 1/10 model of Indian Embassy House in Ankara by Sedad Hakkı Eldem[11]

Figure 11: The built 1/10 model of Sirer Yalısı in İstanbul by Sedad Hakkı Eldem[12]

[11] Personal Photograph Archive (27 April 2009).

[12] Personal Photograph Archive (27 April 2009).

Figure 12: The built 1/10 model of Florya Atatürk Sea Residence in İstanbul by Seyfi Arkan[13]

Figure 13: The built 1/10 model of Salih Bozok House in İstanbul by Seyfi Arkan[14]

[13] Personal Photograph Archive (27 April 2009).

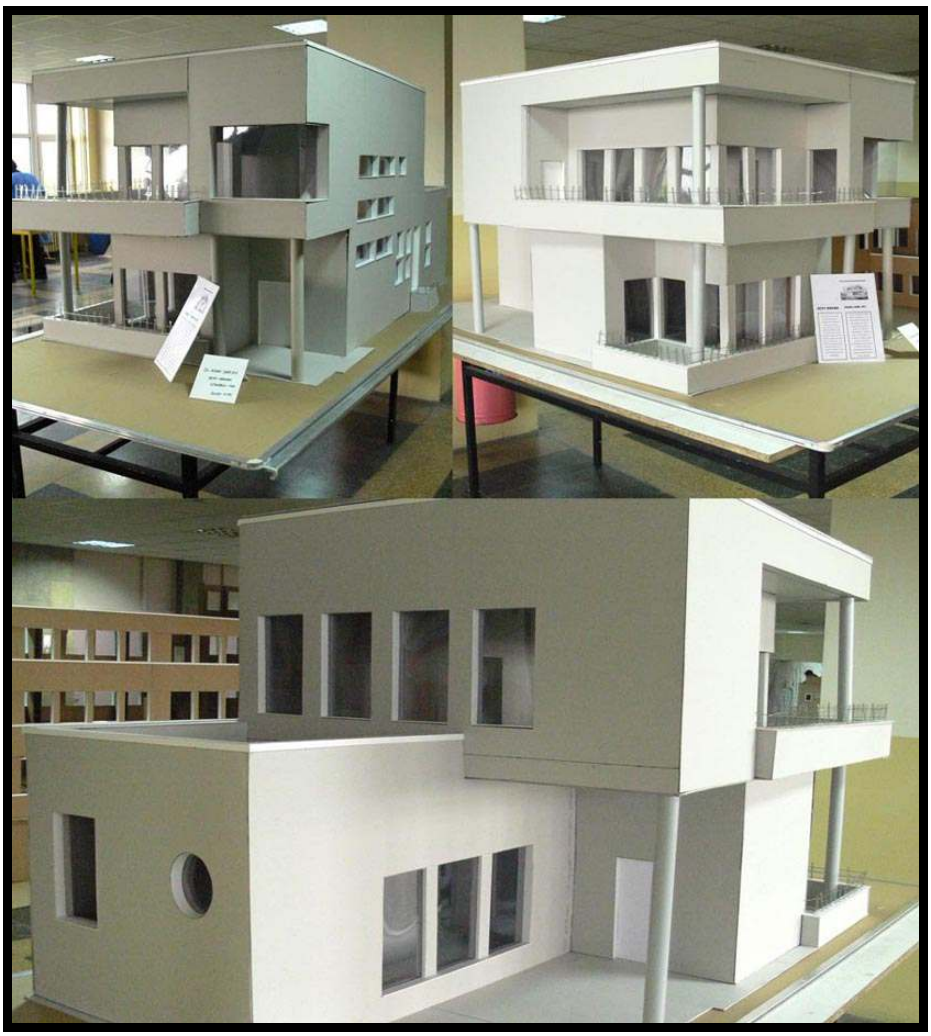

Figure 14: The built 1/10 model of Dr. İhsan Sami House (6) in İstanbul by Seyfi Arkan[15]

[14] Personal Photograph Archive (27 April 2009).

[15] Personal Photograph Archive (27 April 2009).

Figure 15: The built 1/10 model of İsmet Paşa Kız Enstitüsü in Ankara by Ernst Egli[16]

5.1.1.4. The Logbooks:

The exercise *Logbooks* of the of spring semester of the 2007-2008 academic year, was the consequence of an unexpected articulation on the first application of the exercise *1/10 Model Making* by one of the students of the previous semester. This student, who dealt with the model making of the Curutchet House, has recorded her remarks concerning her experiences by writing a short story of the students as 'Little People of Curutchet'. After that experience, the idea to make the students articulate their experiences of studio process, directed the instructors to design an exercise of logbooks. The intention behind the exercise was explicated as providing a self-disciplined process of experiencing design, by making the

[16] Personal Photograph Archive (27 April 2009).

students be obliged to record the process. With this instrument, the students would have the opportunity to reflect on their previous approaches to design thinking and be able to compare it with the post reflections of the instructors.

It was also observed that one other intention of the exercise was providing a medium to give the instructors the opportunity to follow the thinking and/or explication habits of the students, as their existing practical knowledge. This attitude exemplifies the intention to beware of the students existing personal knowledge. Another observed intention was taking the advantage of being able to reflect on the students' notes as an instrument for articulation that is breaking the routine of the commonly applied jury system.

The notebooks that were collected from the students have been spontaneously converted into a medium of communication by the instructors and continued with their comments direcly on the notebooks.

One apparent outcome was that there was an apparent tendency of the students to treat the notebooks as the personal diary of a teenager. This exemplifies how it is possible to witness the way that the preconceptions of the students work in the first year studio. This notice was converted into a criticism by the instructors, which would have functioned for the students' notice of their need for self-discipline and reverent approach to their duty.

Since the collection of the notebooks was in the middle of the semester, their evaluation became a one to one private conversation between instructors and students,. The idea behind this conversation was to support students' self-reflection on their own writings and the aim was to make them recognize the chances that they meet during the design exercises to help them improve their skills in design thinking. In order to see the comments made by their instructors on their notes, they were made to reread what they had written while facing the comments individually. This opportunity rendered this medium as a communication interface between the student and the instructor concerning merely the students thinking behaviors in their design acts.

5.1.1.5. Sketching the Impressions from a Walk in Ankara:

The exercise *Sketching the Impressions from a Walk in Ankara* is developed in a more conventional way as a sketch problem with a preliminarily given number of elements of

design. This exercise was observed to repeat each semester with varying means and intentions as one of the routines of the course.

In its application in the spring semester of the 2007-2008 academic year, at the initial stage of the exercise, a city tour was organized on feet from Sıhhiye to the Citadel of Ankara through Atatürk Boulevard, on which the architectural masterpieces built after the foundation of the Republic are aligned. The task was explained to the students as the sight seeing tour of the final project, which is planned to be designed on a land inside the citadel. During the tour, the instructors pointed and explained some architectonic qualities visible through the facades of several significant buildings and structures to the students. They also prohibited taking photographs during the tour. After the completion of the tour, the students were asked to make the four sketches of four different places through their observations, which was an unexpected question for them. The intention was to collect their immediate impressions right after the tour and make them represent their own images of their casual observations on the paper. This is an example attitude for the idea of making the students try to articulate their experiences by means of sketching. This trial is the means for them to comprehend their development level of observation and expression skills. This exemplifies an exercise intending more the notice of the level of self-knowledge than the acquirement of the exercise content. The intention was proved to be achieved when the students' surprise was observed to turn into panic for not knowing what to sketch.

5.2. Discussion on the Example Case:

This part is the explication of the determined categories of exemplifying data and the relations between them. It explores how the subsidiaries of the exercise experiences that have been explained in the previous part can be understood when the whole task of exercise designing, application and reflection phases are considered as a whole. This task is an attempt to decompose this whole into its particulars, as the distinguished headings below, as they are meaningful with their relations to each other on building up the whole. The collected data are considered for their value in students' transition towards creative individuals. The exemplifying includes instructors' attitudes in the explored course towards the students' personal knowledge and their skill development for continuous self-education.

Below, the distinguished headings discuss the exemplifying value of the gathered data in order to articulate the conclusions derived through this dissertation. A part of the collected

data for instructor attitudes are distinguished for their value in exemplifying the designed support and conditions for enabling the students' creative experience, which includes the idea of enabling student articulation as reflection. The collected data also include a category for exemplifying the deal with the difficulties and dangers of the students' responsible acts, especially for their old learning habits and proneness to conformism for the readily available code of rules.

5.2.1. Exemplifying the Designed Support for Creative Transition and Continuous Self-Education

The exemplifying of the designed support for creative transition requires recalling the idea of preparing the necessary conditions for the students experience of creative act. The deal with the tension between the students' conformist attitude and instructors' will to enable students' creative experience is the subject of this exemplifying. It has been discussed for the first year students of architecture that the existing personal knowledge of them with all of their past experiences, conceptions and habits require attention, especially concerning the external support for their creative experience. The examples display a set of conceptions, attempts and precautions of the instructor team about the setting design for the students' experience, in an existing situation with real subjects and problems that they deal with.

In order to comprehend the problems of this second semester course, the existing personal knowledge of the second semester students of architecture requires attention. In the first semester of the school of architecture, the students experience the tension between their old learning habits with the required ones for architecture education. When students coming from high school are not asked to repeat the given information as it was given to them, their skills that have been developed to memorize and repeat the prescribed as it is do not work. In the second semester, the students' existing personal knowledge includes experiences of this tension from the first semester, and adds new ones onto it. The students who were good at their previous learning skills do not feel as confident as they did in their previous educational life. On the contrary, in the second semester they start to expect questions that ask for their own ideas about a given subject; and feel the necessity to have the skill to comprehend an entity not from a single prescribable point of view but from their own point of view. Their actual goal is set in this period, which is a fundamental mission of the transition period.

One major example was the pre-designed act of debate between two instructors in front of the students about the lack of the students' interest in architecture. Within the debate one side was holding the idea that it was only the students' problem and that they must have found a way to like what they are doing. The other side was holding the idea that if the students had not yet discovered what they could like in dealing with architecture and the trial to experience it, it would be only the instructors' fault but not any of the students.

This act of debate occurred before the decision phase for the *Improvisations* exercise in the spring semester of 2007-08 in order to make the students articulate and understand their own position in transition. The students appeared to be complaining about their lack of will for solving the given design problems. They were also observed to be limited and hesitant in behavior, after being prescribed with the "must not do's" by the instructors, and had acquired a misconception that they were expected to behave in a certain pattern. By this way it was possible to discover that the students had not been motivated with the theme of being a designer in an architectural office. This experience exemplifies the instructor teams' sensitivity about students' motives for the designed experiences in the studio. The primary intention was to motivate the students, both by directly addressing the subject of motivation in a sincere attitude with the students and by deciding to apply an exercise break to awaken the students internal motives.

The design of this exercise break was a task of providing the proper setting and atmosphere in the studio for the students' motivation. The intentions behind the exercise were motivating the students for both the exercise experience, and their personal knowledge and skill development. The intention for these motives exemplify the consciousness for the students' need of heuristic passion for achieving a goal.

One of the methods observed in the participated course for enabling the students' heuristic passion was employing the students' play instinct in the studio exercises. This exemplifies the conception about the relationship between play instinct and creative act.

In the exemplifying exercise *Improvisations,* the task was to provide the available media for the students to feel passionate for participating in an action taken within the studio with a support from the students' play instinct. The media selection was made accordingly with an intention to let the students feel free from the obligations of a course, without an evaluation that ends up by grading that would inevitably take the primary importance for the students. Another important intention was to free the students from external responsibilities than that

of the improvisation game, including any design requirement and architectural content. Instead, the media was selected so as to employ the students' play instinct, in a context where they would feel competent and confident throughout the task.

After the completion of the performance, by intending to repeat the exercise, the students were willing to display their potentials that they could not have realized in the previous experience. This was a clear demonstration of the students' self-reflection, which delivered the success of the related intention behind the exercise. The potentials that the students wanted to display were their encouragement, excitement, enthusiasm and motivation that they shared and transmitted to others in a group work, while being observed by their instructors without a possibility to be interrupted. Other potentials were their willingness to produce valuable outcomes, which appeared to be one of the motives and exemplifies the delivery of the achieved heuristic passion in the students. One other motive appeared to be the game character of exercise, which had the potential to make the students feel more comfortable than they were in the routine studio works. They were given the opportunity to work with each other as a shared improvisation process of all the students. For instance, during the performance, the video recording group begun trying to correct the problems they had observed, like the insufficient speaking volumes of the acting students behind the very high volume of the sound making group. This was a clear example for their experiencing the heuristic act.

