EXPERIENCE CHART AS A RESEARCH AND PRESENTATION TOOL
FOR USER OBSERVATIONS
SUPPORTING DESIGN STUDENTS AT UNDERGRADUATE LEVEL

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ABSTRACT

EXPERIENCE CHART AS A RESEARCH AND PRESENTATION TOOL FOR
USER OBSERVATIONS
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The data collected through user observations can remarkably inspire and inform the early stages of the design process. User observations have the power to reveal unarticulated needs and desires of people through focusing on "what they really do" in a given situation, instead of solely relying on "what they say they do". Conducting user observations as part of exploratory research has become a valuable skill in design profession. As the design students of today will be the design practitioners of tomorrow, this study explores the potential ways to hone design students' skills to conduct user observations. With this regard, it focuses on the development and the assessment of a user observations toolkit to be integrated into design education. First, the toolkit, namely the *Experience Chart,* has been developed based on the criteria gathered from the relevant literature. Then, it was integrated into an undergraduate level of design project at Middle East Technical University, Department of Industrial Design. Finally, the evaluation of the toolkit was completed through conducting semi-structured interviews with the design students who utilized it in design education project. Based on the findings from these evaluations, the toolkit was revised and diversified. The main output of the thesis is the suggestion of the Experience Chart as a toolkit to empower undergraduate design students in their user observations. This study also provides

suggestions in general how to guide design students before, during and after their user observations.

ÖZ

LİSANS DÜZEYİNDE TASARIM ÖĞRENCİLERİNİ DESTEKLEYEN KULLANICI GÖZLEMLERİ İÇİN ARAŞTIRMA VE SUNUM ARACI OLARAK DENEYİM ÇİZELGESİ

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Kullanıcı gözlemleri aracılığıyla toplanan veriler, tasarım sürecinin erken evrelerini dikkate değer şekilde bilgilendirebilir ve bu aşamalarda tasarımcılara ilham verebilir. Kullanıcı gözlemleri, insanların yalnızca ne yaptıklarına dair dile getirdiklerinin ötesinde, belli bir kullanım bağlamı içerisinde, gerçekten ne yaptıklarına odaklanılmasını ve bu sayede insanların örtük ihtiyaç ve isteklerinin ortaya çıkarılmasını sağlayacak güce sahiptir. Bir araştırma yöntemi olarak kullanıcı gözlemleri yapabilmek, tasarım mesleğinde giderek önem kazanan bir beceridir. Bugünün öğrencilerinin yarının tasarımcıları olacağı göz önünde bulundurularak, bu çalışma, tasarım öğrencilerinin kullanıcı gözlemleri yapabilme becerilerini geliştirecek olası yolları araştırır. Bu amaçla, bu çalışmada tasarım eğitimine dahil edilmek üzere, bir kullanıcı gözlemleri araç setinin geliştirilmesi ve değerlendirilmesine odaklanıldı. Öncelikle, ilgili alanyazından derlenen ölçütler temel alınarak, Deneyim Çizelgesi isimli tasarım araç seti geliştirildi. Daha sonra bu araç seti, ODTÜ Endüstri Ürünleri Tasarımı Bölümü'nde bir lisans tasarım projesine entegre edildi. Son olarak, bu araç setini tasarım eğitimi projesinde kullanan öğrencilerle yarı-yapılandırılmış görüşmeler yapılarak bu setin değerlendirmesi tamamlandı. Bu değerlendirmeden çıkan sonuçlarla, araç seti gözden geçirildi ve çeşitlendirildi. Bu tez çalışmasının temel çıktısı, lisans düzeyindeki tasarım öğrencilerinin kullanıcı gözlemleri yaparken onları

destekleyen Deneyim Çizelgesi'nin bir araç seti olarak önerilmesidir. Bu çalışma aynı zamanda, tasarım öğrencilerinin genel olarak kullanıcı gözlemlerinden önce, gözlemleri sırasında ve sonrasında nasıl yönlendirilebileceğine dair görüşler sunar.

Anahtar Kelimeler: kullanıcı gözlemleri, gözlem kılavuzu, tasarım eğitimi, tasarım süreci, tasarımcı adayları

To Mom and Sisters

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CHAPTER 1

INTRODUCTION

Today, design is a big word, and its vast territory is already ever-expanding. It is hard to find a definitive explanation about what design is; however, one thing can be said for sure that its nature is ever-changing. Especially for the past three decades almost every area of design territory has witnessed focal shifts in terms of their priorities (Sanders & Stappers, 2012). Among these shifts, three prominent ones are happened from:

- "designer-centered" to "user-centered" (McDonagh, 2006, p. 6);

- "object-centered" to "experience centered" (Buxton, 2007, p. 12);

- "things people use" to "what they [people] do" (Kumar, 2013, p. 4)

Abovementioned shifts imply that today's designers need to put users in the center of designing activity while designing and developing their products or services in order to stay relevant to the users. Understanding the needs and desires of the people is now an indispensable part of the design activity. Design has become more interested in what people actually do with the products along with the kind of experiences they get from interacting with them, rather than the product itself. Accordingly, research become an inherent component of design to correspond these shifts through understanding people in depth (Margolin, 2016). Especially the research conducted to inform and inspire early stages of design has gained great importance due to increasing complexity of the activities held in these stages (Sanders & Stappers, 2012).

Changes and trends happening in the design world naturally possess implications for design education and necessitates corresponding adaptations. As the design students of today will be the design professionals of tomorrow, it is important for

them to be able to get involved in design research more effectively to differentiate themselves among other graduates. However, novice designers like design students may not possess these research skills simply due to the lack of experience in design practice. In teaching, it is found important to make these steps explicit (Demirbilek, 2004; Dooren et al, 2013; Turhan, 2013).

Design research which aims at understanding user needs and preferences at the early stages of design may utilize a variety of methods. Among them, the method of user observation is a well-established insight collection method that thoroughly helps understand people within their environment. What makes user observations so special for design research is that it relies on the rigor of the need identified through observation. By looking at what people really do instead of what they say they do, observation enables the discovery of unmet, latent or true needs of the people (Coopers & Evans, 2006; Kumar, 2013; McDonagh, 2015; Moggridge, 2007; Norman, 1998, 2013, Sanders & Stapper, 2012). Especially designers' direct involvement in the user observations results in remarkable contributions.

As it is the case with any research, user observation necessitates being systematic, and it requires to follow some considerations. These rules and considerations should be made explicit to design students if they wanted to conduct user observations as research activity. However, how these rules and considerations can be communicated in design education is questionable as the literature felt short of providing guides or tools specifically aimed at design students.

1.1 Aim of the Study

This thesis aims to explore what kind of guidance that design students need for conducting user observations; along with in which ways design students can be supported to conduct user observations as an effective research method for their design projects. In order to explore the potentials of this, a design toolkit called Experience Chart Toolkit has been developed, integrated and evaluated within an educational design project in the third-year studio course of Department of Industrial Design at Middle East Technical University (METU). With this aim in mind, this study has the following purposes:

- Examining and evaluating the position of user observations in design research along with the instructions, tools and guides facilitating it;
- Investigating the potentials of developing a guide in the form of a toolkit for user observations to be conducted and presented by design students;
- Examining the outcomes of integration and evaluation of the toolkit into an educational design project from the design students' points of view;
- Providing suggestions for improvement in the form of a new toolkit and guidelines that enable design students to conduct user observations more effectively.

1.2 Research Questions

The main research question is:

- What kind of guidance can empower design students in user observations conducted to inform and inspire early stages of design process in design education at undergraduate level?

The secondary research questions are:

- What kind of considerations and tasks are involved while conducting user observations as a design research method?
- How these considerations can be made explicit and communicated to design students to guide them while conducting user observations and communicating their findings of?

1.3 Structure of the Thesis

Structure of this thesis and the relation between the chapters can be seen in the Figure 1.1. There are six chapters present in this thesis:

Chapter 1 presents the aim of the study and the research questions.

Chapter 2 presents the findings of literature review. Initially, it explores user observations in the form of participant observation as a qualitative data collection method. Later, it explains the position of user observations in design research.

Following to that, it evaluates guides and tools for user observations. The chapter is finalized with evaluation of design research within the design education context.

Chapter 3 starts with an overall methodology of the study. Later it describes the gradual development of a toolkit, namely the Experience Chart Toolkit V1, that facilitates user observations for the design students.

Chapter 4 is dedicated to the Primary Research. It explains how the EC Toolkit V1 is integrated into an undergraduate design project and how it is evaluated by the undergraduate design students participated in this study. Following that, it presents the findings of from the evaluation and their interpretations.

Chapter 5 involves alternatives developed for the EC Toolkit V1 in the light of the Primary Research findings and their interpretations. It suggests the EC Guide V2 as the final design direction of this study.

Chapter 6 presents the overall conclusion and related limitations of the study.
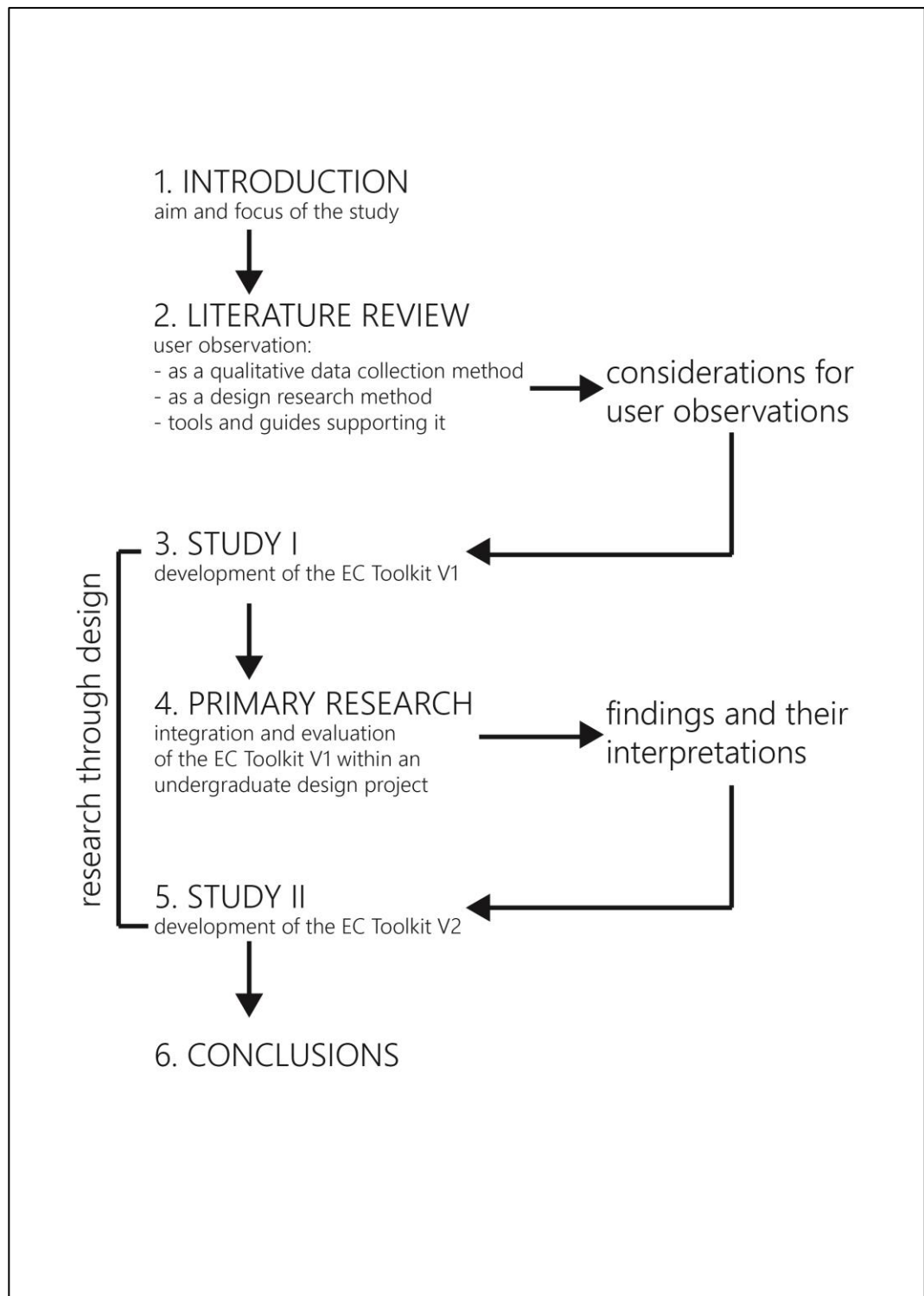
Figure 1.1 The structure of the studies conducted in this thesis.

