Uncovering Design Competence: An Overview and a Model of Design Skills

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Abstract

This paper reviews the assumption of design competence passing over a threshold and eventually being equalized to come into being in every soul who gets exposed to education offered by design institutions. Firstly, two distinct ways of viewing design as areas of daily activities and expertise are discussed. Institutions' role in design competence is argued within the context of modern industrial view. Post-positivist paradigm, philosophy of design and phenomenology are explored to lighten the methodology used in this paper. Expertise both in a general way and in design is explained. Finally to put back the skills that are diminished by the assumption stated above, a model of design skills is suggested. Primary skills like systematic and conceptual thinking which seem to occur in abstract mental channels are discussed as design thinking abilities; while secondary skills like exposing, constructing and designating which seem to occur in concrete physical channels are discussed as communicational abilities.

Keywords

This paper focuses on design skills that constitute design competence. The subject (the acting person) oriented approach of this paper while decomposing design competence into design skills turns this paper into a study that also focuses on the designer. The designer is the core of the design activity that discerns, targets, attends, highlights, formulates, defines, tackles, solves the problem, manages the process and generates the results. Consequently the designer, in this paper, is seen as the most important aspect of design process. Without him, needlessly to say, there will be no results generated and no design process managed, but in the first place there will be no problem to refer at all. Yet, until there becomes a designer formulating a phenomenon as a design problem, the problem will not come into being and eventually will stay implicit. Treating an implicit phenomenon as a design problem results in the emerging of implicit skills in the designer himself. At this point, progress that the designer experiences while developing design skills gains importance. There seem to be two distinct states of design skill groups; the first one in which these skills are seen as primal and immature, and the second in which they are seen as advanced and mature. These two states match with two distinct ways of viewing design, i.e. the ones that highlight professional or amateur design abilities.

Two Distinct Ways of Viewing Design

There is an important view in design research (Papanek, 1984) which reduces design to a fundamental human activity level and consequently calls it as a group of daily routine actions. Accordingly; activities like buying clothes, cleaning the house, organizing the desktop and cooking all have simple mechanisms of decision making, hence can together be referred as the lowest level in the path of acquiring competence. These kinds of skills which are left unnoticed in the background patterns of daily life's network push themselves to the fore when people other than the subject – the designer himself are taken as targets

of intended users. When skills like cooking delicious food, cleaning the curtains accurately, having the gift of gab or riding the bicycle skillfully refer to social benefits more than the subject himself; these skills get out of the daily context they are in and head for expertise on different areas like cookery, dry cleaning, advocacy and juggling. For another area of expertise, design, Cross (1990, p. 132) lists the core features of design ability as follows: "Resolving ill-defined problems, adopting solution-focusing strategies, employing abductive/productive/appositional thinking and using non-verbal, graphic/spatial modeling media". He also suggests a dualist structure for design skills: *Nature and nurture of design ability* (Cross, 1990). The former refers to the innate skills while the latter implies the group of skills that are to be developed during life.

Institutions' Role Based on World Views

This disparity of skills is mainly generated by the values imposed by modern industrial view. Cross (1990, p. 132) states that "especially in non-industrial societies, there is often no clear distinction between professional and amateur design abilities, the role of the professional designer may not exist". Consequently there becomes no need for institutions to undertake such a role. On the other hand, modern industrial view tries to set the components of this disparity apart as much as it can. In this context, design institutions aim to bring the innate skills down by accepting them as the level zero. They also try to bring the nurtured skills up by adding a heavy outcome like competence to the education they offer. Thus, they can fulfil their mission to act as a bridge in the space formed by these two ends getting far from each other. The main basis for this is the competence degree these institutions offer which is assumed to be equalized while design skills are being developed. This approach prevents a deeper understanding of design competence and therefore some design skills seem to be diminished. In this context, the critical question which constitutes the main argument of this paper is as follows: Does reducing various expertise levels (with different skills developed through vocational development processes of unique individuals within the context of education that design institutions offer) to an outcome of competence, result in losses of understanding and explaining design ability? This argument, affirming this statement, suggests that design skills are getting meaningless by being reduced to this outcome.