Both in terms of the aim of the exercise and for completing the satisfaction of the participants, the post-production of recordings were another attempt for solving the problem of inconvenient acoustics. During the screening session of the assembled recordings of students, it was noticed that the act of improvisation had not been completed by the end of the game. This provided clue for the students' notice of the value of their immediate decisions both for experiencing an actual act of comprehension. They did not have to act as the designer that they had been expected to act by then. The assembling work also exemplified the idea that when there is heuristic passion, the problems that seem to prevent the expected outcomes, can be converted into opportunities by which meaningful wholes could be achieved. It was observed that the students did not give up the task by hiding behind an excuse like the unheard speaking voices in the video recordings, but chose to continue with a different scenario on assembling the video. The students were observed to be able to see beyond what is expectable; they tried to solve their problem by reproducing the means that are available to their reach the intended whole; and they achieved a successful

screening of their post-production. For the instructors, the greatest success of the exercise was the students notice of their existing skills in the creative act of their own, which was expected to be the most powerful motive for the following design problems in rest of the semester.

In many sources, sketching technique has been investigated and expressed as one of the most valuable media for the creative thinking ability of the design process.[17] However, looking from the students' eye it is possible to predict that their personal knowledge and previous experiences on sketching are not enough to be as effective as an improvisation game is for their confidence. It was observed that the motivation of the students and their actual involvements in the act by apparently disregarding the factor of being controlled by their instructors was fulfilled.

Similarly, in the exercise *Simulation Games*, the students were left free to interpret and act the given characters to the extent that they . In the period between the presentation of the assignment sheets and the application of the exercise *Simulation Games*, the willingness of the students to participate in the event could be observed.

In the exercise *Simulation Games*, when the students were discussing the proposed subjects of debate like "functional vs. beautiful space", they were able to discuss it without being interrupted by their instructors although they were discussing it in front of them. They could hardly continue the discussion for not knowing how to defend the sides that they had been asked to and the merit lies in their struggle without knowing how to. This can be interpreted as a chance to notice the lack of their personal knowledge, and regarded as an articulation of incompetence by the students for their instructors and themselves. Therefore, the exercise *Simulation Games* was an example for the attempt to enable the students' self-reflection on their existing knowledge, while remaining in the character of a game.

The atmosphere of the exercises *Improvisations* and *Simulation Games* were different from the routine, not only in terms of excluding the codes but also in the way the assignments were introduced, and also for the students' perception of them. The students were aware that the assignments were in the range that they could reach mentally and physically.

The relation between improvising and momentary decision making which is mainly conducted by the decisive tacit powers of the individual, made it possible to think that the

[17] See the discussion on sketching as a means of explication and reflection in chapter 4.

improvisation technique as an exercise module is applicable for providing a setting for observing the momentary decisions and hence, the creative powers of the students.

The intention to enable the students' creative transition is exemplified by another method to engender the students' comprehension of a meaning transmitted through a work of architecture. During 1/10 scaled Curutchet House model making, having the students comprehend the house as a whole with a 1/100 scaled preliminary model before the actual model building process, is an evident clue for the intention to prepare for an efficient act of comprehension of the whole process. It is an example for designing the process of the individuals experience in a work of architecture. In the exercise, the intended experiential problem solving processes on the model building materials constituted an introduction to the basic concepts of architecture like the material use, structure/form relationship, and tectonics. Hence, the exercise is also an example for the task of employing a student experience for introducing unfamiliar conceptions.

This attitude was observed to concord with the intention to awaken students' awareness of the reason why they were assigned with the task. It was possible to observe the learning outcomes of the 1/10 built Curutchet House in the students' final semester projects. The site for the final project was given in the old housing district inside the fortification walls of the Ankara Citadel, the physical properties of which resemble the site of the Curutchet House with an additional yard and vista of the City of Ankara partially at the backside. The program was also quite similar to that of Curutchet, as including the living and working spaces together. There were approaches that were borrowed apparently from the ideas of Le Corbusier on the Curutchet House, such as the inside-outside relationship achieved through the existing tree on the given site or designing with the common walls shared with the neighboring houses. The students have apparently explored what they could do with the design elements that they have comprehended within the previous experience. These results were satisfactory for the instructors as the students appeared to have committed an act of comprehension, internalization of meaning and reproduction of that meaning through their own means. One clue for this was that none of the students were in an attempt to replicate the physical features of the Curutchet House.

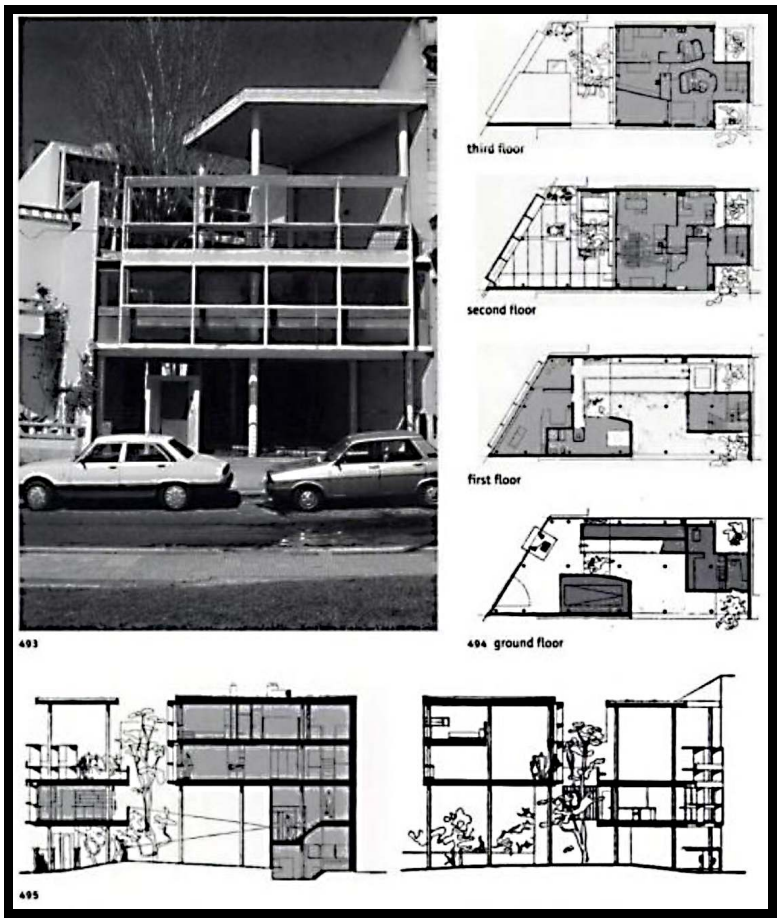

Figure 16: Perspective and Drawings of the Curutchet House, La Plata, Argentina. (Le Corbusier 1949)[18]

[18] H. Hertzberger. *Space and the Architect: Lessons in Architecture 2*, (Watertorenweg: 010 Publishers, 2001: 220).

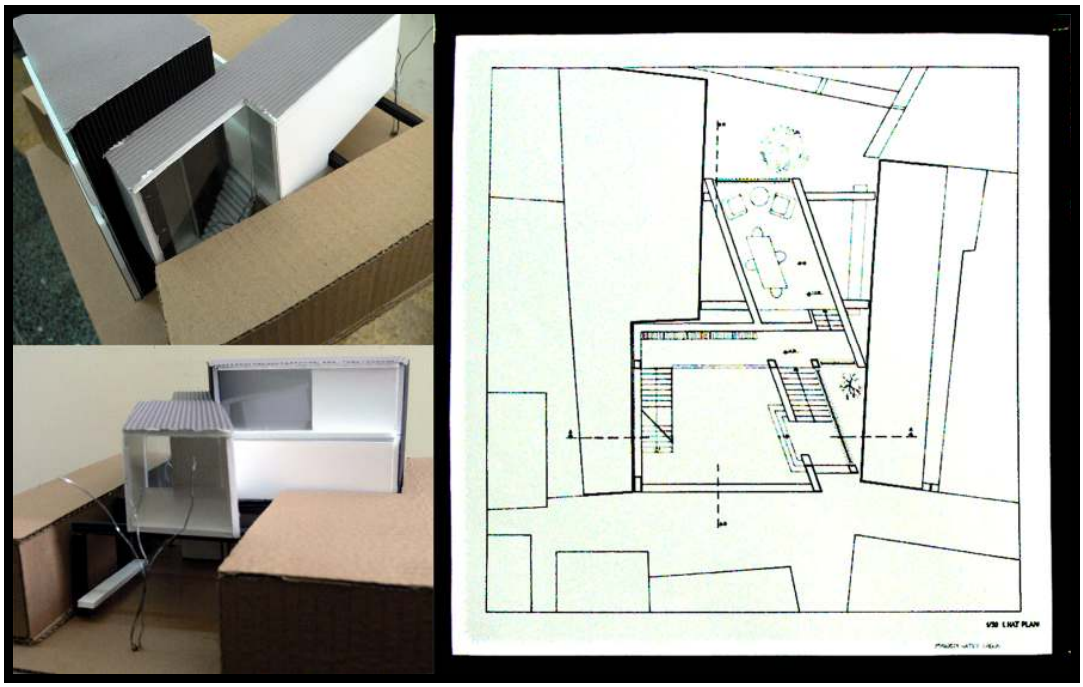

Figure 17: A part of one of the Students' final Project projects' representation material as 1/50 model and drawings[19]

The outcomes of the second application of the exercise *1/10 scaled Model Making* can be interpreted regarding the initially set purposes of the exercise model. The purpose of experiencing a construction phase was satisfactorily fulfilled for all the five groups as observed to be agreed by all of the instructors. For example, the group of 1/10 Farnsworth House builders, in order to support and strengthen the raised floor slab and the flat roof slab have developed their own method without any recommendation from their instructors, as stated by both the instructors and the students. As the students expressed the process of production, they initially had formed a wooden reinforcing structure for the slabs in order to make them bear their loads without torsion or bending on the wooden piloties. After mounting the grey cardboards on the wooden structure of the slabs, they have applied plaster for approaching to the white smooth affect of the slabs and piloties of the Farnsworth House.

[19] Personal photograph archive (17 January 2008).

Figure 18: Students' final corrections of the 1/10 model of the Farnsworth House just before the exhibition opening[20]

During the refection session after the exhibition opening, the instructors displayed their satisfaction with the outcomes of the exercise with an explicit appraisal of the students' efforts and working methods. It was apparent that both the instructors and the students were convinced that the students had experienced the creative act, and did that within a group work. The counter reflections of the students occurred apparently with an improved self-confidence in their skills of production and application.

The gathered data during the observations has examples for the attitudes to take precautions for the difficulties and dangers of the responsible act. During the student presentations of Mies van der Rohe's masterpieces and worldview, the students were observed to be presenting merely their homework, without any attempt to comprehend the content that they present. The instructors' attitude was intentionally disappointing the students about what they did for preparing the presentations by telling them that it was totally useless. This attitude was a caution of the instructors about the danger of behaving with unquestioned codes and habits of the students' past. It is expectable that the experience was an unforgettable one for most of the students.

One constant conception of the instructor team throughout the observation period was that proposing a solution for a student to solve his/her problem of not knowing how to approach a

[20] Personal photograph archive (07 April 2008).

given design problem is doing the task that they must do by themselves. This attitude also exemplifies the precautions for the dangers of the responsible act. Showing the students a method to follow would make the students immediately return to that method as they did in the past, and obey what is prescribed without questioning in order to reach success on dealing with a next problem of design. The instructors' attitude also exemplifies the adoption of individual discovery as a learning instrument. It argues that the students must discover everything by themselves and they can only be supported by being made to face their personal knowledge.

It is also possible to exemplify the attitude that requests students' self-reflection. The intention behind the exercise *Sketchings of Ankara* was to make the students discover their habits in environmental observation. When the sketch problem was assigned, each member of the instructor team was aware that the students would not be able to recall the structures and buildings that they have passed by only a few hours ago. During the presentation of the sketch problem, the students were informed that they did not need to know anything more than what they have just experienced during the tour on feet. However, the students' sketching experience was apparently structured around unconfidence and panic because of not knowing what to sketch on paper. The message transmitted by the instructors was clear; that the students have to improve their habits and attention in environmental observation. The students were asked to repeat the tour by themselves, and repeat the sketching exercise thereafter.