CHAPTER 2

LITERATURE REVIEW

This chapter presents the findings reached by reviewing the literature relevant to the focus of the research undertaken. This focus can be broadly described as user observations in design research to be conducted by undergraduate design students.

User observations are predominantly in the form of participant observation which is a prevalent data collection method within qualitative research that has its root in the social sciences. Therefore, firstly, qualitative research and the role of participant observation within are explained and explored.

Design research mostly refers to the research carried out to inform design process, and the involvement of user has become an indispensable part of it. Thus, secondly, design research is explained and explored through its types, its practical applications, and approaches to user observation within the design process.

Conducting user observations as a design research mostly requires the use of proper methods and tools. Thirdly, exemplary methods and tools from the literature and the design practice in relation to user observations are presented.

Undergraduate design students are novice designers who are lack of practical experience and theoretical background in design research. Therefore, finally I will present insights in relation to design research in design education.

2.1 Role of Participant Observation in Qualitative Research

The main purpose of research is to generate knowledge (Gillham, 2000). It is a systematic process of inquiry, at the end of which researchers know more about a phenomenon than they did before (Archer, 1995; Merriam, 2009). A researcher can adapt various aims in this process: "to contribute to the knowledge base in a field (pure research), improve the practice of a particular discipline (applied

research), assess the value of something (evaluation research), or address a particular, localized problem (action research)" (Merriam, 2009, p. 4).

Approaches to research can be classified as qualitative, as quantitative or as mixed methods which involve elements from both qualitative and quantitative methods (Creswell, 2013; Harwell, 2011). Regarding this classification, in reality, it is hard to claim that there is a strict distinction between these approaches. Creswell (2013) states that a study could be more qualitative or more quantitative when the two approaches are compared to each other; or it could be a mixed research method if the study stands somewhere in between.

Qualitative research methods focus on gathering and analyzing qualitative data about people, their experiences and the meaning that they attribute to these experiences while they make sense of their world (Crouch & Pearce, 2012; Merriam, 2009). Quantitative research methods, on the other hand, are interested in collecting numerical data through counting and measuring, and analyzing them statistically (Crouch & Pearce, 2012; Gillham, 2000; Tracy, 2013).

The contextual focus of this thesis study can be broadly described as observing people in the form of participant observation within the scope of design research. This participant observation can be claimed to be the best-known data collection method of qualitative research (Bryman, 1988), and design research literature itself is highly dominated with qualitative research methods. Also, methodological approaches adopted while conducting this study are predominantly qualitative in nature. Thus, understanding qualitative research in depth would not only create a solid basis for the following sections in the literature review, but it would also provide much of the rationale for the methodology part of this study.

2.1.1 Qualitative Research

Qualitative research has its origins in social sciences, and it has demonstrated a significant growth especially in the discipline of 'anthropology' (Creswell, 2013). Anthropology is defined by Crouch and Pearce as "the study of human beings, their lived experiences and their cultural practices" (2012, p. 83).

Many authors (Atkinsons, Coffey & Delamont, 2009; Tracy, 2013; Merriam, 2009) refer to qualitative research as a comprehensive framework to put emphasize on its breadth. According to Atkinsons, Coffey & Delamont (2009), "in terms of methodologies, perspectives and strategies, qualitative research is an umbrella term which encompasses many approaches." Apart from its main interest in understanding people, their experiences and attributed meanings to these experiences in the context of their world; literature is full of detailed and complex definitions of qualitative research (Merriam, 2009).

According to Merriam (2009), a common strategy to understand the complex nature of qualitative research is to outline its major characteristics. Although she warns that different characteristics are highlighted by diverse range of writers, Creswell (2013) declares that a consensus has been reached lately on the major characteristics of qualitative research in the works of many authors. These major characteristics are: participants' meaning, natural setting, emergent design, researcher as the key instrument, reflexivity, multiple source of data, inductive and deductive data analysis, and holistic account (Creswell, 2013). As a strategy, these characteristics are taken as a guide over which to explain qualitative research more in depth with the integration of its other important features.

2.1.1.1 Characteristics of Qualitative Research

Participants' meaning: The kind of evidence that qualitative researchers seek should provide an in-depth understanding of what is going on from the participants' viewpoint (Gillham, 2000; Denzin & Lincoln, 2005). The focus is not on the meaning that the researchers construct, but on people's interpretation of their own experiences (Creswell, 2013; Merriam, 2009).

In order to enable an in-depth understanding of studied phenomenon, participant sampling is mostly purposeful, nonrandom and it is small in numbers for a qualitative study (Crouch & Pearce, 2012; Merriam, 2009).

Natural setting: Qualitative research is typically conducted in the field, i.e. the natural setting, where the participants experience the world within. Traditionally by spending significant period of time in this natural setting; researchers gather data

by talking to participants and observing their behaviors within their context (Creswell, 2013).

In the literature, there is a concept that directly refers to the context-bounded nature of qualitative research called 'thick description' coined by Clifford Geertz (1973) (as cited in Tracy, 2012). Thick description suggests that researchers should initially describe the context being immersed and the specific phenomenon being studied in that scene in a literal and complete way, and only then they should seek greater statements and theories in relation to study (Merriam, 2009; Tracy, 2012). Tracy emphasizes that "meaning cannot be divorced from this thick contextual description" (2012, p. 28).

Emergent design: Qualitative research should be flexible and responsive to the changing situations. It is hard to give a well-defined structure to qualitative research beforehand, as the conditions might require alterations in the plan when the researcher enters the field and starts exploration (Creswell, 2013).

Researcher as key instrument: Qualitative researchers might occupy an instrument for gathering data, which is called a 'protocol', while observing or interviewing participants; however, the researchers are still the ones who collect and analyze the information (Creswell, 2013). As understanding participants' meaning is central to the qualitative studies, Merriam (2009) states that human instrument is the ideal mean of gathering and analyzing data. The rationale depends on humans' ability to give immediate responses; adapt themselves to changing circumstances; and their capability to evaluate nonverbal and verbal communications (Merriam, 2009).

Reflexivity: As the researchers are the key instrument of data collection in qualitative research, according to Harwell they cannot "pretend to be objective bystanders to the research" (2011, p. 149). Qualitative researchers should be reflective on their role, backgrounds, point of views, perceptions and previous experiences while forming their interpretations (Creswell, 2013; Harwell, 2011; Tracy, 2012). By doing so, researchers not only minimize the biases in the study,

but also declare to what extent and how their individuality affects the course of the study (Creswell, 2013).

Multiple sources of data: Instead of counting on a single type of data source, qualitative researchers support their studies with multiple forms of them, such as interviews, observations, textual documentations and audiovisual recordings (Creswell, 2013). Sometimes the term 'bricolage' is used to define the use of multiple source of data (Crouch & Pearce, 2012).

This strategy of referring to a variety of data source and combining multiple methods while gathering and analyzing data is called 'triangulation', and its goal is to reinforce the credibility of the study (Creswell, 2013; Crouch & Pearce, 2012, Merriam, 2009). Triangulation questions whether similar findings are reached from multiple sources —usually three of them as its name suggests.

Inductive and deductive data analysis: Common reason to conduct a qualitative research is the lack of a theory or the insufficiency of the existing ones to address the topic of inquiry (Merriam, 2009). For this reason, it is an inductive data collection process to create theories that are consisting of a set of themes derived from the study (Creswell, 2013; Merriam, 2009). It is also a deductive process, because the researchers analyze these themes and try to figure out the adequacy of findings (Creswell, 2013).

Holistic Account: Qualitative research aims to provide a complex and detailed picture of the studied phenomenon through reflecting on multiple perspectives and identifying many facts shaping this picture (Creswell, 2013; Merriam 2009). This rich-descriptive characteristic of qualitative research is supported with images, data in the form of quotes from documents, formal field notes and excerpts from videotapes (Merriam, 2009; Tracy, 2012).

When a research is completed, the quality of it is naturally questioned and judged. Crouch & Pearce (2012) define two types of criteria for this judgment: traditional and nontraditional. According to them, traditional criteria are "based on scientific methods" and "questions of validity, reliability and generalizability apply in particular to research based on quantitative methodologies" (p. 74). Since

qualitative research is different from traditional quantitative research in term of its main assumptions and perspectives, it requires different criteria for its quality assessment (Tracy, 2013). For example, replicability and generalizability of research findings is not usually a proper evaluation criteria for qualitative research as its findings are resulted from the unique interaction between participants and researchers in a given situation (Harwell, 2011). Criteria to evaluate qualitative research is defined as nontraditional. Nontraditional criteria questions to what extent participants' experiences and their point of views are reflected in an authentic and trustworthy way, i.e. credible way, in a qualitative research (Crouch & Pearce, 2012). Previously mentioned strategies such as triangulation of emerging findings, reflexivity referring to researcher's position in the study and thick description of the context ensure a fair level of credibility.

2.1.1.2 Types of Qualitative Research

Merriam (2009) states that, although qualitative research has gained acceptance as an umbrella term, the application of it within different disciplines and fields has produced a variety of qualitative research forms. Merriam (2009) puts emphasis on seven more commonly used ones among different forms of qualitative research: basic qualitative research, phenomenology, grounded theory, ethnography, narrative research, critical qualitative research and qualitative case study. To her account, a basic qualitative research represents the main characteristics of qualitative research that are completely present in all other types. It requires no further explanation. Other mentioned types, however, have an added dimension, "resulting in variations in how the research question might be asked, sample selection, data collection and analysis, and write-up" (Merriam, 2009, p. 22). Table 2.1 briefly explains the types of qualitative research with their added dimensions.