The main difference between this approach imposed by contemporary design institutions and the new view that this paper aims to bring forth has its basis on two different world views. This paper tries to correlate with the post-positivist paradigm to get a new point of view in order to understand and explain design competence. Generally, positivist paradigm sets a threshold and evaluates the subjects (the acting persons) from that frame while post-positivist paradigm can reveal uniqueness by investing each subject with unique values. Causing problems between humans and the world, the positivist paradigm is having a downfall while the post-positivist paradigm is having a rise as rhetoric (Yıldırım & Şimşek, 2011). Positivist paradigm tries to reach a singular truth by a mechanical and materialist objectivity, measurability and relation of causality regarding phenomenon, people, society, institutions and relations between them. The point emphasized here is that this system is a mechanical one which humans cannot affect, change or attend to its process. Design methods within this context are named as *hard systems*, while methods relating to the new paradigm are called *soft systems* (Broadbent, 2000). Post-positivist paradigm states that there is not only a single truth, thus huge theories and sovereign approaches have left their places for subject oriented and pluralist approaches (Yıldırım & Şimşek, 2011). For this new paradigm, objectivity is not the case, but different viewpoints are.

Methodology

Phenomenological approach has its place in this new paradigm and also in this paper. As Dorst (2003, p. 5) states, "positivism and phenomenology differ quite strongly in the way subject (the acting person) and object (the outside world) are related. (…) In phenomenology the person is not static, but a dynamic, emotive social being with a history and an environment which heavily influences the person's construction of reality. And the subject is influenced (and in the end 'formed') by what he/she perceives". This paper, instead of evaluating individuals from a threshold and reducing their uniqueness, tries to break up design competence into separate design skills and thus bring forth a subject oriented view. Because this paper takes competence as an existing but implicit, hidden and reduced phenomenon, it will try to brighten its shaded sides. Consequently, this implicit and worth to be known phenomenon will be tried to be exposed by the phenomenological approach. *Phenomenon* is the antonym of the word *implicit* (Heidegger, 1926/2011). Phenomenology determines this paper's approach by its relations with soft systems and post-positivist paradigm.

Philosophy of Design

Even if phenomenology is usually seen as a philosophical movement, it is more likely a philosophical method. When a philosophical method is associated within design, a new cross disciplinary area called philosophy of design emerges. In philosophy of design, a common method is to take design in a philosophical way, which means applying the rational reasoning of philosophy to design. Galle (2002, p. 216) argues as follows:

> What the themes reviewed above have in common, is that they are all aspects of design, and insights about them were obtained by rational reflection rather than empirical observation… (…) I would suggest that, as a major *raison d'etre,* '[the philosophy of design] serves the end of helping, guiding, suggesting how the [designer] comes to *understand* what he is doing, and not simply how he comes to *do* what he is doing... This coming to understand what one is doing, rather than just *understanding how to do it* is an insight about design of the kind I have been talking about, and which I believe can only be pursued by philosophical means, as offered by the philosophy of design.

This disparity of *how to do* and *what to do* serves the originality of this paper, because this paper aims to explore the nature of design knowledge by searching for design skills that constitute design competence. This means that it will not generate a method to show how to design, rather, a model to make a contribution to design knowledge. In this way, it will not only conform with this disparity of how/what but also match with the ninth level which was indicated by Love (2000) as the epistemology of design theory in his paper suggesting ten levels for both theory and practice. This level is the one which contains "those analyses and discussions about the critical study of the nature, grounds, limits and criteria or validity of design knowledge" (Love, 2000, p. 306). This paper does not stand on an empirical observation because of several studies which have already done that, and also because of a limited number of studies having a philosophical approach on this subject as this one.

Phenomenological Approach

Phenomenological approach is not only argued within philosophy but also in informal channels. Arguing about phenomenological *epokhe* [1], an example in *Ekşisözlük* [2] is rather explanatory. This example, which is written by a user with a nickname *tadzio*, can help us to understand the phenomenological approach that guides this paper. It is as follows:

> Let's say that you are to talk to a friend about an incident that happened a few days ago. However, while talking, you sensed that something is wrong. You asked yourself if you have made a mistake with what you have told. Then you gave a break. You started to look over the things you have shared. You reviewed the relations between your sentences and focused on the recourse of what you had experienced that day. What had you done and what had happened to you then? Later, you noticed that while you were speaking, somehow, probably due to absent mindedness, things you have told relating to the things that had happened that day have entwined together with some other things you had experienced long before as if they all had happened at the same time. Thus, you apologized from your friend and started all over to tell the essence of the matter. In this earthly example, there becomes a break phase followed by a recourse one. Thanks to the recourse phase, you can obtain an appropriate method to analyse and review your experiences. In order to adapt what is told here to phenomenology, the break refers to *phenomenological epokhe* and recourse refers to *phenomenological reduction*. Phenomenology firstly gives a break which weakens the hegemony of the things we commend ourselves to. After the break, our attention recourses from the experienced things to the one that experiences himself (http://eksisozluk.com/entry/13400659).