5.2.1.1. Exemplifying the Conception of Articulation as Reflection

Within the gathered data, there are examples for the attitude that is after enabling students' self-reflection and reflection in action on what is articulate with the attempt to enable students' reorganization of personal knowledge. This part specifically focuses on the available procedural information within the observed setting towards articulation that enables student reflection. The data I composed not only of student articulation for reflection, but also of all tasks of articulation performed within the studio for the students' comprehension.

For the instructors', their level of articulation was determined mostly by their common experiences and conceptions about applications of certain exercise models. The overall attitude towards articulation in between the instruction team was observed to be an

agreement based on their shared tacit knowledge. On the other hand, when the question was about what assignment to give in a single course; or in which direction could the semester be directed, the attempt and effort of all the instructors for articulation was perceived.

This effort was also observed in the attempts to enable students' comprehension of what is articulated. For example, the first application of the *1/10 Model Making* exercise included a preliminary session for making the students comprehend the Curutchet House with specially selected media for articulating the features and meaning transmitted through the created spaces. It was explicit in between the instructors that the outcomes of the *1/10 Model Making* exercise were expected to be the interpretations of the students in their projects or other reflections that they would do later during and after the semester. Within this scope, there was a noteworthy effort to catch the students' attention with the sensibility of Le Corbusier transmitted through the space conceptions of the Curutchet House, by differing media for articulation, like displaying photographs of the house with a background music, telling the story of the house, calling attention to spatial features to enable discovery of the space qualities.

Moreover, it was observed that their attitude towards student articulation was constantly positive and triggering for the students to articulate what they experience with every available media, and most of the time by encouraging them to develop their own media for articulation.

One occasion was in the application of the exercise *Improvisations*. The intention behind the exercise included giving tacit messages, which do not mean much when prescribed, but have a potential to be internalized when experienced especially with their merits. This was a mode of articulation, which did not necessarily had to be verbal. Indeed, such an articulation of the basic intentions of the exercise was a natural requirement of these intentions that directed the whole task through a passion to achieve a meaningful outcome at the end. The method for articulation was not borrowed from the past but developed in a heuristic act.

The exercise had another dimension for its attitude towards articulation, which was enabling the articulation of the students with their own means in the way that they select by their own will. The requirement of the assemblage of the video recordings was indeed a requirement for the student articulation of what they experienced during the task. During and at the end of the performance in the exercise, it was observed that the instructor team agreed that the intentions to make all the students desire to participate with a heuristic passion as well as

enjoy the process were fulfilled. The expressions of the instructors after their observations pointed that the students have had tried to do their bests and some had forced their limits, which had not been witnessed beforehand.

One of the most important outcomes of the exercise *Improvisations* was that the students requested another trial, which demonstrated that they believed they had learned from the process and would be able to do better second time after 'becoming experienced' with this experience. Within the observational outcomes in general, an actual self-criticism from the students' side is a very rare thing to happen such immediately after or during an event in the studio. Criticism by the students usually happens when they want to hide behind excuses when they feel they are not sufficient to fulfill the assigned design works. It is important to be aware of the focus of the criticism, especially when the students are disappointed for not being able to show and use their potentials that they actually wanted to show.

One other occasion was in the application of the exercise *Simulation Games* to demonstrate the positive attitude towards articulation in action. Initially the assignment sheets provided the limits and guidelines for the students to improvise accordingly. This attitude also transmitted tacit messages to the students to understand why they were subject to the event. The intention behind the exercise was to achieve as much articulation as possible from the students about their conceptions on architectural profession. This exemplifies the awareness of the power of tacit knowledge, that may lead the students into misconceptions, which also bears the danger of the responsible act.

The students were expected to play their interpretations of the characters that they were supposed to improvise on, which needed their extra attention. As a merit, there were students who attempted to act the character in the setting as realistic as they could do. As another merit, it was also observed that some students were able to focus on the most remarkable of the given features of the characters.[21] One example for the articulated knowledge of the students on the given subject of debate was experienced in the performance of the sixth setting of the *Simulation Games*. During the debate between the architect who is not satisfied with the applied finishings of her design work, and the construction worker, the employed expressions give clues about possible interpretations for the students' knowledge. After the complaining remarks of the architect about the applications, states the worker; "We put here

[21] One example of performances is given in Appendix B.2.

diagonals too, as you have wanted."[22] This expression may be the implication of a consciousness about the behavior of a worker to convince the architect. On doing this, the student intentionally puts the character he plays in a humorous situation. However, it is also possible to sense his slightly sarcastic tone of voice on speaking to the architect when the video recordings are examined. This gives a clue about his tacit knowledge of the preconceptions of a worker for an architect. With this expression, he might be trying to act sympathetically to the architect by using her vocabulary. Considering this attitude together with the sarcastic tone of his voice, it is possible to sense his tacit idea about the workers' thoughts about the authority and limits of a female architect.

Such interpretations are possible to an unlimited extent considering the whole of the all ten performances of the students. The reason behind this example interpretation is to show how the performances enabled the articulation of the students' tacit knowledge of the given subjects, which provided the opportunity to reflect on the students conceptions. Moreover, the intention to make the students experience a structured form of articulation was also fulfilled.

The data gathered on the exercise *Logbooks* demonstrates the use of articulation to support the creative act of comprehension. One reason behind assigning the logbooks was the consciousness about the loss of communication interface compared with the irregular semesters as the student number was about four times greater than the previous semester.

It was not only the act of articulation, but also the form, method, and attention for articulation as a task that the instructor team was sensitive about. After examining the students expected reflections on their design act in the *Logbooks,* the major criticism of the instructor team was about the insensible manner the students treat to their intended memento. Most of the students were understood to have dealt with the assignment just as another drudgery to fulfill. The students were unaware of the profits provided by this instrument of one-to-one communication with the instructors. However, after their notebooks were commented on by their instructors and returned back to them, one important feedback was the request of some students for giving their notebooks to the instructors for once more to be commented on.

[22] The Turkish version of the actual speeches of the stage setting 6, transformed by the author in to written format from the video recordigns are in the Appendix B.2.

One reason for this might be that the students were willing to use an alternative communication interface or they took the advantage of an external reflection on their design thinking at the first comments on their notebooks. They could also be willing to express themselves and to be considered. Regarding the comments of the instructors to their way of thinking and articulations without any necessity of an end product, some of the students appeared to be confident about the consciousness of their instructors that they were fabricating fake stories for their design process.

In the second collection of the notebooks some students' who had treated the assignment like a duty to by pass, appeared to change manner. That the medium worked as a support to make the students notice the use of articulation in experiencing the creative act of comprehension, was also evident when the students thanked their instructors for commending on their notes.[23]

5.2.2. Exemplifying the Deal with the Difficulties and Dangers of the Students' Responsible Act

The loss or inexistence of the meaning of the whole to be comprehended is the unhealthy consequence of the students' experiences. Since the comprehensive meaning is the condition for understanding the subsidiaries with their parts and relations in a whole, without that meaning neither understanding nor learning from an understanding can be possible. For the first year students of architecture the whole can be anything on which they can practice the act of comprehension. The difficulty lies in the pressure of the students' readily available methods, and in their need to develop new methods of their own for comprehension. The existing but tacitly dominating inarticulate code of rules or some lower purposes that hinder the higher purpose to incubate the heuristic passion behind themselves in the closer look cultivates the danger to loose the sight of the comprehensive whole. This final categorization part of the exemplifying discussion associates the available data that exemplify the attitudes to fight this danger.

The confusion between focal and subsidiary awareness occur as the two contrasting poles of the discussion. These are the opposing poles the concept of which is borrowed from the theory of personal constructs that will be employed to be helpful for expressing the difficulty

[23] Appendix C displays example images of the students' notes on their logbooks.

in dealing with students' responsible act. On the one side, there are attempts and attitudes of the instructor team to keep the meaning of the focal awareness, and on the other there are focalized subsidiaries of the students that constitute a resisting power against specifying the whole. The tension between these two poles is the core for the difficulty in dealing with the students responsible act.

The students' insist on acting with the readily available code of rules could be experienced at any stance of the studio work. The most remarkable of the collected data for exemplifying this insist was observed during the presentations about Mies van der Rohe, before the 1/10 model making exercise of his masterpieces. The precaution that was taken by the instructors against the students' tendency to use the readily available was inhibiting them from reading a ready text, but allowing only speaking to the audience with what has remained in them from what they have read on researching the literature on the subject. The students' resistance to this precaution was memorizing a ready text and reciting it to the audience. In their approach, the given assignments were merely treated as homework to be completed; with all their old learning habits and ways of getting high grades and praise. This experience displayed how the students resisted against their reorganization of knowledge which can only be executed by themselves via reflecting on their own articulation of unquestioned codes and their rationale. The instructor team's attitude of immediately ending the students' recitation of others' texts and canceling the students' presentation session was to transmit the message to the students about the necessity for their learning how to reorganize their knowledge by an actual act of comprehension.

Another example attempt to transmit the same message was in the exercise *Simulation Games*. In the seventh act of the exercise, the students were repeating the criticisms they have heard in the final reflection phase of the previous exercise, the subject of which was the subject of debate. They were speaking about the 'necessity of getting excited to deal with the design problem', which is one of the routine expressions used in the routine of the exercise. On the other hand, the students were observed to get excited in their preparation processes for the exercises *Improvisation* and *Simulation Games*; without being told to get excited. These exercise breaks enabled the instructors to make the students compare what a real excitement for a task is and what they mean by getting excited with a design problem.

Additionally, in the improvisation exercise, inhibiting the share of any information about the event before it was applied was in order to prevent any preparation for the performance. This

would mean that they would not have a chance to think on what the instructors might prefer to see before or during the performance. The intention was to free the students from their existing codes that they were still acting responsible for, and experience a studio work that does not aim to satisfy their instructors; but aim merely to perform the act. Such freedom from the students' old habits of playing for the instructors was also observed during the Simulation Games exercise.

In the example setting the instructor team was not after the students' developed skills of comprehension and creative act by the end of the semester; but their experience in their own creative acts of comprehension. The purpose was observed to make the students recognize that they have to develop their own means and methods for making use of their institutional education in architecture.

One noteworthy experience throughout the observations was the dominating calmness and modesty of the instructor team even when the students upraised at the most tempered levels. This mood enabled both the control of the task and agreement with the students in the most tensile moments of the studio process.

CHAPTER 6

CONCLUSION: COMPREHENDING THE PROMISE OF TRANSITION IN FIRST YEAR ARCHITECTURE EDUCATION

The attempt to comprehend the act of learning in architecture and its relation with architectural knowledge was the first undertaking of this study. The question was to decode the concept of knowing, especially on its practical base, which is unquestionably the fundamental feature of architectural knowledge. Staying persistent with the idea of not considering the act of knowing apart from its knower, the decoding is followed with a special concentration on the personal dimension of knowing, dependant on its tacit portion, which determined the main theoretical position. Different layers of the concept of learning in architecture were revealed, which when brought together enabled an integrated conceptualization of the creative act of comprehension as the main learning instrument of the individual architect. This conceptualization is the manipulation of the theoretical position adopting learning as a personal task, according to which learning the content and learning to learn should be considered as two different problems that have to be solved at once. This study is believed to introduce an approach to the domain of education in architecture that has further potentialities for studying the power of personal dimension in architectural creativity.

The discussion did not attempt to bring a ready operation guide that can immediately be applied in the educational settings of architectural training. The aim was rather proposing channels of explicating the subsistent problems and tensions, which is recommended for both depicting the problems and concentrating on their dynamics.

There is one major tension that the dissertation focuses on. It is the tension between the two subjects of the first year architectural design studio, who represent its two opposing poles;

one of which is the student who is prone to conformism, and the other is the instructor attempting to provide the students' creative experience. It is intentional that this focus is not shifted to another dimension, nor shared the ground with another tension with the introduction of another *opposite pole* conception. The unbroken totality of the whole discussion was the purpose of this decision. The main theoretical position of the study is established on studying the personal knowledge theory of Polanyi, *from* which the depicted tension was attended *to*. Its disposition is attained by interiorizing the theory by attending "… from the theory to things seen in its light, and … [being] … aware of the theory, while thus using it, in terms of the spectacle that it serves to explain."[1] Preparing the reader for the attention to the problem of first year architecture education from the theory of personal knowledge was the primary intention behind the configuration of Chapter 1.