Table 2.1 Common types of the qualitative research and their explanations.

Narrative research people's stories	Researchers collect stories told by people as data, evaluate these as accounts of human experience and often retell them within a chronological narrative (Creswell, 2013; Merriam, 2009; Tracy, 2012).
Phenomenology essence of an experience	Researchers focus on the experience itself, i.e. the essence of human experience, and examine how experiencing a phenomenon is transformed into consciousness (Creswell, 2013; Merriam, 2009).
Grounded theory substantive theory	Through inductively analysing the qualitative data, researchers aim to build a substantive theory of the studied phenomenon grounded in the participants' perspective (Creswell, 2013; Merriam, 2009).
Ethnography culture of a group	Researchers traditionally study a cultural group by immersing themselves into their natural context over a significant period of time, and collect data primarily through participant observation and interview (Creswell, 2013; Tracy, 2012).
Critical research critique, challenge, transform, empower	Researchers not only try to understand the studied phenomenon, but also criticize and challenge to transform and empower it (Merriam, 2009).
Qualitative case study in-depth analysis of a bounded system	Researchers are interested in in-depth description and analysis of a case, i.e. a unit of human activity, within its real-life context that is bounded by time and place (Creswell, 2013; Gillham, 2000; Merriam, 2009).

Coming out of the discipline of anthropology, ethnography poses another critical role on the development qualitative research and is claimed to be a well-known type of it (Creswell, 2013). The importance of it for this thesis study is that, it frequently employs participant observation as the primary data collection method. Actually, it has been evident in the literature that the borders surrounding qualitative research, ethnography and participant observation appear to be vague, as they evolve together by informing each other. Especially participant observation and ethnography are commonly used in the literature interchangeably (Bryman, 1988).

2.1.2 Participant Observation as a Qualitative Data Collection Method

As it is the case with any research, according to Merriam, "observation can be a research tool when it is systematically conducted around specific research questions; and when it is questioned through the checks and balances in producing trustworthy results" (2009, p. 118).

Central aspects to observational methods that are employed to understand people are not drastically different than qualitative research itself. Those aspects are basically watching systematically people's actions, recording observation in a way and then describing, analyzing and interpreting what has been observed (Gray, 2004; Robson, 2011).

2.1.2.1 Types of Observational Methods

Observational methods applied in research have two main types: participant observation and detached/structured observation. In participant observation, the researchers are involved in research setting; whereas in detached/structured observation, the researcher observes from outside of the setting. Participant observation is largely qualitative in style, concerned about the meaning that people attribute to their actions, mainly descriptive and compatible with flexible research designs. Detached/ structured observation, on the other hand, is largely quantitative, frequency and classification of people's action are the main focus and mostly conducted with fixed research designs (Gillham, 2008; Gray, 2004; Robson, 2011).

According to Gray (2004), data collection within each type of observations can be done covertly or overtly. This attributes two other roles to an observation. In an overt observation, people being observed are aware that the observation is taking place; whereas in covert observation they are unaware of this, and the identity of researcher remains hidden (Gray, 2004). Naturally, covert observation raises ethical concerns from the perspective of the subject of observation. Overt observation, on the other hand, might raise concerns on the rigor of the research, if the role of observer and the degree of involvement are not communicated well. Diagram in Figure 2.2 represents the roles ascribed to an observation and their relations to the observer and the subject of the observation as a diagram.
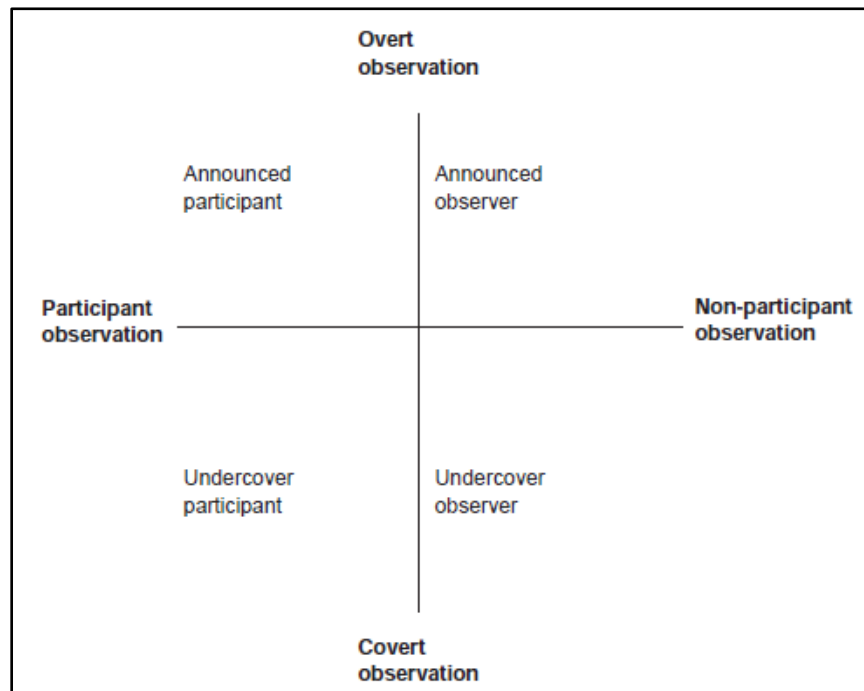
Figure 2.1 Possible roles in an observational research (Gray, 2004, p. 240).

Before progressing through the participant observation, it is important to point out a possible confusion that the word 'participant' can cause. In general terms within research, 'participant' refers to the people that the study focuses on. For the term 'participant observation', however, the word 'participant' refers to the researcher who observes; indicating that researcher is involved in the research setting and becomes a part of it.

2.1.2.2 Participant Observation and Its Guiding Dimensions

According to Bryman (1988), participant observation is "the sustained immersion of the researcher among those whom he or she seeks to study with a view to generating a rounded, in-depth account of the group, organization, or whatever" (p. 45). It is predominantly a qualitative data collecting method for understanding and knowledge generation by watching, interacting, asking questions, collecting documents, and making audio or video recordings (Tracy, 2012). It also includes the characteristic of qualitative research mentioned before (see Section 2.1.1.1).

Participant observation is mostly supported with other data collection methods such as unstructured interviews and semi-structured interviews as a way of triangulation (Bryman, 1988).

Collected data usually recorded in the site is defined as 'field notes'. They are the textual accounts of the observations to be used as the basis for analysis (Merriam, 2009; Tracy, 2012). They usually include description of the setting, the people, the activities, direct quotations and observer's comments (Merriam, 2009, p. 13).

Spradely (1980) defines nine guiding dimensions of the context in which every participant observation takes place. Those guides can be used while collecting data through participant observation: describing, analyzing and interpreting collected data, and presenting the findings. Those nine dimensions are (Spradley, 1980, p. 78):

> "**1**. **Space:** the physical place or places
> **2. Actor:** the people involved
> **3. Activity:** a set of related acts people do
> **4. Object:** the physical things that are present
> **5. Act:** single actions that people do
> **6. Event:** a set of related activities that people carry out
> **7. Time:** the sequencing that takes place over time
> **8. Goal:** the things people are trying to accomplish
> **9. Feeling:** the emotions felt and expressed"

2.1.2.3 Types of Participant Observation according to Researcher's Role

The "degree of involvement, both *with* [emphasis in original] people and *in* [emphasis in original] the activities" that researchers observe characterizes the nature of the relationship between observer and observed (Spradely, 1980, p. 58). Participant observation can be categorized into four types with regards to the role of researchers that defines this nature of relationship (Merriam, 2009).

Based on Gold's (1958 as cited in Merriam, 2009) categorization, these four types of participant observation are: complete participant, participant as observer, observer as participant and complete observer.

Complete participant: The researchers become a member of people being studied by hiding their observer identity from them in order not to interrupt the natural course of living of these people (Merriam, 2009). However, Spradely (1980) and Tracy (2012) state that, complete participation occurs when the researcher is already an ordinary member of the studied people with the same aim described by Merriam.

Participant as observer: People being studied are aware of observer identity; the primary purpose of the researchers is to participate and become a member although this membership is an improvised one (Merriam, 2009; Tracy, 2012).

Observer as participant: People being studied are aware of the researchers' observer identity; the primary purpose of the researchers are to collect information as researchers, which may not necessitate participation. (Merriam, 2009; Tracy, 2012).

Complete observer: Also called passive participation (Spradely, 1980), the researchers themselves are hidden from the group, e.g. behind a one-way mirror or they observe people in a complete public context, e.g. airport (Merriam, 2009).

In addition to these types, Merriam (2009) mentions about a recent stance called as **collaborative partner**, which is considerably close to complete participant. However, the researchers' observer identity is clearly articulated by everyone involved, and the researchers and involved people are seen as equal partners (Merriam, 2009).

2.2 Spectrum of Design Research

What is common to doing design and doing research is that they both are "processes of initiating a change in the manmade world" (Crouch & Pearce, 2012, p. 33). They intend to create a more preferable future that is refined with these initiated changes. By building on previously generated knowledge, and progressing through iterations of planning and evaluating, both produce new results that connect to the world people experience (Sanders & Stappers, 2014). A considerable difference is present in the nature of their "intended primary results", which are: "specific, product or

service" for design; and "generalized, knowledge" for research (Sanders & Stappers, 2014, p. 27).

When the words 'design' and 'research' are joined together, the terms 'design research' and 'research design' emerge. The term research design refers to types of inquiries structuring the methodological approach giving direction to a research study (Creswell, 2013). Its use is widespread among many disciplines and sciences. What is central to this study is the term design research.

2.2.1 Nature of Design Research and its Categories

There is not a single common definition of the term design research that can be referred directly (Frankel & Racine, 2010; Liem & Sigurjonsson, 2012; Nova, 2014), and there are many types of design research presented in the literature that are rather difficult to distinguish them (Buchanan, 2001).

As a strategy, design research and types of it are explained and categorized based on four selected criteria that are found noteworthy to mention and relevant to this study. These criteria by no means aim to prescribe a strict division within design research, rather they should be perceived as ways —occasionally intersecting— that navigate the reader within the field of design research.

The selected criteria based on which the term design research is categorized are: source of design knowledge (Cross, 2007); use context of the term (Sanders & Stappers, 2014; Sato, 2009); type of problem addressed (Buchanan, 2001); and relations between research and design (Archer, 1995; Frayling, 1993).