So, in phenomenology, like experienced in this example, there generates an orientation to the consciousness which enables to reach the core without any bias. As a result of finding the existing arguments of design competence deficient and dogmatic, the main approach of this paper contains the break along with the reasoning process and the recourse in the designer himself. This will result in an essential change in the understanding of design competence.

Expertise

Differences between experts and non-experts are reviewed in many researches including Christiaans and Dorst (1992), Ho (2001), Kavakli and Gero (2002), Popovic (2004) and Kruger and Cross (2006). In these studies the main factors that make people experts are tried to be found. The fundamental difference between them is that the experts can perform much better than non-experts in areas of planning and organizing. For instance, Lawson and Dorst (2009, p. 13-14) state as follows: "One of the key common characteristics of generic expertise models suggests that experts do not necessarily do the same things as novices. Whether we look at the playing of chess, the solving mathematical problems or the flying of aeroplanes, we find it is not simply a case of experts working faster, more effectively or better than novices. What we find is that they operate differently". There appear scattered approaches in expertise as a general study by the effects of various areas like music, sports, chess and literature. However these approaches can be gathered around two main views. Ericsson and Lehmann (1996) state that; the first one which was led by Galton (1869/1979) brings the innate skills fore and capacities while the second and newer one, led by de Groot (1946/1978) and Chase and

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[1] Epokhe is a word derived from Ancient Greek meaning suspending judgments about something temporarily.
[2] Ekşisözlük is an informal, collaborative and hypertext Turkish online dictionary in which registered users can contribute by adding information

Simon (1973), emphasizes training and experience. These two views match with the concept generated by Cross (1990) which mentions about *the nature and nurture of design ability*. For the view which takes expertise within the context of innate skills, experience and exercise are needed but not enough for expertise, since they have to be built on the basis of innate abilities. On the other hand, according to the view that takes expertise within the context of training and experience, almost anyone can be an expert provided with appropriate training. Ericsson, Prietula and Cokely (2007, p. 2) supporting the second view; state as follows: "Consistently and overwhelmingly, the evidence showed that experts are always made, not born. These conclusions are based on rigorous research that looked at exceptional performance using scientific methods that are verifiable and reproducible". This paper also stands near this view as enabling different skill states on different subjects, without limiting any skill developments due to innate abilities.

Design Expertise and Design Competence

Design expertise has emerged by a solid whole being broken up into separate activities of *designing, manufacturing, selling* and *using* within the context of modern industrial view. Thus, design expertise departs from the view that reduces design to a fundamental human activity level. There becomes an essential difference between these two views with respect to the intended users, i.e. in expertise, the subject (the acting person) targets the community almost all the time. Yet design activities not only refer to an expertise state but also drag the designer to an expert position. At this point, the designer takes over responsibility to develop his ability to higher levels to become an expert and differs from the ones who do not design for others. Another difference emerging within the context of design as an area of expertise is that it can be discerned and departed from the background patterns of daily routine network, thus it can come out and be perceived as a distinguished activity. Daily routine activities are unnoticed and embedded within the context they are in. However design expertise, referring to the activities generated for the society, can be distinguished from other activities and thus can gain a state in which it allows itself to make a progress and give better and efficient results, which also affirms the nature of expertise.