The selected tension for structuring the discussion is not a definite depiction but the employment of a medium to explicate the subsidiaries of other possible tensions within the educational settings as a sample tension; a representative. Polanyi argues that "… a true knowledge of a theory can be established only after it has been interiorized and extensively used to interpret experience."[2] It is intended in this dissertation to guide the reader on interpreting any learning experience for architectural content by making him/her *interiorize* the theory of personal knowledge.

The first chapter is a reading key of the dissertation that is written with the point of view of the personal knowledge theory by Polanyi. Its function is much further than summarizing the theory; it explains the main conceptions and adoptions of the thesis, like adopting learning as a personal act, discussing the function of creative act as an instrument for irrevocably enlarging the knowledge of the individual; including the potentialities of the design act as creative act. Illuminating the outline for explaining architectural knowledge has potentialities on discussing the development of architectural knowledge, which enables a gradual focus on architecture education with its requirements and processes. The concept of *tacit knowledge* has the cohesive power on constructing the discussion on the *personal dimension* especially in architecture education.

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[1] Polanyi, *The Tacit Dimension* (1983: 17).

[2] Polanyi (1983: 21).

The investigation was continued with the conditions to consider an act of comprehension as *creative experience* displaying the same attitude with the experience based education theory of Pestalozzi. The conditions are having a personal reason for a heuristic act; articulation of personal knowledge, and the intention for the *reorganization of personal knowledge*, which could be more tangible within the realm of *aesthetic experience* for exploring the conception of learning in architecture. This enabled revealing of the conceptions about the *personal dimension in aesthetic experience*.

Then, the discussion continued with the contribution of Dewey's idea of experience, who also presents *mis-educative experience* that distorts the growth of personal experience; which is an explanation for the personal knowledge of students who are prone to conformism that represent one of the poles of the main tension. Later the focus moved on to the contents of an architect's tacit knowledge that remains in-between his/her explication and action, and arrived at the requirement for the emphasis on *meaning*, which inevitably connects itself to aesthetic experience. The accumulation of aesthetic experience was considered to reinforce the *decisive power* of the architect to transmit meaning through aesthetics.

Schön's theory of *reflection in action* was the following contribution in the discussion as a solution for the *incommensurability* problem of tacit knowledge, when the issue is *reorganization* of personal knowledge through *articulation*. This was discussed as *reflection in action*, which was the focus of the following discussion of *external coaching*.

The required aspects of an external coach from the viewpoint of this study were discussed as, being experienced in creative act of comprehension, being aware of the focal awareness, and having the skill to reveal convincing possibilities for students' passionate problem solving. *Self-criticism*, which was discussed as the major objective of external coaching, was considered as the necessary skill development for the painstaking process of eliminating personal prejudices and unquestioned conceptions that hinder creativity in action. This skill was considered to be the condition for the process of becoming courageous enough to take the responsibility of jumping into the sea of unknowns. Then, the external support was discussed as providing the proper practicum for students creative design experience.

The next task was focusing on the development of the conception on *institutional architecture education* in the post industrialized society, with a special focus on the current approach overlapping with the viewpoint of this study. The findings about the current

approach meet at a common point, as the necessity to focus on making the students *take the responsibility for their own learning* by abandoning the curricula that obstruct creativity.

In order to express the concept of *transition*, the thesis focused on the students former context before encountering with architecture education. The characteristics of *secondary education* were investigated within this task. The basic needs of the transition period was the next discussion, which was on the subsidiaries of the heuristic process to solve the problem of the main tension, all of which are primarily based on the necessity to enable *students' personal reasons* to commit the design act. Then, the study probes the existent answers to these needs given by the *basic design course*, beginning from the primary intentions of its origins at Bauhaus School of Architecture. Gropius's manifest for an architect and Itten's idea behind his selection of methods and instruments of design practice displayed a noteworthy concordance with the viewpoint of the study. Then, the universal basic design codes, as they have been distinguished by Itten were discussed separately with their *functional aspects* as the subsidiaries of a meaningful design work. The following discussion was for the subsidiaries of the first year design studios as opportunities for transition, which were the studio exercises, studio communications and setting designs for student reflection.

The focus on first year architecture education was essential especially with the transitional opportunities it might provide to students of architecture who are accustomed to an educational system allowing development of learning habits that display major contrasts with the requirements of architecture education. The depicted tension of the dissertation is an outcome of these contrasts. The *tacit dimension* is a major object of exploration within the reasons, features, consequences and prospects of this tension.

With this outlook, this dissertation does not test Polanyi's theory, nor does it seek for a break in the existent. *From* the theory of personal knowledge, it discusses and *attends to* the first year of architecture education as a potential for creative transition; in order to clarify and prove the existence of possible merits and opportunities of this discussion. It illuminates that any personally decided act may serve as a learning instrument in addition to the personal purpose of the act in concern. The discussion does not acknowledge a competition between learning to design and learning to act creatively; but illustrate that they are not distinguishable from each other, since both target practical knowledge and both require experience to eventuate. Moreover, the dissertation discusses that the design experience, which is primarily the medium for learning to design, can reach this primary object only

when it is a creative experience at the same time. Otherwise, what is acquired through an experience of a design exercise would remain on the unconscious, tacit level by keeping its *danger of being decisive* in the next design experiences of the learner.

The reason for the concept of transition became focal throughout the dissertation is a consequence of the most demanding problem of practical knowledge. The hesitant and anxious mood in decision making, being attracted by the conformity of the readily available, and the expectation of the right answer from the most easily reachable source of information are some of the characteristic attitudes that establish the problem. Hence it is a consequence of the one side of the polar tension that trigger the major problem of the thesis. The concept of transition is a solution keyword for the tension between the student with conformist and confined attitudes and the emancipating instructor.

The sequential character of the chapters of the dissertation can be expressed to have a gradual attention to the idea of continuous self-education from general as architectural knowledge to specific as the transitional potentialities of first year institutional education of architecture. The intention behind this character is to reveal the potentialities of creative skills in an architects' life time learning progress. Articulation of the cognitive value of creative experience was one of the merits of delving into the first year in architecture education. It was an important point of emphasis that transition from a self-centered individual who is prone to conformism to a self-confident creative individual is not necessarily a process of first year architecture education, and is not necessarily completed in the years of institutional education. First year has a remarkable character with its opportunity to make the individual face the truth about creative skills. Hence, also for this dissertation, first year is regarded as an opportunity to reveal the potentialities of creative skills.

Depicting a research methodology could be regarded as a preceding task for a dissertation. This is reasonable when the rest of the research work could be structured on studying with case studies, on a comparative ground for instance, right after clarifying the point of view to dominate the research act. However, as in this dissertation when the research is structured for developing a discussion, explaining which research methodology is the most convenient one to complete the dissertation can best be discussed when the discussion is clarified. This is the reason to select the fourth chapter for explaining and discussing the possible research methodologies conducted on research subjects developed around the tacit knowledge

domain, and for depicting the best possible attitude for a research on the discussion of this dissertation.

Having depicted the research attitude, the dissertation is completed with exemplifying the matters of consciousness about and methods to cope with the tension that set up the main discussion of the dissertation in an existing first year design studio setting. In this part, the instructor team of the exemplifying setting was considered to be a single subject that exemplify one pole of the tension, while the students exemplified the other pole. The collected data is filtered into those that reflect the instructor team be after providing the proper media for students' creative experience, and into those that reflect the students' resistance against acting creatively to reorganizing their knowledge; so that the employed media to cope with the tension could be exemplified.

The reason for the exemplifying process can be inquired on the existential base of the discussion. According to the condition that Polanyi stipulates for thought, collecting information about a group's or an individual's approach in general is possible only by investigating the base of the reality that he/she serves for. In other words, the data should be collected about what is acted responsible for, what is considered, or sacrificed, or fought for, and what is expected. The task can only be possible within the own reality of the subject in concern, which is the instructor team in the case of exemplifying.

In the dissertation the process of developing the discussion was a rebuilding of the reality of this exemplifying. The research was for all the explicable subsidiaries that illustrate the tension in concern. What is implicit can only be transmitted by illustrating the relations between these subsidiaries in a meaningful whole, which is the example setting that has its own reality. In the exemplifying phase, the transmitted is more than what could be transmitted with the discussions on the subsidiaries one by one, although the examples do not include other conceptions than these subsidiaries. During the research on the subsidiaries, the possible conceptions of the first year students of architecture and their reflections on their acts of learning were discussed. Moreover, the sources that may feed these findings were cited to take the most wholesome picture possible. On the other hand, in the exemplifying phase, it is possible to reveal the task handled by the instructor team to create their own reality in front of a group of students who have actual worries and conceptions of their own. The subsidiaries that could be connected under one experience were the priorities, common practical knowledge, common attitude of the instructor team;

precautions that they take for possible dangers; the media that they design for students' creative experience; the intentions and expectations beneath their media design; the technique they prefer to transmit the content of the media to the students; and the attitude towards the outcomes of the applied exercises. With the exemplifying method, all these subsidiaries could be comprehended within the whole without being necessarily separately considered one by one. This constitutes the integrating capacity of the exemplifying study, as converting the fragments of the sentence into a meaningful sentence. It is possible to explain that the exemplifying can tell more than the sum of its subsidiaries with the Gestalt principles as Polanyi does for his discussion on the act of comprehension.

The final remark is that the dissertation provided a structured outlook to see that the personal dimension in architecture has an opportunity to be revitalized by the first year of institutional architecture education, when the idea is to provide the necessary setting for students' creative experience. With the help of the exemplifying cases, it proceeded putting forward the promises of this idea of designing creative experience. Its totality was enabled by the basic intention of exploring the positive side that is after providing the best possible design for creative experience. However, the prospects that its study base confirms includes the opportunity to study the possible misleading attitudes that overlook or are unaware of the need and necessity of the transition period to revitalize the personal dimension in architecture. This discussion, which would be the next step after this study, would employ the conception about responsible act with its difficulties and dangers as discussed throughout the thesis.

This possible next step is the deal with another tension between two poles of a similar kind with the two poles of this dissertation. Like the polarized conformist attitude of the students, the next possibility of a similar polarization can be sought within the conformist instructional attitudes in the first year design studio. When this future discussion is expected to be fed by two opposite poles, the unlike pole could be the attitude that assumes to be aware of what the students' personal knowledge is comprised of and has no effort to comprehend it further. It may search for the data that set evidence for attitudes supporting tacitly the resistance of students against their reorganization of knowledge. This profile appears as opposite to what has been discussed in the dissertation as the *instructors' side* that tries to prepare the proper conditions for the students' creative experience. In the dissertation, the discussion on how destructive coaching could be have slightly touched on the aspects of this opposite pole. This new polar distinction would provide new criteria for assessing current applications in a

selected setting or for a comparative study on different settings. Interpretation of data may include the possible reasoning for the displayed attitude, which may engender further discussion on the *level of consciousness* in these attitudes. This thesis is believed to provide a promising route to depict the problems of studying the external support for architecture students' creative transition and to study the required problem solutions of the personal dimension in the first year of institutional architecture education.

If the study is continued on this path, it may illuminate the potential dangers of hardly considering the past learning habits of the students, or hardly intending to prepare a proper setting for the students' creative experience. It may also reveal the consequences of instructors' attitude against articulation. These anticipations are the hidden possibilities within an ongoing process of first year education, which becomes apparent when the path provided for comprehending the problem of the first year architecture education by this thesis is followed. It becomes possible to illustrate the solutions for other problems and the discoveries made in the course of their heuristic acts with the inquiry methods provided by this point of view.

Holding the viewpoint of this study, further inquiry is possible on several other issues. One of them is the exploration on the evolving conceptions about the creative transition in students and the expectations of the instructors in the following years of institutional education process. With the addition of students' accumulated experience in the sea of unknowns that is expected to be provided by the first year, the confrontations in the following years would provide a divergent map of issues about possible tensions that would reveal further crucial potentials of this viewpoint.

In the following steps of this approach, it is important to make clear how the final understanding of architecture education can be influenced by it. With the emphasis on the "transitional era" the thesis makes it possible to entail questions about the current applications of conventions in educational institutions; such as their attitude for curriculum; or their way of approaching to the students' expectations from their institutions; or their explications of the following ten years' success.