Design research based on the source of design knowledge: If the goal of research is knowledge as Archer (1980) stated, then the goal of design research has something to do with design knowledge. According to Cross, "development, articulation and communication" of this design knowledge is the concern of design research (2007, p. 47). Cross believes that design knowledge resides in three sources: people (who design), processes (how designed) and products (what designed); and based on these sources, he proposes a taxonomy for design research

showing similarities with previous efforts put by Archer in 1980. This taxonomy consists of the following:

> *Design epistemology* – study of designerly ways of knowing
> *Design praxiology* – study of the practices and processes of design
> *Design phenomenology* – study of the form and configuration of artefacts

> (Cross, 2007, p. 48)

Design research based on the use context of the term: There are two common meanings ascribed to the term design research with regard to its use context. *In practice*, it generally refers to "research that is performed as a part of doing design" (Sanders & Stappers, 2014, p. 27). This typically includes collecting information —particularly on users, their needs and through involvement of them— to inform specific design projects (Sanders & Stappers, 2014; Sato, 2009). *In academia*, it means research about how designing is executed and focuses on developing a body of knowledge mainly in the forms of theories, methods, principles and tools to inform future design studies and practical applications (Sanders & Stappers, 2014; Sato, 2009).

Design research based on the type of problem addressed: Buchanan (2001) suggests that design research may be 'clinical', 'applied' or 'basic' in relation to the type of problem addressed.

> **Clinical research** deals with an individual problem or case through collecting data and developing understandings to inform the solution to be proposed. Its use is very common in design practice and in design education (Buchanan, 2001).

> **Applied research** has a larger and relatively generalizable focus regarding findings comparing to clinical research; and it aims to provide some principles and directions towards problems situated in a general class of phenomena (Buchanan, 2001).

> **Basic research** is relatively less employed by design community and according to Buchanan (2001, p. 18), it is "directed towards fundamental

problems in understanding the principles —and sometimes the *first* [emphasis in original] principles— which govern and explain phenomena".

Design research based on the relation between research and design: Two prominent figures in the field of design research, Frayling (1993) and Archer (1995), propose quite similar categorizations that have considerable coverage in the literature. Although they use different phrasings for their categories (see Table 2.2), in the design literature, these categories are commonly referred as: 'research into (about) design', 'research through design', and 'research for design'.

Table 2.2 Types of design research according to Frayling (1993), Archer (1995) and their common use in the design literature.

Frayling (1993)	Archer (1993)	Design literature
research into art and design	research about practice	research into (about) design
research through art and design	research through practice	research through design
research for art design	research for the purpose of practice	research for design

Research into (about) design refers to the research activity conducted outside of the design that inquires design practices, such as historical, aesthetic, perceptual or theoretical research (Frayling, 1993). The criticism of a design in relation to people and society also falls into this category (Archer, 1995).

Research through design occurs when the research activity is carried out through the design process as it happens in materials search, development work and action research (Archer, 1995; Frayling, 1993). What is important to research through design is recording the steps of the design process, reflecting on the findings and communicating them to the later steps of the design process (Hanington, 2012).

Research for design is conducted to inform practical applications of design and findings of it are embodied in the designed outcome (Archer, 1995; Frayling, 1993). Research for design is profoundly associated with the term design research due to its perceived capacity to shape successful design outcomes (Dorst, 2008; Friedman, 2003; Frankel & Racine, 2010).

Frankel & Richie (2010) suggest that Buchanan's (2001) classification shows correlations with what is presented by Fraying (1993) and Archer (1995). They match 'critical research' with 'research for design'; 'applied research' with research through design and 'basic research' with 'research into (about) design'.

This study is interested in both of the use context of the term design research: practice and academia. The way the study is carried out and the ultimate aim of the study —contributing to the body of design knowledge— are academic in nature, close to applied research, and share considerable commonalities with research through design characteristics. On the other hand, the topic that is explored within this study resonates mainly with the design research in the practice context, close to clinical research, and falls into the category of research for design. For this reason, in the rest of the literature review, the term design research is used in the context of design practice (particularly focusing on users, their needs and through the involvement of them) indicating a clinical study conducted as research for design, unless otherwise stated.

2.2.2 Models of Research for Design

Literature review on research for design reveals that it is mostly interpreted through approaches and methods employed within. For example, as shown in Figure 2.2, Sanders and Stappers (2012) propose a map called "landscape of design research" covering emerging approaches and methods within research for design area. On the horizontal scale, the map is defined by approaches to design research. The bottom of the map represents research-led perspectives carrying traditional and applied characteristics. The top of the map represents design-led perspectives emerging recently. On the vertical scale, the map is defined by mindsets dominating the practice of design research. The left side of the map represents the expert mindset.

Design researchers are perceived as experts and users are considered as reactive informers. The right side of the map represents the participatory mindset. Design researchers with a participatory mindset works collaboratively with users (Sanders and Stappers, 2012).
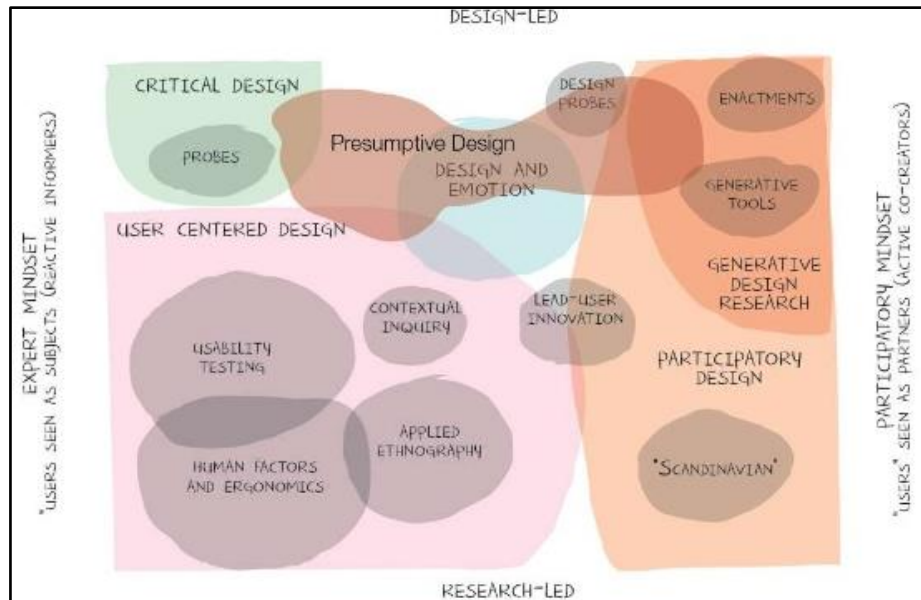
Figure 2.2 The Landscape of Design Research (Sanders & Stappers, 2012, p. 19).

In this map, user-centered design occupies relatively the greatest area. In this area, design researchers attempt to understand user needs in a better way by predominantly employing observational methods.

Moggridge (2007), in the area of interaction design and human-centered design, highlights four different kinds of research methods on a diagram shown in Figure 2.3 that represents research for design. On the horizontal scale, the diagram characterizes design opportunities and needs, from left being explicit to right being latent. On the vertical scale, the difference in techniques is represented —from top being macro (involving many people) to bottom being micro (involving few people) (Moggride, 2007).

The position of observational techniques in this diagram correlates with the qualitative research literature. Focus is on understanding a small number of people through interpretive techniques for the exploration of users' latent needs.
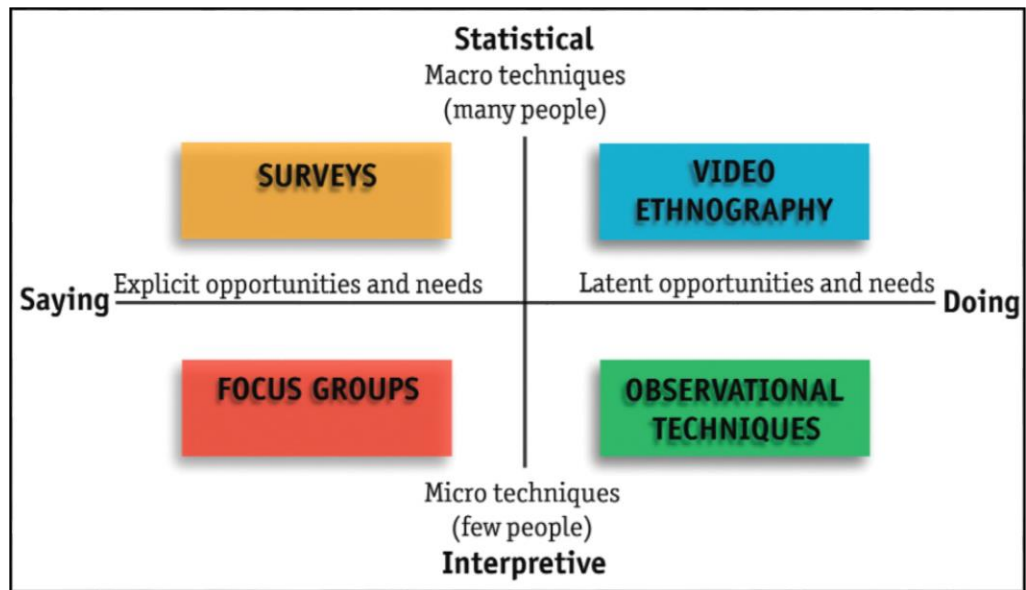
Figure 2.3 Kinds of research methods in design (Moggridge, 2007, p. 664).

Within this thesis study, a particular emphasis is given to the interpretation of design research by Hanington. Figure 2.4 shows the model proposed by him in 2007, namely *Model of Design Research,* and identifies three phases through which design research can inform and inspire the design process. This model has four characteristics that are highly relevant to the topic of this study:

- It is a model that explores design research by relating it to the design process;
- It is specific to research for design;
- It focuses on human-centered methods; and
- It is a design research model predominantly developed within the design education context.
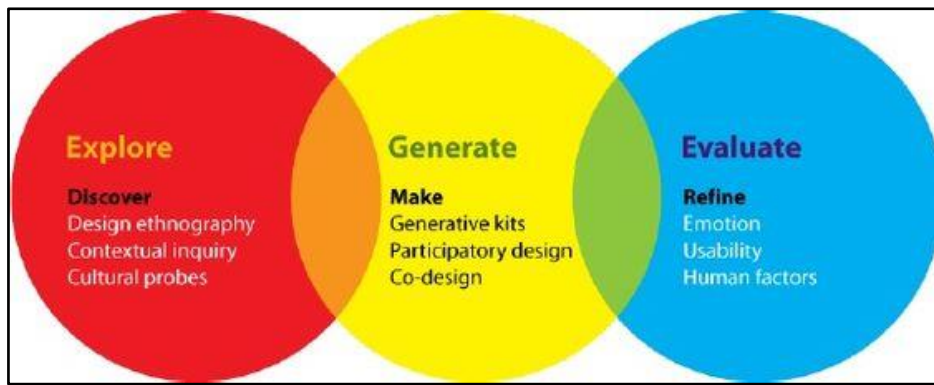
Figure 2.4 The Model of Design Research (Hanington, 2007, p. 4).

The three phases are: exploratory, generative and evaluative. These phases are almost sequential but still iterative in nature, and their intersections represent flexible and transformative use of attained approaches and methods for each of them (Hanington, 2007, 2010, 2015). Hanington (2015, p. 43) gives concise explanations for each of these phases as follows:

> "Exploratory research and design is characterized by user and product studies, intended to forge a knowledge base and empathy with people and things, particularly in cases where design teams may be engaged in unfamiliar territory. Generative research is a more focused effort targeted at a deeper understanding of user needs and desires, and concept development through participatory design activities. Evaluative research combines field and lab methods to gain feedback and to test emerging design concepts against user expectations."