While design expertise indicates such a development process, contemporary design researchers mostly take this matter by defining definite levels and associating them with design approaches (Dreyfus & Dreyfus, 1980; Dorst, 2003; Dorst & Reymen, 2004; Dorst, 2008). These researches imply that design shows mainly linear development processes and the levels distinguished in them are indecomposable. On the contrary, this paper aims to break up design competence in order to get a new apprehension of this design knowledge. Design competence can be defined as reaching a mature level in design. In expertise models, the expert level has a higher hierarchical state than the component. Thus, competence does not refer to a high level of ability, but rather a state in which being authorized and being able to do something is emphasized. The reasons why this paper focuses on competence instead of expertise is that, competence is a much vaguer phenomenon than expertise and also is offered by the design institutions. Cross (2004, p. 427) states as follows: "The topic of expertise has been receiving increasing attention in the design research community. There has been a rapidly growing development of protocol and other empirical studies of design cognition, amongst which have been studies of expert, or experienced designers, comparisons of the processes of novice and expert designers, and some interview studies on outstanding or exceptional designers". While differences between novice and expert levels got much attention, competence is usually neglected.

Design Expertise Models

There seem to be two leading models within the context of design expertise. Dreyfus and Dreyfus (1980), showing how the students acquire skills through education, introduces a more general frame and constitutes a basis for a design expertise model in design research. Dorst (2003, 2008) associates this model especially with design. Making small changes in the contents, he adds two layers as *naïve* and *visionary* (Dorst, 2008). The model consists of the following statements:

> Naïve. This is an extra level, preceding the novice level that is the start of the Dreyfus model. This state is requires in a model of design expertise since design-like tasks are not only performed by professionals, but also by ordinary people in everyday life. (…) A novice will consider the objective features of a situation, as they are given by the experts, and will follow strict rules to deal with the problem. (…) For an advanced beginner, situational aspects are important; there is a new sensitivity to exceptions to the hard rules of the novices. (…) Competent designers act in a radically different way. They select the elements in a situation that are relevant, and choose a plan to achieve goals. Problem solving at this level involves the seeking of opportunities, and of building up expectations. (…) The real expert has many years of experience which allows them to recognize high-level patterns in design situations and respond to a specific situation intuitively, and performing the appropriate action, straightaway. (…) A master displays a deeper involvement with the professional field as a whole, dwelling on success and failure. (…) The visionary consciously strives to extend the domain in which they work (Dorst, 2008, p. 8-9).

Conclusions and a Model Suggestion of Design Skills

The model this paper suggests by taking a phenomenological approach in a philosophical manner has a tripartite structure. Primary skills like systematic and conceptual thinking which seem to occur in abstract mental channels are discussed as design thinking abilities; while secondary skills like exposing, constructing and designating which seem to occur in concrete physical channels are discussed as communicational abilities. This disparity mainly lies on the contrast of concepts like abstract – concrete, body – mind and substance – meaning. Tertiary abilities that beleaguer these skills externally like historical and cultural issues are discussed as supporting abilities. Thus, this model allows different expertise states on different skill components. The assumptions that any skill of the so-called competent designer is at the same level and any selected skills of the same kind from two so-called competent designers are even get irrelevant in this model. Contrary, it suggests that a unique individual can have different expertise states on different skills. Finally, the model this paper suggests is as follows:

SKILL TYPES	MAIN SKILLS	DETAILS (1)	DETAILS (2)
Primary (Design Thinking)	1) Context Perceiving		
	2) Problem formulating	Pracititioner	
		Scientific	
	3) Creating theorical bases	Concept generating	
		Story generating	
		Scenario generating	
	4) Three dimensional thinking		
	5) Problem solving	Pracititioner	
		Scientific	
Secondary (Communicational)	6) Lingual	Dialogue (with a lecturer)	
		Presentation (on a jury)	
	7) Software interfaces	Modeling	Deduction
			Induction
			Deduction and Induction
		Rendering	Scene
			Material
		Animation	
	8) Manual dexterities	Modeling	Mock-up
			Prototype
		Drawing	Sketching
			Illustrating
Tertiary (Supporting)	9) Cultural	Design and Art Culture	
		World Culture	
	10) Historical	Design and Art History	
		World History	

Figure 1: A model suggestion of design skills

As the closing remarks, briefly, this paper focused on the stated assumption, put the new paradigm instead of the one that suggested this statement and tried to expose the design skills which seem to be diminished. Generating new expertise models based on these skills is the foresight of this paper. This means that, with the seven levels of expertise mentioned earlier and ten main skills stated above in this suggested model, there become 70 fields of extensive design research. All the ten skills should be much more detailed in order to get a new apprehension of design knowledge. Consequently superficial assumptions that are not studied in detail will be extinct.

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