In the dissertation it is possible to trace an implicit attempt to point that the current conceptions in architecture education require or are already in a transition. It is a matter about the schools' adaptations to the new requirements of the world from the architects. For

instance, the selected tension for this dissertation points further requirements from the previous educational background of the students. Keeping a record of the present tensions in architecture education would enable the articulation of the needs in this ongoing transition. Leaving the safe grounds of the conformist side and expecting the unexpected can be the upcoming attitude in architecture education where no body knows what is to come.

There is further possibility to attend the varying conceptions of transition period in the western schools of architecture. For instance, the attempt of articulating for sharing the student experiences, which is partially fulfilled by the attitudes like the 'Opencourseware' of MIT, is a consequence of the action research as an opportunity provided by systematized articulation in action, and therefore reflection in action.

In most of the schools of architecture, students are accepted to the programs of bachelors' degree in architecture, after completing a preparatory program of a set of courses, which are mainly introducing the students to architectural thinking, architectural designing and making them experience the contemporary architectural world. In this preparatory period, some schools have eliminated the deal with the abstract principles of design for the students' first experiences of design, with a differentiated conception on self-education and transition. For instance starting the design experience in an architectural contextual basis could be explored for its value in promoting design experience as an instrument for developing creative skills.

It appears to have become a common attitude to discriminate the specializations junior and senior years, even when the freshman and sophomore years are not separated from the bachelors' degree program. On the other hand the discrimination of the freshman and sophomore years from the bachelors' degree program is another commonly encountered attitude, which constitutes a separate program as a prerequisite for the bachelors' degree in architecture. Another approach for this preparatory period is the conception of the 'year zero'.

Another noticeable attitude is the exclusion any design courses from the first year of the five year education program of the bachelors degree. Also in some programs, it is possible to observe a more integrated approach with the urban design contexts and possibility for determining and following the study of interest. Lightened course loads and simplified curricula are also commonly encountered, which appears to be for eliminating unnecessary division in students attention and for utilizing the highest potential that is essential for their

creative experience. Indeed, still there are schools holding the dense curriculum and completing the introductory design experience with the exploration of fundamental design principles. Another attempt is fulfilling the representation skills before employing the students with design studies.

The bachelors degree on the other hand, is followed by a preceptorship of professional practice and of academic studies as a masters' degree, which is a common precondition for practicing architecture. The conception about continuity in personal knowledge development is encountered also in the summer schools provided by some schools of architecture for the high-school students, in order to make them acquire experience in design and architectural perception, which is a potential to cultivate personal desire for architectural training.

It is apparent that a conscious and controlled program for the readiness of the students for architecture education and practice has been deciphered into various solutions, which establishes the special attitudes and/or characteristics of the schools of architecture. This illuminates that the viewpoint provided by this study has a potential to attend and discuss a wide variety of subjects, regarding the contexts, applied methods and instruments, and identities of the schools of architecture.

This viewpoint would also pose critical questions regarding the continuous self-education in architectural practice. The possible consequences of the permanence or the re-load of conformist attitude is one side of the issue, which is about the post scenario of the mis-educative experiences. Together with a exemplifying study of a proper setting for research, which is similar to that of the thesis, these consequences would enable a profile for the dangerous; for the destruction of creative act.

On the other hand, the other side of the questions about the continuous self-education of practicing architects, would enable a documentation of various approaches towards articulating procedural information, self-reflection, and reorganization of knowledge by means of a research within a determined study area. A totality of the gatherings after the completion of the studies about all of these issues would display that the *personal dimension* with its cognitive prospects is the condition for creativity in architecture.

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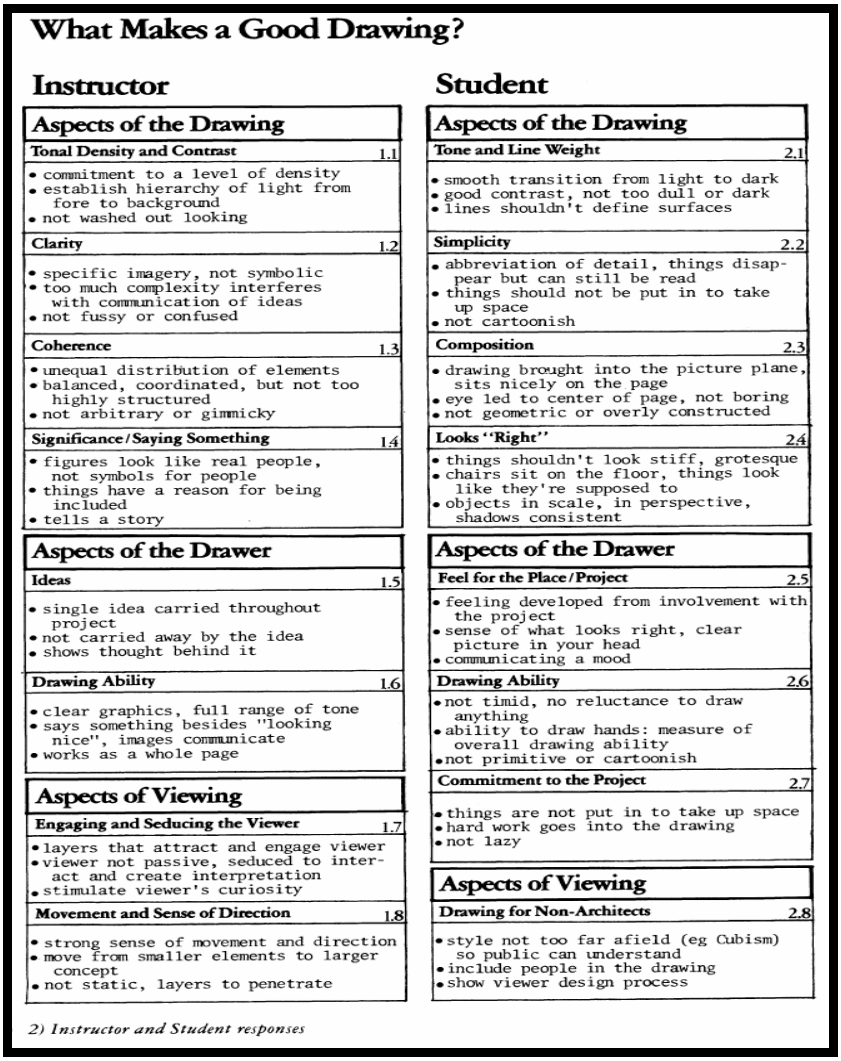
APPENDIX A

EXAMPLE ANALYSIS FOR DIFFERING CONCEPTIONS OF STUDENTS AND INSTRUCTORS



What Makes a Good Drawing?

Instructor

Aspects of the Drawing

Tonal Density and Contrast 1.1
- commitment to a level of density
- establish hierarchy of light from fore to background
- not washed out looking

Clarity 1.2
- specific imagery, not symbolic
- too much complexity interferes with communication of ideas
- not fussy or confused

Coherence 1.3
- unequal distribution of elements
- balanced, coordinated, but not too highly structured
- not arbitrary or gimmicky

Significance/Saying Something 1.4
- figures look like real people, not symbols for people
- things have a reason for being included
- tells a story

Aspects of the Drawer

Ideas 1.5
- single idea carried throughout project
- not carried away by the idea
- shows thought behind it

Drawing Ability 1.6
- clear graphics, full range of tone
- says something besides "looking nice", images communicate
- works as a whole page

Aspects of Viewing

Engaging and Seducing the Viewer 1.7
- layers that attract and engage viewer
- viewer not passive, seduced to interact and create interpretation
- stimulate viewer's curiosity

Movement and Sense of Direction 1.8
- strong sense of movement and direction
- move from smaller elements to larger concept
- not static, layers to penetrate

Student

Aspects of the Drawing

Tone and Line Weight 2.1
- smooth transition from light to dark
- good contrast, not too dull or dark
- lines shouldn't define surfaces

Simplicity 2.2
- abbreviation of detail, things disappear but can still be read
- things should not be put in to take up space
- not cartoonish

Composition 2.3
- drawing brought into the picture plane, sits nicely on the page
- eye led to center of page, not boring
- not geometric or overly constructed

Looks "Right" 2.4
- things shouldn't look stiff, grotesque
- chairs sit on the floor, things look like they're supposed to
- objects in scale, in perspective, shadows consistent

Aspects of the Drawer

Feel for the Place/Project 2.5
- feeling developed from involvement with the project
- sense of what looks right, clear picture in your head
- communicating a mood

Drawing Ability 2.6
- not timid, no reluctance to draw anything
- ability to draw hands: measure of overall drawing ability
- not primitive or cartoonish

Commitment to the Project 2.7
- things are not put in to take up space
- hard work goes into the drawing
- not lazy

Aspects of Viewing

Drawing for Non-Architects 2.8
- style not too far afield (eg Cubism) so public can understand
- include people in the drawing
- show viewer design process

2) Instructor and Student responses

Figure 19: Cuff's depiction of the differing conceptions of 'good drawing'.

Concerning the diagram Dana Cuff analyses the different approaches of the students and the tutors for the concept of a "good drawing": "Comparisons across the diagram reveal the student's concept of a good drawing is more concrete, specific, and technique-oriented than the instructor's, which embodies principles and generalizations from a wider knowledge of drawing is specific at a different level of analysis. The student may see his own product as a one-of-a-kind drawing in contrast to the instructor's placement of the drawing within a larger, more comprehensive class. The student's comments focus on the drawing itself, the physical entity. The instructor evaluates the ideas underlying the drawing, the way they are expressed, the ordering principles, the sense of movement, and the engaging qualities."[1]

[1] D. Cuff, "Teaching and Learning Design Drawing." (Spring, 1980: 6)

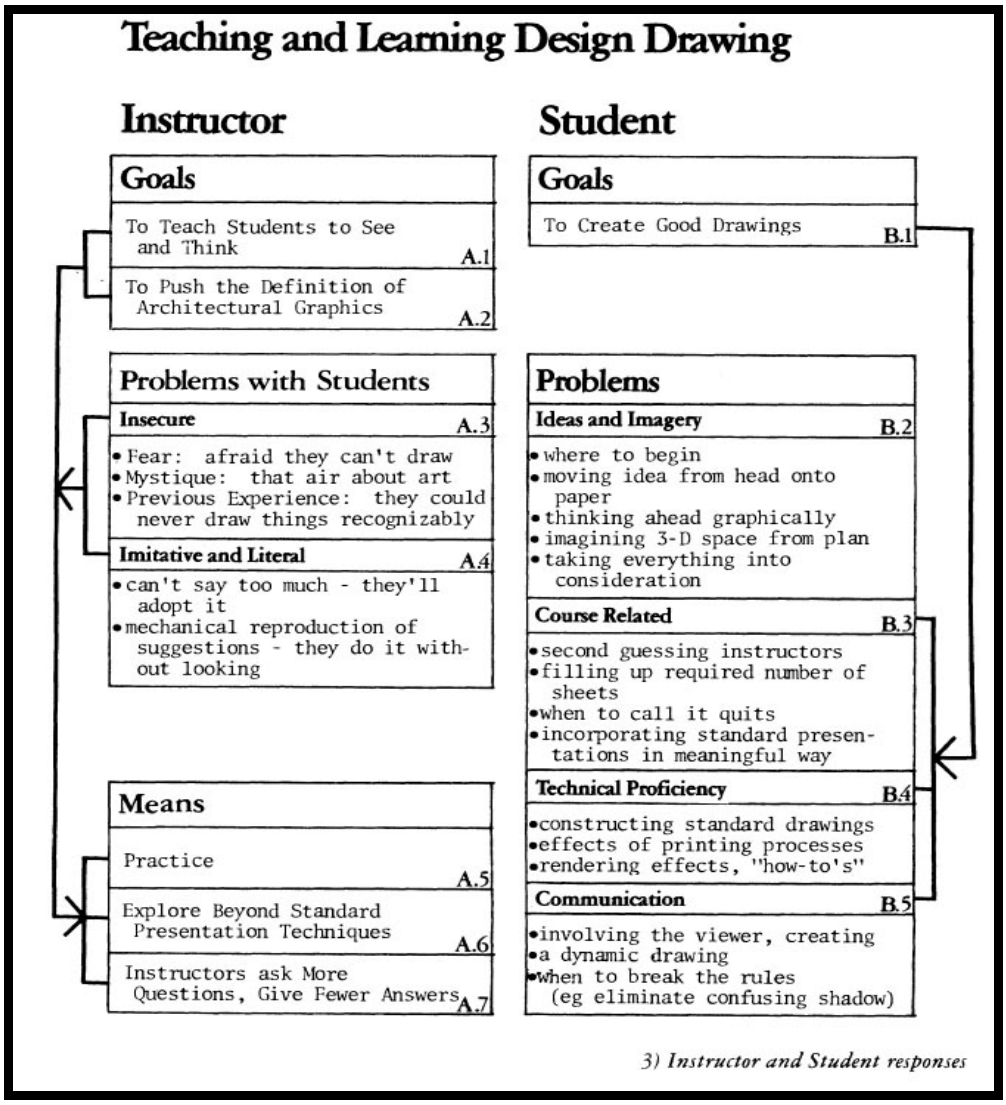


Figure 20: Cuff's depiction of the differing conceptions of 'design drawing'.