Exploratory phase is dedicated to information collection; generative phase refers to guiding inspiration to create concepts through the collected information; and evaluative phase involves the testing of ideas emerged from the generative phase (Hanington, 2010).

In this model, exploratory phase is the main area where insights are collected from people, which informs and inspires design decisions in the front end of design. The model is subtitled as "discover" phase, and design ethnography, contextual inquiry and cultural probes are exemplified as the design research methods which are

dominant within this phase. According to Hanington (2015), this phase aims to collect samples of human experience through the methods being ethnographic in nature such as participant observation, artifact analysis and diary studies.

2.2.3 Role of Observation in Exploratory Research for Design

According to Sanders & Stappers (2008), today, there is a visible enlargement in the front end of design (Figure 2.5), which is the initial step of design process. This front end often called as "fuzzy front end" due to its messy and chaotic nature (Sanders & Stappers, 2012). Exploratory research phase corresponds predominantly to this phase and observational research employed quite frequently to inspire and inform within this phase.
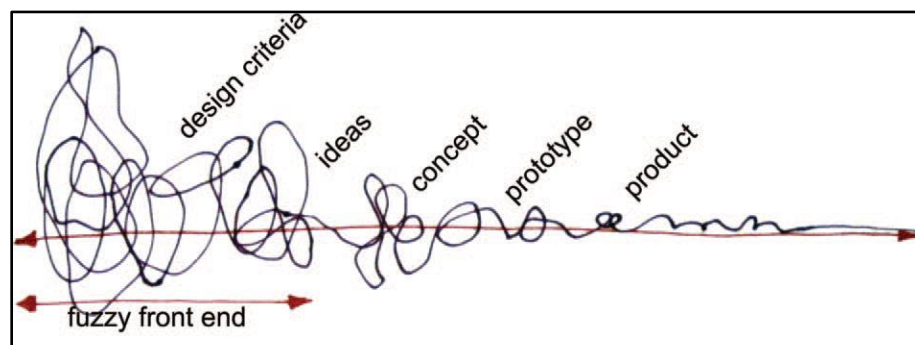
Figure 2.5 Growing fuzzy front end in the design process (Sanders & Stappers, 2008, p. 6).

Models representing design process are constructed by a variety of authorities in the design field. Exploring the role of observation in exploratory research phase in their design processes can reveal valuable insights. Among them, three of them are selected and explained below:

The Human-Centered Design Process, by Norman (2013): Norman (2013) in revised and expanded version of his famous book, *The Design of Everyday Things,* propose a design research model consisting of four different activities: observation, idea generation, prototyping and testing. Observation is the activity where exploration phase of the design research is carried out predominantly. Observation phase is defined as "initial research to understand the nature of problem" about

"customer and people who will use the product under consideration" through understanding participants "interests, motives, and true needs" within their context (Norman, 2013, p. 222). Norman (2013) also emphasizes that the design process should be activity-focused. In other words, activities to be performed by people and the difficulties they experience while trying to accomplish these activities is the focus.

The Human-Centered Design Process, by IDEO (2015): IDEO's design process involves three phases: inspiration, ideation and implantation. Inspiration phase corresponds to exploratory research and indicates information collection through divergent thinking. IDEO (2015, p. 29) explains inspiration phase as follows:

> "The Inspiration phase is about learning on the fly, opening yourself up to creative possibilities, and trusting that as long as you remain grounded in desires of the communities you're engaging, your ideas will evolve into the right solutions. You'll build your team, get smart on your challenge, and talk to a staggering variety of people."

A Model of Design Innovation Process, by Kumar (2013): Model proposed by Kumar suggests that the design process has four main phases*: '*research, analysis, synthesis and realization. Research phase corresponds to the exploratory research and this phase is further divided into three modes: 'sense intent', 'know context' and 'know user'.

The mode of sense intent suggests considering the changes happening, and the effects of these changes in the world of business, technology society, culture, and policy. (Kumar, 2013). Familiarization with the domain to figure out where to start, reframe the perceived initial problem and being in the pursuit of opportunities for innovation are the hallmarks of this mode (Kumar, 2013).

The mode of know context refers to understanding the environment in which product or service will be positioned, through investigating dynamics controlling this environment (Kumar, 2013). This mode encourages researchers to examine how their offerings, their competitors' offerings perform in the market; emerging

strategies dominating the market; relationships within their and their competitors' organization (Kumar, 2013).

The mode of know people covers most of the activities related to observing people. Aim of it is described by Kumar (2013) as "understanding of people's thoughts, feelings, and needs by listening, observing, interacting, and analyzing" (p. 88). He suggests the researcher to immerse into the daily lives of people, and listen to their stories to reach valuable insights about them.

Before processing towards the following section, it will be useful to remind an issue mentioned previously (see Section 2.1.1.2). Similar to their uses in the qualitative research, ethnography and participant observation —sometimes observation by itself— are commonly used interchangeably in the design research literature as well. It is because ethnography is the most common type of qualitative research that utilize participant observation as the primary data collection method (Iacono & Holtham, 2009). In order not to be reductive, the subtle difference between these terms are not paid attention while selecting sources to include within this literature review.

2.2.3.1 Introduction of Observational Research into the Design Field

The familiarization of design with observational research, especially participant observation, is credited to the involvement of researchers with social sciences background into the design research. Three well-known figures of those researchers are: Lucy Suchman, an anthropologist who joined the Xerox Palo Alto Research Center (PARC) in the 1980s; Jane Fulton Suri, an experimental psychologist with a master's degree in architecture who started to work as a human factors specialist at IDEO in late 1980s; and Liz Sanders, with a Ph.D. in experimental psychology involved with the firm Richardson/Smith in 1988 (Moggridge, 2007; Wasson, 2000).

Suchman's ethnographic research in a workplace is claimed to be the design inspiration of Xerox copy machine's large green button (see Figure 2.6) that is very common in most of the copy machines today (Sanders, 2004). She prepared a film as the outcome of her research, revealing the difficulties that office workers had

had while copying, and accordingly led to the design of the button (Sanders, 2004). Suri and her colleagues developed tools and techniques, mostly adopted from social science methods, to understand people's experiences, which were later published as IDEO Methods Cards (Moggridge, 2007). Sanders became a well-known pioneer in participatory design field through methods and tools she developed and employed initially in the practice (Wasson, 2000).

Figure 2.6 The Large Green Copier Button of a Copy Machine (Retrieved 01. 06. 2016 from https://quriosity.files.wordpress.com/2010/06/greencopierbutton.png).

What was rare during the 1990s paved the way for today's interdisciplinary design teams. According to Suri (2011), now it is common to see psychologists and anthropologists collaborating with designers in design teams through using diverse methods from variety of disciplines. Simultaneously, observing people and interviewing them in their natural context became widely popular (Suri, 2011).

After the familiarization of the design field with observation and the recognition of its rewards in terms of gaining depth understanding of people that the designs are aimed at, designers' involvement in the observational research by themselves marks the scene. Design firms such as IDEO encouraged designers to use their "observational skills and intuition in thinking beyond functional problem solving and into the social realm of things" (Clarke, 2011, p.11).

2.2.3.2 Prevailing Attributes of Observations Captured By Designers

Moggridge (2007) labels observation as the "best way to learn about people in the context of a particular design problem" (p. 667) and Norman (2013) defines it as the initial phase of the design research process.

According to Sanders & Stappers (2012), different levels of knowledge reached through different methods and position of observation in relation to these methods can be seen in Figure 2.7.
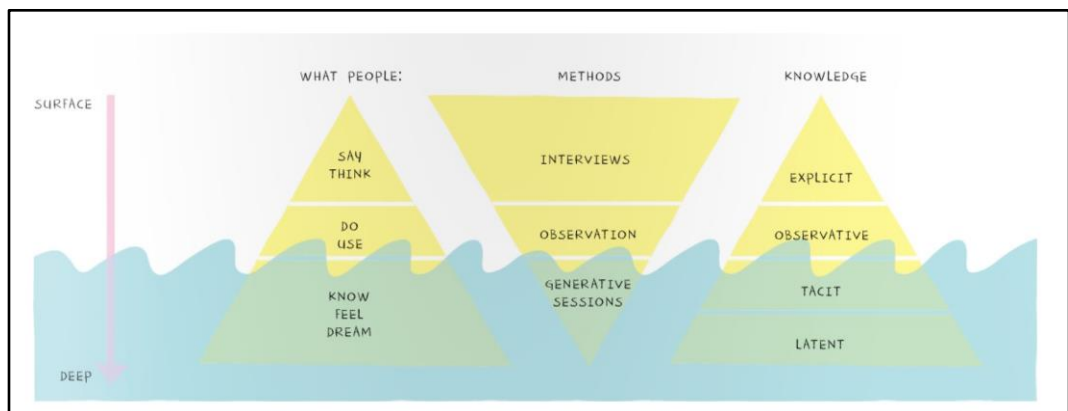
Figure 2.7 Different levels of knowledge reached through different methods (Sanders & Stappers, 2012).

Traditionally, it was marketing's role to collect information from people that would inform the design decisions; however, traditional qualitative market research falls short of discovering unarticulated needs of consumers and transforming them into insights to inform design decisions (Coopers & Evans, 2006; Norman, 2013). For Cooper and Evans (2006) this is because; although people are quite capable of addressing their current demands, they are rarely good at verbally expressing what they would want and likely to have in the future. It is also asserted to be challenging for them to imagine the use of a new product or service to provide reliable responses to researcher. In order to identify latent needs and desires of people, many authors (Cooper & Evans, 2006; McDonough; 2015, Parson, 2009) emphasize the adaptation of new ethnographic research approaches carried out by designers. At the end, proposed product or service will be the outcome of the complex activity of

designing, about which market researchers are not very knowledgeable (Cooper & Evans, 2006).

What is special about the observations carried out by designers? According to Suri's account quoted below, it is designers' own way of doing things, their individuality shaping their outlook affecting what they notice, but also how they interpret the observed phenomena and how they relate it to the possible design outcomes:

> "Designers are enthralled by the world and the search for patterns and hidden rules that apply. But rather than observing it to describe what they see (which would involve seeing literally and objectively), their purpose is a generative and strategic one. Generative in the sense of a future orientation on what is observed – highly dependent on imagination and interpretation. And by strategic, I mean that their observations help in making deliberate judgments about the relevance and meaning of specific design choices."
>
> (Suri, 2011, p. 31)

Suri illustrates how designers' individuality shapes the way they look at the world with the Gen Suzuki's pen-stand design (see Figure 2.8). When Suzuki noticed pens held together in a stack of tape on his friend's desk, he built the connection between objects within their context, which inspired the design pen-stand. Although this example is not an outcome of a planned participant observation, it constitutes a good example an instantaneous observation reflecting the nature of the designerly way of perceiving the world.

Figure 2.8 Gen Suzuki's design for a pen-stand was inspired by his observation of rolls of tape stacked on a friend's desk (Suri, 2011, p. 20).

According to Design Council (2007), a great number of leading companies in the world now involve their designers in research at the onset of their projects. For example, designers in Starbucks participate in their coffee shops as baristas and immerse themselves in the coffee culture up-to a month in order to elicit user experience embodied within the Starbucks brand and its coffee shops. Similarly designers in Xerox pay field visits to customer sites along with service engineers to observe how their customers interact with their products in the actual use environment (Design Council, 2007).

The value and impact of product or services emerged as the outcome of a design process inspired and informed by such observations are explained based on three subjects: people, society and design discipline itself.

On People: It is a very rare case that a product or service is expected to serve solely its designers' needs. Understandably, designers could not have extensive knowledge about each target group that they design for. By observing people and understanding their true needs, designers offer solutions that satisfy people's latent needs at the early stages of design process; i.e. they made design itself more inclusive (Cooper & Evans, 2006; Parsons, 2009).

On Society: According to Arnold, "designers have long been identified as having tremendous impact on society and therefore have the capacity to initiate social and cultural change through design" (2009, p. 1143). Not only will the individuals benefit from design serving the well-articulated needs of people, but also —to a larger extent— the society that the design is situated in. Observing people in the field is a key activity to collect information for desired social change to be built upon. IDEO's *the Field Guide to Human Centered Design (2015)* encompasses quite a few observation-based research methods specifically for this aim.

On Design Disciple: Observing people as a research for design activity produces "evidence based design decision-making, where demonstration replaces assertion as a means of justifying design decisions" (McDonagh, 2006, p. 7). According to Arnold (2009), these evidence-based design solutions will support the "growth of design as a disciplined field in its own right" in two ways (p. 1143): within the

discipline, designers will feel more confident while they are practicing their profession; outside of the discipline, profession will be perceived relevant and taken more seriously by public (Arnold, 2009).

2.2.3.3 Adaptation of Observational Research Methods by Designers

As emphasized in the previous sections, ethnography and participant observation require researchers to immerse themselves for a significant amount of time in the field where people of inquiry are present, in order to deeply understand their experiences. Although understanding people and their experiences within the natural context is central to research for design as well, the way designers work in practice necessitates alterations in the essence of some characteristics present in ethnography and participant observation. The crucial one among these necessary alterations is related to time spent in the field (Hanington, 2010; Norman, 2013; Sanders, 2004). Bichard & Gheerawo explain it as follows (2011, p. 54):

> "The longer studies and observational methods of research that ethnography favors can lead to fundamental truths about the way individuals or groups behave, but in a time-pressured project, designers have to deal with shorter time frames and provoke response rather than waiting for interesting behavior to be revealed. The search is for creative insights rather than an expansive understanding of every aspect of a user's life."

Applied ethnography is an umbrella term encompassing adapted versions of traditional ethnography according the needs of researcher. Sanders (2004) states that the aim of applied ethnography in design research is to bring people's point of view to the design development process; both for the creation of the new products and services, and for the improvement of the existing ones. The term 'design ethnography' is also used to correspond to the abovementioned explanation (Salvador, T., Bell, G., & Anderson, K., 1999). Hanington (2010) explains design ethnography as looking for sufficient data revealing the experiences of people reached through time-sampled observation and suggests to combine observations with conversational interviews and video footage analysis. Norman (1998) uses the term 'rapid ethnography' within the human-computer interaction field to emphasize time-pressured nature of design and simply defines its role as observing the real

needs of prospective users and devising tools that will simplify and enhance lives of them.

In the design literature, there are also other observational methods which are ethnographic in nature but also have added dimensions. For example, 'fly-on-the-wall observations' removes the researcher intentionally from the scene, and suggest capturing observations covertly (Hanington, 2012). Also, human-computer interactions field profoundly employs 'usability testing' as an evaluative research method to test their prototype and observe people while they try to accomplish specific tasks (Hanington, 2012). As being focal to this study, three methods in which the observations captured as exploratory research to inform front end design decisions; and that acknowledge the presence of researcher in the field are explained below.

Touchstone Tours (Guided Tours): In this method, participant guides the researchers in a given environment and they have conversation about the topic of study through the elements present in this environment. This method can be applied in macro environments, i.e. homes; but also in micro environments such as backpacks (IDEO, 2015 Hanington, 2012).

Shadowing: Shadowing refers metaphorically to becoming someone's shadow for a while and demands researchers to follow participants and observe their activities closely throughout their daily routines. Shadowing allows researcher to capture first hand contextual details influencing people's behaviours and motivation; requires well documentation with detailed notes, sketching and photography if possible; and is ideally conducted by several team members (DIY Toolkit, n.d.; Hanington, 2012).

Experience Simulation: Rather than observing participant within their own environment, participant is observed in a mock environment set up by researchers. In this artificial context, participant engages in simulated experience for researchers to understand what matters to them while they are interacting with the elements of the context (Kumar, 2013).

2.3 Guides and Tools Supporting Observational Research

The guides and tools supporting observational research found in the literature are investigated and categorized into three: guides on planning for observations; tools supporting observations around a guiding taxonomy; and tools sequencing or layering the user experience.

Guides on planning for user observations: Human-computer interaction field is productive in terms of providing guiding material for user observation. These materials are mostly in text format. This category collects and summarizes advice from text books on user observation, such as *Observing the User Experience* (Goodman, Kuniavsky, & Moed, 2012) and *Understanding Your User Requirements* (Courage & Baxter, 2005) along with practical suggestions coming from *Apple Human Interface Guide* (2005).

Tools supporting observations around a guiding taxonomy: In the design literature, there are also materials supporting observations around a guiding taxonomy, some of which are supoorted with paper-based design tools.

Tools sequencing and layering user experience: In the design literature, there are tools that are not explicitly supporting observational research, but found noteworthy to mention due to their potentials for interpretation. Selected ones focus on identifying user experience through a timeline based on narratives.

2.3.1 Guides on Planning for User Observations

Research planning: According to Goodman et al. (2012) a research planning involves the following: the goals, defining the reasons why you are going to conduct user observations; the schedule, defining what is going to be done and when; and the budget, calculating how much user observations will cost.

Research planning requires setting boundaries at the beginning of a research or design project not only to keep the researchers focused, but also to identify key stakeholders within the research scope (Hanington, 2015).

Learning about the domain: Familiarization with the domain of activity to be observed and products used within this activity before conducting user observations is crucial to understand what people are really doing (Courage & Baxter, 2005; Goodman et al., 2012). The examination of existing products within task domain, their key functions and working principles, any known issues with those products, products' perceived users and learning about related terminology would provide considerable information for desired familiarization (Courage & Baxter, 2005; Goodman et al., 2012). This information can be reached through online resources (websites, forums, discussions sites, etc.); published materials (books, magazines, product manuals, etc.); technical services, etc. Researchers are also advised to try the specific activity or use the product of inquiry by themselves before going into the field (Courage & Baxter, 2005).

Participant selection: Participant selection naturally plays a critical role to the results of the research. Depending on the kind of information sought and target user group, participants representing typical, extreme or lead users can be recruitment criteria (Kirk, McClelland, & Suri, 2015). Typical users represent the most common key factors defining the target audience; extreme users may represent the high ends, such as extremely enthusiastic or extremely negative users; and lead users represent the ones adopting a new technology in advance compared to others (Goodman et al., 2012). Obvious for most of the cases, the selection of participants having relevant experience and expertise is crucial in order to derive insightful findings from the user observations (Kirk et al., 2015).

Preparation before going into field: Once the researchers arrive in the environment where the user observation would take place, there is no going back and getting something forgotten. That is why user observations require proper preparation before going into field (Courage & Baxter, 2005). Making a list of inventory regarding the materials to take with, such as consent forms, notebooks, pencils; creating a protocol for observations and getting familiar with the equipment to be used during observations are highly suggested (Goodman et al., 2012).

2.3.2 Tools Supporting Observations around a Guiding Taxonomy

AEUIO framework: AEIUO is an organizational framework which can be made use of during the observations as well as while analyzing the collected information. Its name is a mnemonic making it easier to remember the following elements: activities, environments, users, interactions and objects. These elements constitute a guiding taxonomy to pay attention to, document and code while gathering and interpreting information through observations (Hanington, 2012). E-Lab, original developers of the AEUIO framework, describes these elements by supporting them with guiding questions as follows:

> - "**Activities** are goal-directed sets of actions—paths towards things people want to accomplish. What are the modes people work in, and the specific activities and processes they go through?
>
> - **Environments** include the entire arena where activities take place. What is the character and function of the space overall, of each individual's spaces, and of shared spaces?
>
> - **Interactions** are between a person and someone or something else; they are the building blocks of activities. What is the nature of routine and special interactions between people, between people and objects in their environment, and across distances?
>
> - **Objects** are building blocks of the environment, key elements sometimes put to complex or unintended uses (thus changing their function, meaning and context). What are the objects and devices people have in their environments and how do they relate to their activities?
>
> - **Users** are the people whose behaviors, preferences, and needs are being observed. Who is there? What are their roles and relationships? What are their values and prejudices?"

(Hanington, 2012, p. 10)

Based on AEIUO framework, Baskinger and Hannington (2013) developed worksheets (see Figure 2.9) for each elements of AEIUO, for the purpose of organizing thoughts, observations, and ideas into the related frames. These worksheets can also be used as a lens while observing and documenting the information gathered. Their contents and layouts are explained in Table 2.3.
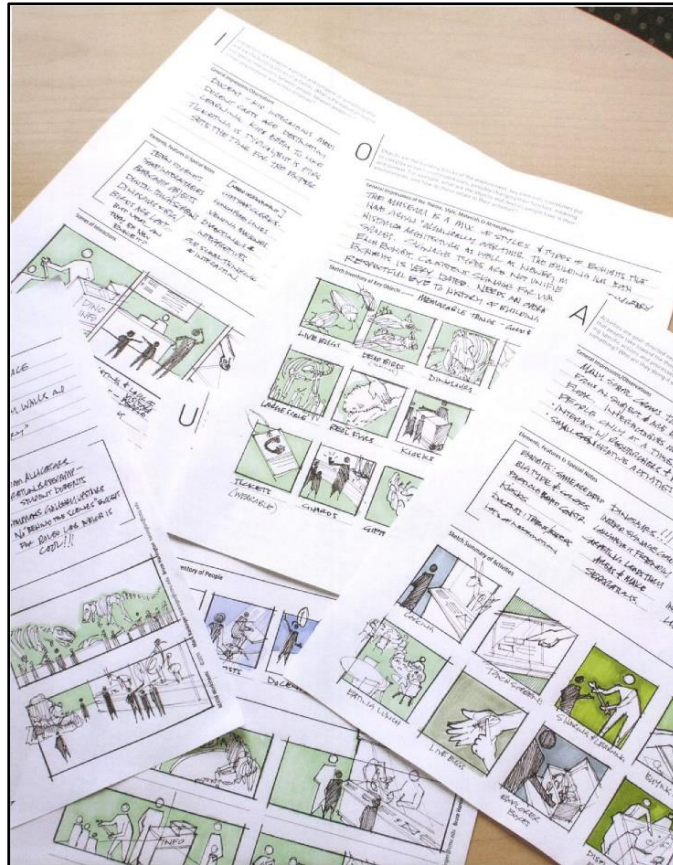
Figure 2.9 Filled out AEIOU framework worksheet examples after user observations (Bardel & Baskinger, 2013, p. 298).
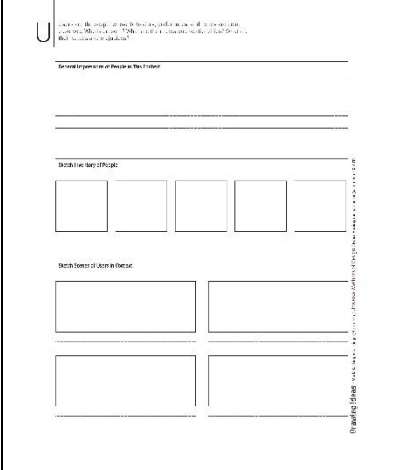
Table 2.3 Contents and layouts of AEIUO framework worksheets.