Her explanation for the figure: "Figure 3, again based on discussions, observations and interviews, indicates that the student is trying to learn to make good drawings while the instructor is attempting to teach an expansive notion of architectural graphics based on careful seeing and thinking."[2]

[2] D. Cuff, "Teaching and Learning Design Drawing." (Spring, 1980: 7).

APPENDIX B

THE EXERCISE SIMULATION GAMES

B.1 THE ASSIGNMENT SHEET

The assignment sheet was distributed to the students of the spring semester of 2007-2008 academic year for the exercise simulation games. The author of the sheet was the researcher herself.

Table 1: The assignment sheet of the exercise *Simulation Games*

Konu: konusu bir mimarlık bürosunda geçen bir tiyatro dekoru tasarlanacaktır. Bu tasarım işi için yönetmen ve iki oyuncu gerçek bir mimarlık bürosuna teklif almaya gelirler.

1. sahne

Kişiler: dekorcular:

1) dekor tasarımcısı (mimar Seyfi),
2) yardımcısı (yardımcı mimar Ali)
    a. yönetmenin istekleri doğrultusunda dekoru tasarlayan kişiler
    b. malzemelerin hepsinin ve onların tüm potansiyellerinin farkında olan deneyimli sahne dekoru tasarımcıları.
    c. iki mimar arasındaki zıtlık birinin "güzel mekan" anlayışıyla diğerinin "doğru işleyen mekan" anlayışı arasında
3) oyun yönetmeni (Kemal)
    a. oyunu kurgulayan sahneleri tasarlayan kişi
    b. kararlarını baş rol oyuncularının özelliklerini bilerek almak zorunda (mimiklerini iyi kullanan oyuncu için ışığın doğru ayarlanması, sesi gür olan oyuncunun anlatıcı rolünde kalması gibi)
4) oyun baş rol oyuncusu (Ayşe)
    a. rolünü iyi vurgulamak ister: rolü mimar
    b. kendi özelliklerini anlatmaya çalışır ve yönetmeni yönlendirmek için çabalar
    c. doğaçlama oyun oynayacaktır.
5) oyun ikinci baş rol oyuncusu (müşteri) (Erol)

Table 1. Continued

6) sanat eleştirmeni (Nusret)
    a. dışarıdan bir göz olarak kalmayı tercih eder, yönetmen belli aralıklarla kendisine danışır ve ters gidenin ne olduğunu anlama konusunda yardım ister
    b. oyunda teknik konulardan çok anlatılmak istenenin netliği ile ilgilenir.
    c. Kurguyu gayet iyi bilir, iki mimar arasındaki gerginliğin farkındadır ve daha da kızıştırmaya çalışır.
7) yönetmenin karısı (veya kocası) (Deniz)
    a. yönetmeni arka planda asıl yöneten kişidir
    b. asla sesi çıkmaz sadece seyreder ama yönetmen onun mimik ve işaretlerine göre karar alır kontrol altında tutmaktır.

Not: Sahne 1 deki oyunun konusu sahne 3'dir.

2. sahne

1) dekor tasarımcısı: (öncekinden farklı bir oyuncu aynı karakteri oynar) (mimar Seyfi)
    a. mimarlar aldıkları kararları uygulatmaya başlamışlardır. Baş tasarımcı bu kararların netleşmesini verdiği anlık kararlar ile sağlamaktadır.
2) Yardımcı tasarımcı (2. mimar Ali):
    a. Yardımcı mimar, diğer mimarın netleştirdiği kararları eldeki malzemelerle bağdaştırarak uygulamaya koymayı kurgular. Çalışan işçileri denetler.
    b. Eldeki malzemeler ile alınan kararların uyuşmasını sağlar gerektiğinde yeni yorumlamalar yapar.
3) Baş İşçi: (Hamza)
    a. Mimarların kararlarına durmadan itiraz eder, kullanılan malzemelerin orijinal, geleneksel bağlamlarını savunur, yeni tasarımlar yeni yorumlar için kullanılmalarına içerler, kızar hatta küser.
4) Yardımcı baş İşçi: (Selo)
    a. Baş işçiden daha ılımlıdır, sözünü diğer işçilere dinletmeyi başarabilir. Onun için önemli olan en kısa zamanda yüklendiği işi en iyi şekilde bitirip teslim etmektir.
5) İşçi 1 ve işçi 2: bir yandan işle ilgilenirken bir yandan da kendi aralarında durmadan mimarları, yönetmeni ve baş işçiyi çekiştirirler. (Cezmi ile Salih)

3. sahne

Kişiler: mimarlar ve müşterileri

Yer: bir önceki sahnede tasarlanan mimarlık bürosu

1) Mimar (Selin): müşteriyi kabul etmekten yanadır; onları büronun borçlarından bir miktar kurtulabilmenin bir aracı olarak görür.
2) yardımcı mimar (Davut): müşteriyi reddetmekten yanadır. Aslında diğer mimarın da farkında olduğu bir sorun olarak sadece gösteriş için evine ne bulursa tıkıştırmak niyetinde olan bayan müşterisini tatmin edebilecek bir tasarım anlayışları olmadığını bilerek bu işin sadece sıkıntı vereceği endişesinden yakınır.
3) müşteri: mobilyacı (İsmail)
    a. Ankara sitelerde büyük bir mobilya mağazası vardır. Karısının sipariş ettirdiği mobilyalar çoktan hazırdır. Renklerine bile karar verilmiştir.

Table 1. Continued

4) müşterinin karısı (Hülya):
    a. bütün isteklerin sahibi kendisidir, kocasını ikna edip getirmiştir ama adamın fazla konuşup kendi kontrolü dışında bir şey yapacağından çok korkar ve bu yüzden de en çok o konuşur, bolca istekler yağdırır.
    a. Babası zengin ama tutucu bir ailenin kızıdır, lise mezunudur, ev hanımıdır,
    b. isteklerinin yerine getirilmesini, komşularına ve akrabalarına gösterişte bulunmayı sever.
2) müşterinin kızı (mimarlık öğrencisi) (Doğa)
    a. devamlı annesiyle didişme halindedir.
    b. Her şeyi bildiğini zannettiğini söyleyerek onu fazla istekte bulunmaması konusunda uyarmaya çalışır, ancak yaşından ve konumundan dolayı fazla dikkat çekemez. Daha ziyade annesinin kendine anlayamayacağı şeyler için müdahale etmesi gerekçesiyle sinirlenmesine sebep olur.
3) Mimarların yine mimar olan bir arkadaşları (Sami):
    a. Sahneyi gizli bir keyif içinde seyreder ve mümkün olan her fırsatta kendi arkadaşlarıyla bayanın isteklerinin yapmaları gerektiği imaları ile dalga geçer.
    b. Bu kişi aynı zamanda öğrenci kızın okulunda yarı zamanlı hocasıdır, kız bir süre sonra hocasının yanında saf tutup duruma onunla birlikte dışarıdan bakmayı tercih edecektir.

Not: kullanılacak olan sahne dekoru, 1. sahne'de tasarlanan dekordur.

4. sahne

Mimarlar 1. sahnede kendi tasarladıkları mimarlık bürosu ile ilgili bazı sıkıntıların varlığı hakkında mutabık kalırlar ve ilk fikirlerini daha iyi ortaya çıkaracak yeni bir tasarım düşünürler. Bu defa aralarında bir müşteri yoktur, yalnızca kendi tasarımlarının üstüne geri yansıma yaparlar.

1) Dekor tasarımcısı (mimar Seyfi),
2) Yardımcısı (yardımcı mimar Ali – 1. sahnedeki karakterler devam eder, ancak canlandırmayı farklı oyuncular yapar)
    a. Mimarlar bu defa "güzel mekân" anlayışıyla diğerinin "doğru işleyen mekân" anlayışı arasında gidip gelmenin kendilerini doğru fikirler üretme konusunda engellediği düşüncesini benimserler.
    b. Tasarladıkları mekânın karakterini oturtmaya yönelik tartışmalar yürütürler. Bu tartışmalar sırasında bu defa da "kullanılan tüm tasarım elemanlarının birbirini tamamlayacak şekilde mekânı bir bütün olarak tanımlaması" fikri ile "mekânı kullanacak olan mimarların kendi özel alanlarının birbirinden bağımsız şekilde yaratılması" fikri arasında birbirleri ile çelişirler.
3) Stajyer mimar 1: (Emrah)
4) Stajyer mimar 2: (Çağrı) Ortamda bulunan stajyer mimarlar (2 kişi) mimarların düşüncelerini somutlaştıracak şekilde var olan dekoru değiştirmeye başlarlar. Bunu yaparken de yapılan değişikliklerin önceki tasarıma göre farkının ne olduğunu konuşurlar, tartışırlar.
5) Her iki ofisteki mimarların ortak arkadaşları olan bir mimar (Sami) (bir önceki sahnedeki 6 no.lu karakter farklı bir oyuncu tarafından canlandırılır)
    a. Tartışmaya ofisteki deneyimlerini paylaşarak katılır

Mimarların önceki tasarımda neden rahatsız olduklarını anlamaya çalışır

Table 1. Continued

5. sahne

Kullanılacak olan sahne dekoru 4. sahnede tekrar tasarlanmış olan dekordur.

1) 3. sahne 6. karakter , 4. sahne 5. karakter olan mimar (Sami) bu defa kendi bürosundadır. (Farklı bir oyuncu)
    a. Büro elindeki uygulama işleri yanında bir de yarışmaya hazırlanmaktadır. Yarışmanın teslim tarihi çok yakındır ancak ekip yarışmaya katılmaya henüz karar vermiştir.
    b. Yarışma deneyimine çok değer verir, geçmişteki deneyimlerin kendine kattıklarını düşünür ve istekli bir ekiple çalışmanın ne kadar keyifli olduğunu bilir. Buradan alacağı keyfin diğer işler için de motivasyon sağlayacağını düşünür.
    c. Yarışmayı aynı zamanda genç mimarların ve mimar adaylarının uzun vadedeki tasarım ekiplerinin bir parçası olabilmeleri için bir fırsat olarak görür.
    d. Ancak büronun işleri de ortağı ile ters düşmeme isteği de eşit oranda ağır basmaktadır.
2) Büronun diğer mimar ortağı (Asuman)
    a. Ortağı ile geçmişte birçok yarışma deneyimi yaşamış ödüller almışlardır. Ancak şu anda ellerindeki işlerin doğru yürütülmesi için enerjilerinin ve vakitlerinin zaten yetmediğini düşünür ve içten içe yarışmaya katılma fikrinin yersiz ve zamansız olduğuna inandığı için ilgisini vermez, büro çalışanlarını uygulanan projeler konusunda yaptıkları işlere odaklanmaya yönlendirir.
3) 3. sahnedeki öğrenci kız (Doğa)
    a. Hocasının teklifi üzerine yarışma ekibinin bir parçası olmak için büroya gelmiştir.
    b. Büroda yürütülen diğer işlerle bir ilgisi yoktur.
    c. Bu yarışma deneyiminin kendi için çok önemli bir fırsat olduğuna, çok şey öğrenebileceğine ve hocasıyla birlikte çalışmaktan çok keyif alacağına inanır.
    d. 2 no.lu ortağın çok istediği bu süreci engellemek istediğini hisseder.
4) Büroda çalışan yardımcı mimar (Serkan)
    a. Büro ortağı olan mimarlardan 10 yaş kadar gençtir, 5 yıllık bir yeni mezun mimardır. Çoğunlukla ortaklar tarafından verilmiş kararların AutoCad dosyasındaki uygulanmalarıyla ilgilenir. Kendi fikrini de söyleyebileceği bir fırsat olarak gördüğü için büronun bu yarışmaya katılmasını çok istemektedir.
5) Büroda çalışan diğer yardımcı mimar (Rüya)
    a. 4no.lu yardımcı mimardan 5 yaş daha gençtir. Mezun olalı 1 yıl olmuştur ve öğrenciliğinden beri bu ekibin yardımcısıdır. Birlikte yaptıkları her şeyden keyif aldığı gibi birlikte yarışmanın da güzel olacağını düşünür.
6) 4 no.lu yardımcı mimarın daha yakın olmak üzere ortamdaki herkesin arkadaşı olan bir mimar (Tarık)
    a. Gitar çalar
    b. Başka bir ekiple aynı yarışmaya katılmaktadırlar. Çalışmaya daha önce başlamışlardır.
    c. Ortamdaki gerginliği yumuşatmak ister.

ARA

Table 1. Continued

6. sahne

Şantiye: Kullanılacak olan sahne dekoru 4. sahnede tekrar tasarlanmış olan dekordur.

1) 5. sahne 2.no.lu mimar kişi (Asuman - yeni bir oyuncu):
    a. Şantiyede denetim yapmaktadır
    b. Şantiyede çalışan müteahhit ile birlikte şantiyeyi gezmektedir. Şantiye yine bir büronun iç dekorasyon projesinin uygulamasıdır. Uygulanmış ve uygulanmakta olan detayları inceler. Bulduğu hataları söyler. Değiştirilmesi ve doğrusunun yapılması konusunda ısrarcı olur.
2) Müteahhit (Ferit):
    a. Şantiyenin başında duran ve tüm işlerin doğru yapılmasını denetleyen kişi olmakla birlikte mimarın alacağı paraya karar verir yetkidedir.
    b. Mimarın itirazlarına ve eleştirilerine direnç gösterir, yapılacak olan değişikliklerin mali kayba sebep olacağını savunur.
    c. Her defasında kendinin mimarlardan daha fazla zevk sahibi olduğunu kanıtlamaya çalışır. Bunun için de mimarın önerdiklerini beğenmez, değiştirmek ister.
3) 5. sahnedeki 4 no.lu yardımcı mimar (Serkan - yeni bir oyuncu):
    a. Şantiyenin fotoğraflarını çeker, çektiği fotoğrafları mimara gösterir, mimarın özellikle çekmesini istediği kareleri almaya çalışır.
    b. Mimar ve müteahhit arasındaki tartışmayı izler ve mimarı haklı çıkarmak için o da çabalar.
4) Şantiye taşeronu 1 ve 2 (Lale ve Özge):
    a. Belirli kalemlerin temini ve uygulaması ile yükümlü olan kişilerdir (mobilya, ahşap vs.). Yapılacak olan değişikliklerin maliyetleri hakkında bilgi vererek tartışmalara dâhil olurlar.

7. sahne

Bir mimarlık bürosu:

1) müşteri: emekli bankacı heykel yapma merakı olan bir kadın (Sultan)
    a. gölbaşındaki arsasına emekliliğini geçirebileceği ve heykeltıraşlık hevesini tatmin edebileceği mütevazı bir yer ister.
2) mimar 1(Sevgi): müşterisinin talebini bir barınma ihtiyacı olarak algılar. Bir yerin bir insanı barındırabilmesi için o insanı tanımak ve anlamak gerektiğine inanır ve onunla ilgisini çeken konularda sohbet etmeye çalışarak heyecanlanmasını sağlamaya çalışır. Bu heyecanın kendi duyarlılığını açığa çıkaracak önemli bir kaynak olduğuna inanır.
3) o anda büroda bulunan bir siteler mobilyacısı (Hüsnü):
    a. "abla sen nasıl bi salon istiyosun" gibi sorularla lafa girerek kadının aslında daha salon olarak tanımlamadan mimarıyla birlikte var edebileceği, içinde yaşayacağı mekanı kendi bildiği salona dönüştürür.
    b. Kendi bildiğini en doğru olarak ortaya koymak ister ve kendine kulak asılmadığını hissettiği anda sinirlenir. Herkese doğrusu neymiş anlatmaya çalışır.
4) mimar 2 (Tankut):
    a. ortağı ile tamamen aynı düşüncelerdedir.
    b. mobilyacının kadının aklını karıştıracak sorularını engellemeye çalışır.
5) Kadının kendi gibi bankacı olan kızı (Lale):
    a. Annesine destek olmak için gelmiş görünmekle birlikte yalnız yaşama kararından dolayı tedirgindir ve bu fikrinin kötü olduğunu savunmak için fırsat kollar.

Table 1. Continued

8. sahne

Bir önceki sahnedeki mimar1, mimar2 karakterleri ve dekor sabit (oyuncular değişir)

1) mimar 1 ve 2 (Sevgi ve Tankut):
    a. önceki sahnenin değerlendirmesini yaparlar
    b. kadının kendi isteklerini ifade edişi ile gerçekten ne istediği arasında ilişki kurmaya çabalarlar
    c. bu değerlendirmelere mobilyacının yarattığı karışıklık hakkındaki görüşlerini de eklerler.
2) Arkadaş mimar 1 ve 2 (Selim ve Mert):
    a. Arkadaşlarının bürosunu ziyarete gelen iki mimardırlar.
    b. Konuyu anlamaya çalışır ve ifade edilen isteklerle gerçekte istenecek olanlar ikileminde bir tartışmaya katılırlar.
    c. Bu tartışmanın neden faydalı olduğunu düşündüklerini de eklerler.
3) Bizim öğrenci kız (Doğa):
    a. Tartışmaları dinler, ve mimarlardan birinden bir anda gelen "bizimle staj yap" teklifi karşısında kalır. Bu onun için ilk defa bir mimarlık pratiği yapma fırsatıdır.
    b. Aklında tek bir soru vardır ve bunu oradaki herkese de sorar: böyle bir tartışmadan nasıl olur da gerçek bir mimari çözüme çok kısa bir zamanda varılabilir?

Sahnenin bir bölümünden sonra tartışma konusu öğrenci kızın sorduğu soruyu cevaplamaya yönelik gelişir.

9. sahne

5. sahne dekoru tekrar.

1) Öğrenci kız (Doğa):
    a. Birlikte yarışmaya katılmaya can attığı ancak yoğun işler nedeniyle vazgeçen hocasına başka bir mimarın ona yanında staj yapmayı teklif ettiğini anlatır.
2) 5. sahne 1. kişi (Sami - kızın hocası) – farklı oyuncu:
    a. Kızın hocası bu durumu fazla değerlendirmez. Ancak öğrenebileceklerinin en fazlasını öğrenmesi konusunda öğüt verir.
    b. İkinci mimarın açtığı tartışma ilgisini çeker.
3) 5. sahnedeki ikinci mimar (Asuman - başka oyuncu):
    a. Öğrenci kızla merhabalaşır ve 1. mimara iki önceki sahnede gerçekleşen durum hakkında yorumda bulunur.
    b. İki mimar, kendilerini anlamak istemeyen aynı zamanda da hayatı boyunca sanatsal hemen hiçbir deneyim yaşamamış paralı bir insanı, yaptıkları işin mimarlık olduğuna ve mimarlığın ne olduğuna nasıl ikna edebilecekleri hakkında kafa yorarlar.
    c. Mimarlardan biri bunun için ucuz maliyetsiz mimari çözümleri diğeri ise karşılarındaki kişinin duyarlı yönlerini açığa çıkarma yöntemini savunur. Birbirlerine hak vermezler ve tartışırlar.
4) Büroda bulunan ziyaretçiler (2 kişi) tartışmanın tarafları haline gelirler ve ikiye iki bir tartışmanın içinde kalırlar. (Ragıp ve Tuna)

Table 1. Continued

10. sahne

Tekrar mimarlık bürosu dekorasyonu yapan büro:

4) Müşterilerine bir sunuş yapacaklardır, ancak aralarında bir fikir ayrılığı doğmuştur ve bu yüzden de iki farklı alternatif üretmişlerdir.
    a. İlk mimar Seyfi, bir mimarlık bürosu açacak mimarların, hele de bu işe ilk defa kalkışıyorlarsa kendi kuracakları bir düzen oluşturmaları hatta mümkünse her ayrıntının kendileri tarafından tekrar elden geçirilebilir nitelikte kurgulanması gerekliliğini savunur.
    b. İkinci mimar Ali ise henüz gerçek mimarlık deneyimini yaşamamış olan mimar adaylarının ilk mimarlık deneyimlerini tecrübeli mimarlar tarafından içinde tasarım yapmaya yönelik doğru tasarlanmış bir mekânda yaşamalarının onlar için çok daha faydalı olacağını savunur.
5) Müşteri: mezun mimar çocuklarına hazır bir büro vermek isteyen bir anne ve babadır. (Fuat ve Pelin)
    a. Her iki tarafa da hak verirler ancak son kararı kendileri vereceklerdir.
    b. Tarafların kendi fikirlerini nelere dayandırdıklarını iyice anlamaya çalışırlar.
6) Büroda çalışan yardımcı mimarlar 2 kişi. (Hale ile Jale)

Her biri tartışma taraflarından birini benimser ve tartışmaya katılır.

B.2 EXAMPLE APPLICATION SPEECH TEXT

The following table includes the improvised form of the 6th stage text as a selected example from the whole application of the exercise *Simulation Games*. The following text is the written form of the speeches and acts performed during the students' performance gathered through video recording.

Table 2: The speeches and acts of the stage 6 in the exercise *Simulation Games*

Müteahhit Ferit:
— Gel Sami usta gel. Buraları ne yaptınız ya.
Sami Usta:
— Ya hallettik ya...
Müteahhit Ferit:
— Burada böyle bir şey yoktu ki, sen çiçek böcek koymuşsun o ne ya?
Sami Usta:
— Ya mimar baştan demiş. Buralar düz olsun demiş. Ben gittim baktım böyle çiçekli daha güzel. Hoşuma gitti.
Telefon çalar. Telefonun çalış melodisi arabesk bir şarkıdır. Müteahhit telefonun melodisi duyulmaya başladığı zaman:
— Duracaksın burada… Bak çok güzel şarkı bu. **(bu müteahhidin genel intibası ile ilgili bir gösterge olarak oyuna dâhil edilmiş bir elemandır.)**
Bu esnada sahneye mimar ve yardımcı mimar rollerindeki oyuncular kendi aralarında konuşarak yaklaşmaktadır. Konuşmalar birbirine karışır fazla bir şey anlaşılmaz. Müteahhid telefon konuşmasını bitirir ve mimar Asuman hanıma döner:
— Merhaba Asuman Hanım.
Mimar Asuman:
— Merhaba. Nasıl gidiyor çalışmalar? Bakmaya başlayalım.
Müteahhit Ferit:
— Fayanslar bitti. **(bu sahnedeki "fayans" denetimi seçilen şantiyenin bir iç mekan uygulaması olduğu yönünde bilgi verir.)**
Mimar Asuman:
— Nasıl bitti fayanslar? Benim size verdiğim listede bunlar mı vardı? Arkadaşlar, malzeme listesine bakmadınız mı hiç?
Müteahhit Ferit:
— Ya gayet güzel sen de…
Yardımcı mimar:
— Malzemeyi bırakın, ya şu bitirmelere bakar mısınız lütfen?
Sami Usta:
— Ya bakın burada diyagonal geçişler yaptık.
Mimar Asuman:
— Benim size verdiğim proje nerde? Neye göre yapıyorsunuz bunları?
Sami Usta:
— Proce var mı nerde?
Müteahhit:
— Daha güzel olmamış mı?
Mimar Asuman:
Beyefendi verdiğim listede bu malzemeler mi vardı? Sebep gösterebilir misiniz neden bunarı kullandınız?