AEIUO framework worksheets	Explanation of worksheet content and layout
	Definition of "activities" by E-Lab.
	Single area to note down general impressions and observations.
	Area divided into three to note down elements, features and special notes
	Eight squares for summarizing activities through sketches.

37

Table 2.3 Contents and layouts of AEIUO framework worksheets (cont.)

	Definition of "environment" by E-Lab.
	Single area to note down general impressions of the theme, style, materials and atmosphere.
	Area divided into three to note down elements, features and special notes.
	On the left hand side, floorplan to draw; on the right hand side, two rectangular areas to draw scenes.
	Definition of "interactions" by E-Lab.
	Single are to note down general impressions and observations.
	Area divided into three to note down elements, features and special notes.
	Three squares for sketching scenes of interactions.
	Definition of "objects" by E-lab.
	Single area to note down general impressions of the theme, style, materials and atmosphere.
	15 squares for sketch inventory of key objects accompanied with captions.

Table 2.3 Contents and layouts of AEIUO framework worksheets (cont.).

	Definition of "users" by E-Lab.
	Single area to note down general impressions of people in context.
	Five squares for sketch inventory of people accompanied with captions.
	Four rectangular area to sketch scenes of users in context accompanied with captions.

POEMS framework: POEMS as an observational framework carries quite a few commonalities with AEIOU framework. POEMS is also a mnemonic that stands for people, objects, environments, messages and services; and helps to understand the context of the study by making sense of these five elements present in this context (Kumar, 2013). If the study focuses on a product, Kumar claims that through the lens of POEMS framework, researchers implement the study with a broader perspective and perceive "context as systems of related elements" (2013, p. 105). The five elements are explained through questions, examples and directions as follows (Kumar, 2013, p. 105):

- "**People:** Who are the different kinds of people in the context? Mother? Repairperson? Customer? What appear to be their reasons for being there? Try to capture the full range of types of people present. Record them on your note-taking template.
- **Objects:** What are the various objects that populate the context? Phones? Dining table? Newspaper? What are the broader categories of objects? What is their relationship to one another? Record them.
- **Environments:** What are the different settings where activities take place? Kitchen? Store? Meeting room? Determine the distinct environments within the context. Record them.
- **Messages:** What messages are being communicated in the context, and how are they being transmitted? Conversations? Package labels? Signs? Record the messages.
- **Services:** What are the distinct services offered in the context? Cleaning? Delivery? Media? Note the types of services available and record them."

Publicly available worksheets or templates for POEMS framework to be used during observations could not found. Kumar (2013) suggests researchers to create one for themselves before going into the field, by simply dividing notebooks into the five corresponding elements of POEMS. However, there is a filled out example presented in Kumar's book depicting POEMS framework on paper (see Figure 2.10).

Figure 2.10 An example of POEMS framework on paper (Kumar, 2013, p. 104).

In the example presented in Figure 2.10, a photograph from the observation is seen with some notes on it. The caption located at the top of the photograph literally says: "Description of photograph (Point out important aspects of image and describe them)." The caption at the bottom of the photograph literally says: "General thoughts and comments."

The page including elements from POEMS framework is divided into three rows: in the first row, observed activity is described; in the second row, elements in POEMS framework accompanied with some guiding text are presented; and in the third row, a large empty area is dedicated to comments in relation to observed user experience. Figure 2.11 shows the reproduced version of this page for readability purposes, being true to content and distribution of it, but not being attentive to the allocated spaces in the original layout.

Activity	(Specify)				
Detailed description of the activity				Time: Morning , Afternoon, Evening	
People	Objects	Environment	Messages		Services
Who is the main subject of this picture?	List objects participants interact to conduct this activity	Describe setting or location where this activity takes place	List information transfer during this activity		A system enabling this activity

	M	F
Child		
Youth		
Adult		
Elderly		

Comments about user experience

Figure 2.11 An example of POEMS framework (reproduced from Kumar, 2013, p. 13).

Five Human Factors framework: This framework aims to support observations through capturing five factors claimed to driving the overall user experience: physical, cognitive, social cultural and emotional (Kumar, 2013). According to Kumar (2013), by initially breaking people's experience into its constituent parts to understand each of them thoroughly; and later reassembling them to create a holistic picture will provide a deeper understanding of people's experiences. Five human factors are explained through questions, examples and directions as follows (Kumar, 2013, p.13):

- **"Physical:** How do people experience their physical interaction with things and other people? What do they touch, push, pull, open, close, lift, carry, control, and so forth?
- **Cognitive:** How do people associate meanings to things they interact with? What are the various interactions that require people to think? What do they, read, research, process, assess, and decide?
- **Social:** How do people behave in teams or in social settings? How do they formally and informally interact, make decisions, coordinate actions, make schedules, and work together?
- **Cultural:** How do people experience shared norms, habits, and values? What, if any, shared values seem present? How do they manifest?
- **Emotional:** How do people experience their feelings and thoughts? What in the environment is triggering these emotions? Are people sad, aggravated, frustrated, or happy?"

Figure 2.12 shows a filled out worksheet including notes on five human factors along with elements situated in POEMS framework. According to Kumar (2013), the worksheet is designed for a workshop held in Institute of Design IIT about observing a partying activity. The worksheet includes additional information about the observed activity, time of it, quotations form short interviews with people, and insights gathered and a need statement. This observation is supported with a photography and short notes on it which are not shown in here. When taking into account the two filled out worksheet examples presented in Figure 2.9 and Figure 2.11, it is recognized that some areas are left blank by the researchers. It is also visible that for some areas, there are long sentences written whereas for some of them there are just a few words describing what is observed in relation to activity. These might be related to available information to the observers.

Figure 2.12 A filled out worksheet for user observation including five human factors (Kumar, 2013, p. 102).

In relation to POEMS framework and Five Human Factors framework, there is a software prototype, namely *User Insights Database Tool* through which videotaped observations can be tagged in the light of elements and factors present in these frameworks (Kumar, 2004). The aim is defined by Kumar (2004) as to make collected insights organized, shareable and reusable. Although sharing and reusing the observations' insights is not one of the direct concerns of this study, this software prototype is noteworthy, as it is a medium other than paper-based worksheets, which facilitates observations. Figure 2.13 shows how the researchers can tag the observation with predefined options corresponding to elements in POEMS. Same tagging option is applicable for Five Human Factors framework under the 'user experience segment'. Figure 2.14 shows that this software prototypes also enables the researchers to compare different observational studies recorded.

Figure 2.13 Tagging observations through POEMS Framework in User Insights Database Tool (Kumar, 2004, p. 8).

Figure 2.14 Comparing two observation clusters in User Insights Database Tool (Kumar, 2004, p. 9).

Shadowing framework: The worksheet for people shadowing (Figure 2.15) is designed for researchers to take notes on while following and observing the participant, and has the following characteristics (DIY Toolkit, n.d):

- On the top-left corner, researchers take notes on shadowing activity by indicating the location, date and time. Following to that, they give details on the demographics as age and gender, and the reason for shadowing.
- On the bottom-left corner, researchers indicate the key findings.
- The rest of the worksheet is divided into the guiding taxonomy consisting of six elements as follows:
    - "Likes: observations on personal preferences
    - Dislikes: observations on particular concerns
    - Habits: observations on existing routines
    - Activities: observations on actions triggered by situation
    - Objects: observations on the use of specific objects
    - Space: observations on the effect of the environment"

Figure 2.15 People shadowing worksheet (DIY Toolkit, n.d).

What is common to these four frameworks is that they attempt to divide observations into manageable parts —both while conducting and analyzing the observations— and later on try to reach a holistic view. They urge researchers to pay attention to certain elements located in the context of a study and make use of additional guiding questions, explanations and examples. Their shared concern is to enable the researcher to make the best out of the observations by integrating many related criteria to pay attention.

Table 2.4 shows how elements within abovementioned frameworks can be matched with Spradley's (1980) nine dimensions of participant observation (see Section 2.1.2.2); and highlights the elements present in all frameworks, except for the Five Human Factors framework. It stands as the most distinctive one compared to others, as it claimed to be directly related to user experience.

While creating Table 2.4, I associated the elements having the similar meaning but different wording, such as "user" with "people", and "space" with "environment". POEMS framework seems not to have the "activity" element although the other two have; and Shadowing framework misses "people" element although the other two have. The case with the POEMS framework can be explained as, the central focus of it is already observed "activity"; and shadowing framework directly refers to following "people".

Table 2.4 Comparison of Spradely's (1980) nine dimensions guiding participant observation with AEUIO, POEMS and Shadowing frameworks.

Spradely (1980)	AEUIO	POEMS	Shadowing
Space	Environments	Environment	Space
Actor	Users	People	People
Activity	Activities	Activity	Activities
Act	Interactions		Habits
Object	Objects	Objects	Objects
Event		Services/ Messages	
Time			
Goal			

2.3.3 Tools sequencing or layering the user experience

The Customer Journey Canvas: This canvas aims to document people's journey through a service, along with collecting insights about before and after the actual service journey. This tool supports the *user journey map* method as well, which is described by Hanington (2012) as the visualization of the experiences people have when interacting with a product or service, so that each moment can be individually evaluated and improved.