Table 2. Continued

Müteahhit Ferit:
— Merhaba Lale hanım.
Taşeron Lale:
— Ben de Lale, hepsini biz yaptık, merhaba beyefendi.
Taşeron Jale
— Asuman hanım önce sakin olun lütfen, bu tamamen maliyetle ilgili bir şey.
Mimar Asuman:
— Neden uslanmıyorsunuz? Ya bu üçüncü denetimim hala her şeyi kafanıza göre yapıyorsunuz. Kaç kere kırdırtmak gerekiyor?
— Ya bunlar ağaçta mı yetişiyor zannediyorsun sen ya, bunlar para. Gayette pahalı. İşte ucuz olsun güzel olsun bakın çiçek de koymuş vallahi güzel olmuş.
Mimar Asuman:
— Madem bu güzeldi o zaman bana niye verdiniz para? Kendiniz çizseniz olmuyor muydu?
Sami Usta:
— Ya biz sizin dediğiniz o beyazdan da koyduk aralara.
Taşeron Lale:
— Bunu ben kendi evime de yaptırdım o kadar güzel oldu ki.
(Herkes konuşuyor, fazla bir şey anlaşılmıyor.)
— Ferit bey bize parayı verdi, biz de verilen paraya göre bunu yaptık.
Mimar Asuman:
— Ben sizinle muhatap olmak zorunda değilim Ferit bey benim muhatabım sizsiniz.
Müteahhit Ferit:
— Onlar yapmış ben de arkalarındayım.
Yardımcı mimar (fotoğraf makinesinin ekranından az önce çektiği detayları gösterirken):
— Onu boş verin de şuna bakın şuraya bakın lütfen yani ya. Yani sadece fayanslar o karoları maroları hepsini mahvetmişler lütfen ya.
Mimar Asuman:
— Ben bunları sayılı verdim sizin okumanız yazmanız yok mu, nasıl böyle bir şey yapıyorsunuz.
Müteahhit Ferit:
— Arkadaşım sen xxxx mezunu musun? Orda bi [*instructor D*] varmış böyle hepinizin başının etini yiyormuş.
Gülüşmelerden konuşmalar anlaşılamıyor.
— Maliyet diye bişey var. Maliyet!
Mimar Asuman:
— Ne maliyeti? Zaten üçüncü kırdırışım, ne maliyeti?
Yardımcı mimar:
— Lütfen yani İnstructor D'nin o mübarek insanın adını azına alma
Gülüşmeler
Müteahhit Ferit:
— Burada sanat mı soyut mu ne biz anlamayız.
Mimar Asuman:
— Ben burada sanattan değil projeyi okuyup okuyamamanızdan bahsediyorum.
Sami Usta:
— Ya bacım procede ne var şimdi ya
Mimar Asuman:
— Burada belirtilen fayans...
Sami Usta:
— Ya öyle fayans mı olur bak burada çiçekler var bak diyagonallik de var aralara senin dediğinden de koyduk bak beyazlardan da koyduk senin gönlün olsun diye.

Table 2. Continued

Müteahhit Ferit:
— Bir Dakka şu para işini bir konuşalım ya.
Taşeron Lale:
— A bence de biz daha paramızı almadık. Yani daha alacağımız var yani.
Müteahhit Ferit:
— Yani bu projeye taş çatlasa dört buçuk beş milyar veririm size başka da bir şey vermem kardeşim. Yani bu yaptığınız işe ancak beş milyar veririm başka da veremem.
Mimar Asuman:
— Arkadaşım işi rezil eden sensin zaten bir de fiyatta benle nasıl pazarlık yapıyorsun?
— Sökülecek bunlar kesinlikle ne olursa olsun ben böyle bir şeyi kabul etmiyorum asla.
Taşeron Jale:
— Ama maliyet...
Mimar Asuman:
— Maliyet beni ilgilendirmiyor.
Taşeron Lale:
— Bizden bu kadar, bu kadar paraya bu kadar iş yapılır.
Müteahhit Ferit:
— Biz memnunuz, 5 milyar veririz. Kabul etmiyorsan sen bilirsin. Hadi bize müsaade, odamıza gidelim.

APPENDIX C

EXAMPLE NOTES ON THE *LOGBOOKS* OF THE STUDENTS AND THEIR INSTRUCTOR

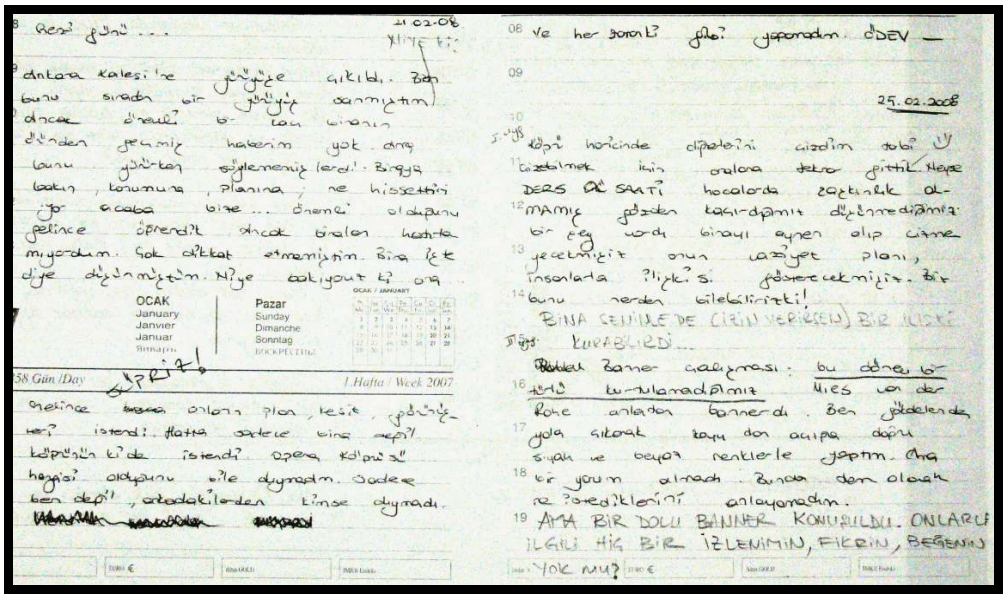


Figure 21: An example student note on the *Logbook* about the sight seeing tour on foot in Atatürk Boulevard in Ankara before the exercise 'Sketchings of Ankara' in spring semester of the 2007-2008 academic year.

The figure is a copy of a page in a student's logbook, including both his/her notes and an instructor's comments on these notes, which has converted into an instrument of communication and reflection. It is possible to follow the student's attitude to convert his/her experiences into a story to be told to the instructors. This can be interpreted as an attempt to fulfill the instructors' requirements, while as s/he states that s/he could not have understood what exactly the instructors expect from the students approves this interpretation.

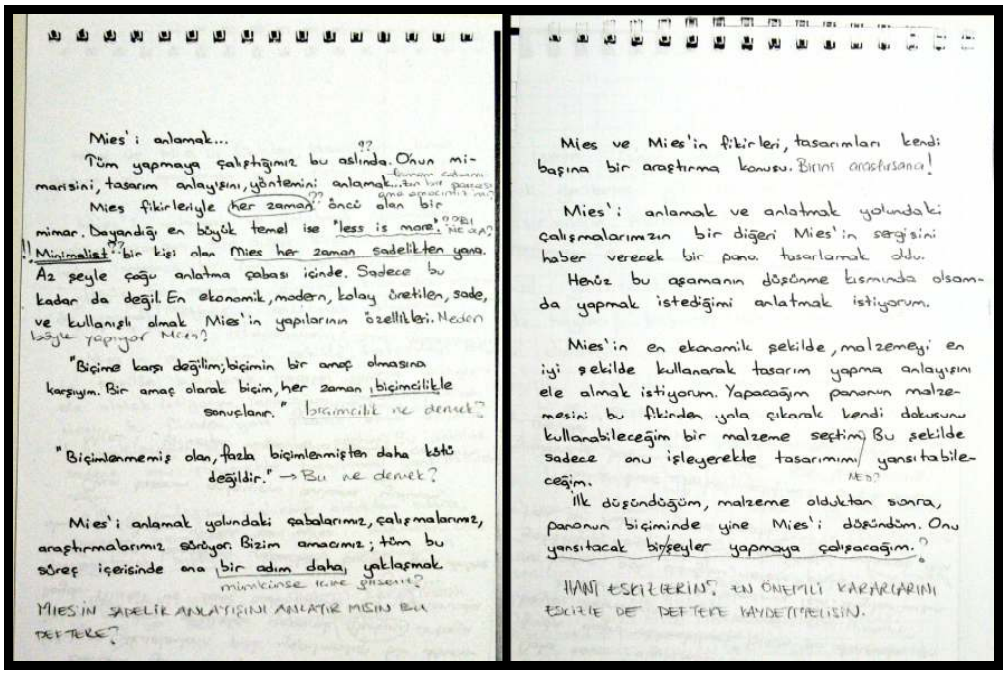


Figure 22: An example student note on the *Logbook* about the required studies on Mies van der Rohe before the 1/10 Model Making Exercise of Mies's works in the spring semester of 2007-2008 academic year.

The figure is a copy of a page in a student's logbook, including both his/her notes and an instructor's comments on these notes, which has converted into an instrument of communication and reflection. It is possible to grasp the instructors' asking attention for conscious use of concepts, ideas, and adoptions. It is also possible to follow the instructors' request for further articulation and reflection in action.

CURRICULUM VITAE

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EDUCATION

Degree	Institution	Year of Graduation
MS	METU Architecture, Ankara	2004
BS	METU Architecture, Ankara	2002
High School	Büyük Kolej High School, Ankara	1998

WORK EXPERIENCE

Year	Place	Enrollment
2006 – Present	Gazi Univ., Architecture, Ankara	Research Assistant
2004-2006	METU, Architecture, Ankara	Research Assistant
2004-2004	Ayşe Ergül Mimarlık Ltd., Ankara	Architect

FOREIGN LANGUAGES

Frequency in English (Upper Intermediate Level)

PUBLICATIONS

1. 2009, Jan.-Feb. “Toplu Konutu Sürdürmek: Bir Yönetim ve Yenileme Arastırması Olarak "Hous-es" Tematik Ağı.” *Mimarlık Dergisi*, Vol. 345, pp. 32-38.
2. 2007, Sept.-Oct. “Türkiye’de Yeni Bir Barınma Biçimi Olarak ‘Kondominyum’.” *Mimarlık Dergisi*, Vol. 337, p. 34-37.

PAPERS FROM CONFERENCES AND SYMPOSIA

1. 2010, July 4-7. “In-City Gated Communities of Ankara,” *ENHR 2010*, İstanbul Technical University, İstanbul, Türkiye.
2. 2009, May 25-26. “Flexibility in Architectural Education: How the First Year Architectural Studio Tutors and Students Meet: A Comparative Research Study.” *Architectural Education Forum IV*, Erciyes University, Kayseri, Turkey.

3. 2008, May 10-12. “Discovering the Personal Reason for Architecture Education.” *Design Train Congress: Designing Design Education*, Amsterdam, Netherlands.
4. 2008, April 25-27. “Architectural Design in Between: An Investigation for the Evaluation Criteria of The Pritzker and The Aga Khan Awards for Architecture” *Living in Between - Being in Between*, Girne Amerikan University, Girne – KKTC.
5. 2006, March 17-18. “A Pragmatist Reconstruction of Lakatos’ SRP in Order to Study the Developing Tacit Knowledge in Architectural Praxis.” *1st International CIB Endorsed METU Postgraduate Conference*, Middle east Technical University, Ankara, Turkey.
6. 2005, May 19-21. ““Mimarlık ve Kentsel Planlama Alanları Arasındaki İletişimin Yeni Tasarlanan Çevrelerde Oluşturulan “Konut Toplulukları”na Etkileri”, *XVII. Uluslararası Yapı ve Yaşam Kongresi*, Bursa, Turkey.
7. 2005, Apr. 14-15. “Lifestyles and the Use of Technology in the In-City, High-Rise Residential Developments of Istanbul”, *5th International Postgraduate Research Conference*, Salford, England.
8. 2004, Dec. 2-3. “Yapısal ve Bölgesel Ölçekte Akıllı Sistemler”, *Yapı ve Kentte Bilişim 2004*, Ankara.

MEMBERSHIPS

1. 2007 Apr. 30– May. 4 Kıbrıs “International Workshop on Tourism and Architecture (IWTA)” Famagusta, TRNC. Organization Committee Membership.
2. 2005 – 2006. METU CIB (International Council for Research and Innovation in Building and Construction) Student Chapter Membership
3. 2005 “Built Environment and Information Technologies: 1st International CIB Endorsed METU Postgraduate Conference” Organization Committee Membership
4. 2002 - …Member of Turkish Chamber of Architects

HOBBIES

Reading, traveling, painting, photography, and sports