An example for the use of the Customer Journey Canvas for observing people could not be found, however, it certainly has elements that can be transferable and relatable for user observations. Figure 2.16 shows how this canvas looks. Following, Figure 2.17 reproduces the elements and guiding question in this canvas for readability purpose.
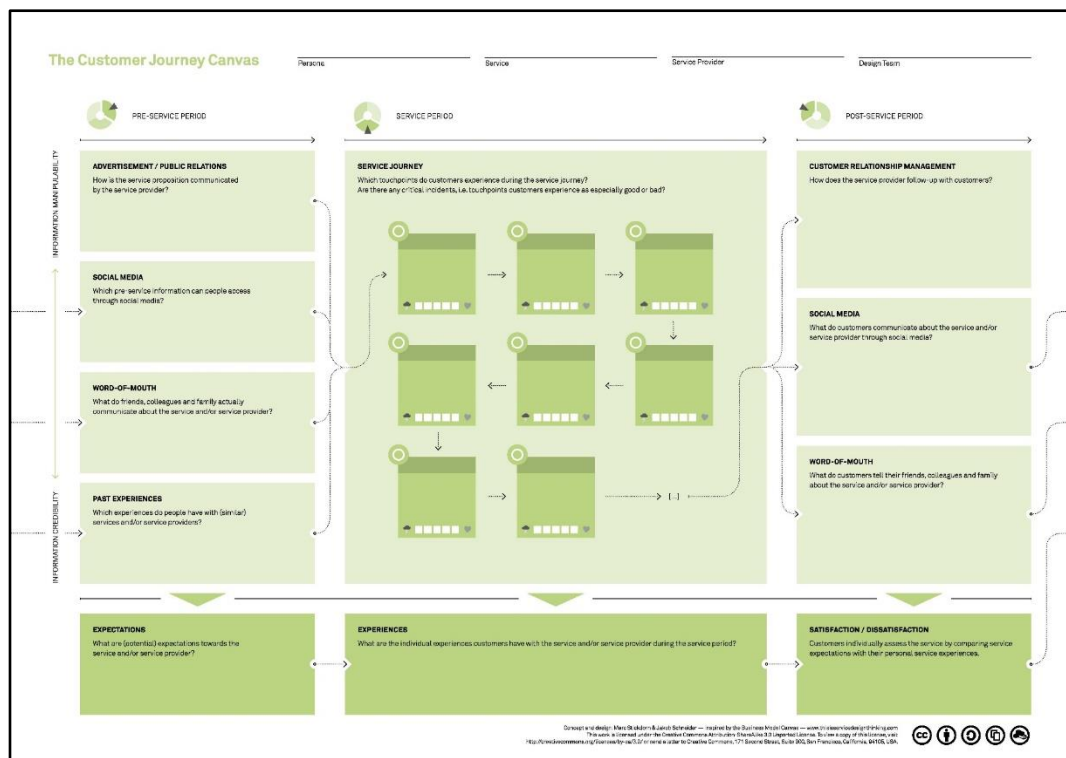
Figure 2.16 The Customer Journey Canvas (Stickdorn & Schneider, 2011).
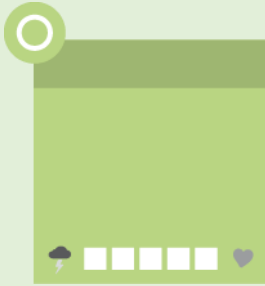
Persona:	Service:	Service Provider:	Design Team:
PRE-SERVICE PERIOD	**SERVICE PERIOD**		**POST-SERVICE PERIOD**

PRE-SERVICE PERIOD	SERVICE PERIOD	POST-SERVICE PERIOD
<u>Advertisement / Public Relations</u> How is the service proposition communicated by the service provider?	<u>Service Journey</u> Which touchpoints do customer experience during the service journey? Are there any critical incidents, i.e. touchpoints customers experience as especially good or bad?	<u>Customer Relationship Management</u> How does the service provider follow-up with the customers?
<u>Social Media</u> Which pre-service information can people access through social media?		<u>Social Media</u> What do customers communicate about the service and/or service provider through social media?
<u>Word-Of-Mouth</u> What do friends, colleagues and family actually communicate about the service and /or service provider?		<u>Word-Of-Mouth</u> What does customer tell their friends, colleagues and family about the service and/or service provider?
<u>Past Experiences</u> Which experiences do people have with (similar) services and/or service providers?		
<u>Expectations</u> What are (potential) expectations towards the service and/or service provider?	<u>Experiences</u> What are the individual experiences customers have with the service and/or service provider during the service period?	<u>Satisfaction/ Dissatisfaction</u> Customers individually assess the service by comparing service expectations with their personal service experience.

Figure 2.17 Elements and guiding questions included in the Customer Journey Canvas (adapted from Stickdorn & Schneider, 2011).

At the top of the canvas, it encourages the researcher to identify information related to persona, service, service provider and design team. These details can be useful if the number of the participants are high in numbers.

Pre-use service period: This period is about how and through which channels people get in touch with service. Rather than observations, previous experience of customer and their expectations are dominant.

Service period: In this period, people are observed and their interactions with the service are documented step by step. These steps are called "touchpoints" in the Customer Journey Map, and are represented with separate squares, supported with a scale at the bottom, indicating the degree of pleasantness of interaction. The experience of people is also questioned and this can be documented in text format.

Post-service period: In this period, relationship between people and service provider is questioned, when people are not actually using the service. How people mention their experience to others and through which channel are also examined here. Total perceived satisfaction of people is also summarized in this period.

Day in the life: This method is actually designated for users themselves to reflect on and express their needs and desires while having conversations with researchers. However, it has a lot of potential to be applied to observational research as it aims to reach a compressive understanding through three layers of investigation. In Figure 2.18 a simple representation of graphic-based tool corresponding to this method is given. Sanders & Stappers (2012) explain the layers included as follows:

- In the first layer, namely *the layer of facts*, users describe what happens in one specific day by indicating the sequence of activities occurred that creates a holistic story.
- In the second layer, namely *the layer of valence,* users explains indicated activities by attaining them 'smileys' representing enjoyable, high points or 'frownies' representing unpleasant, low points.
- In the third layer, users give explanations and examples in relation to each attained high and low points.
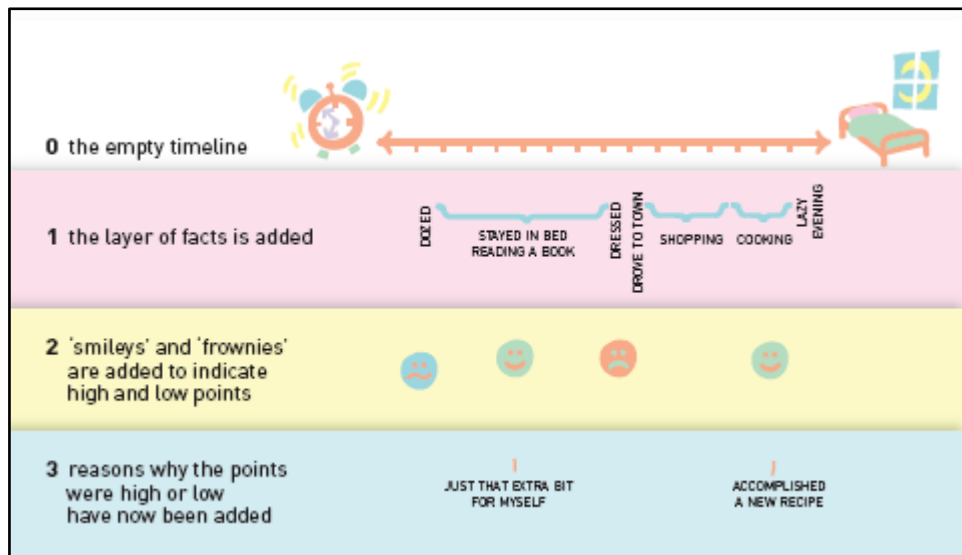
Figure 2.18 Day in a life method (Sanders & Stappers, 2012, p. 54).

A User Diary Format: Diary studies demands users to express personal details about their daily lives and events, mostly in a worksheet provided by designers doing user studies (Hanington, 2012). The difference between "day in the life" method and diaries is that the user completes the study while having conversations with researchers in the former; whereas the user completes the study while the researcher is not around in the latter. A user diary format created by Ogur (2014) is paid particular attention because its focuses on activity and it can be conducted in relatively a short amount of time. Shown in Figure 2.19, this diary format divides the activity evaluation into four layers. Middle two layers are dedicated for users to take notes on phases of activity of inquiry and corresponding feedback coming from the product used while executing this activity; top and bottom layers are dedicated to users to evaluate the phases of activity in terms of experiences of users —top being the positive, and bottom being the negative.

User Experience Interview Tool: This tool is designed for interviews but has potentials to be adapted for user observations (see Figure 2.20). Researcher notes down the phases in the experience in the upper part. Below, there is a part called 'emotion scale' on which the researcher indicates to what degree the participant is satisfied with the corresponding phase in the experience. At the bottom, the why

part is situated. The researchers note down the reasons and explanations that has been expressed by people, and indicates whether they are satisfied or unsatisfied.
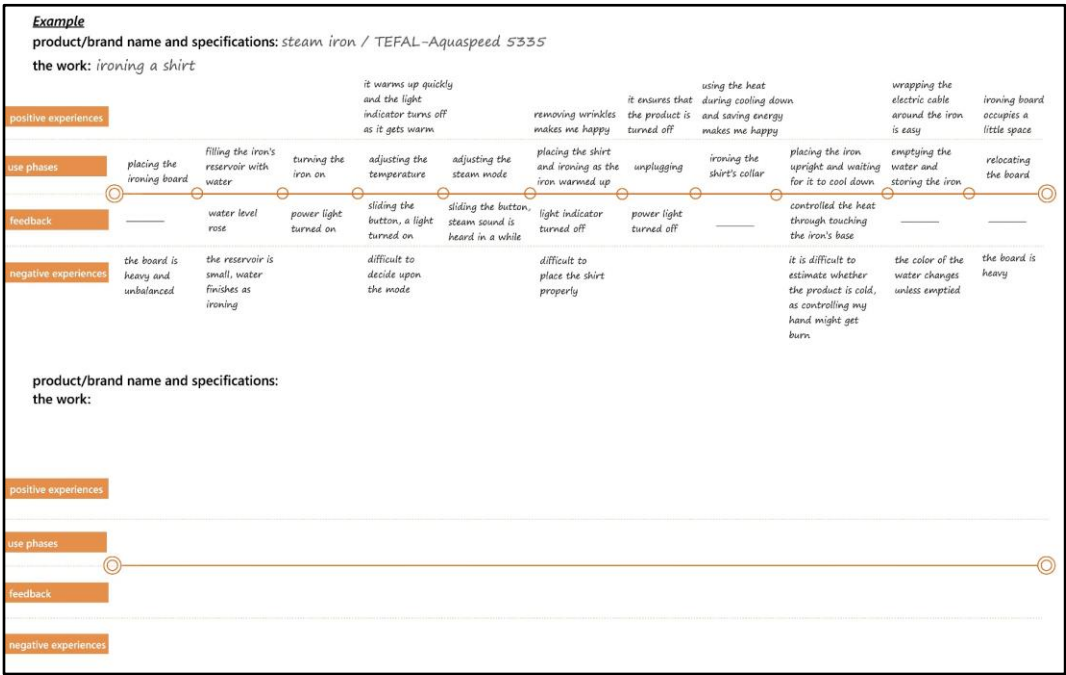
Figure 2.19 A user diary format (Ogur, 2014).
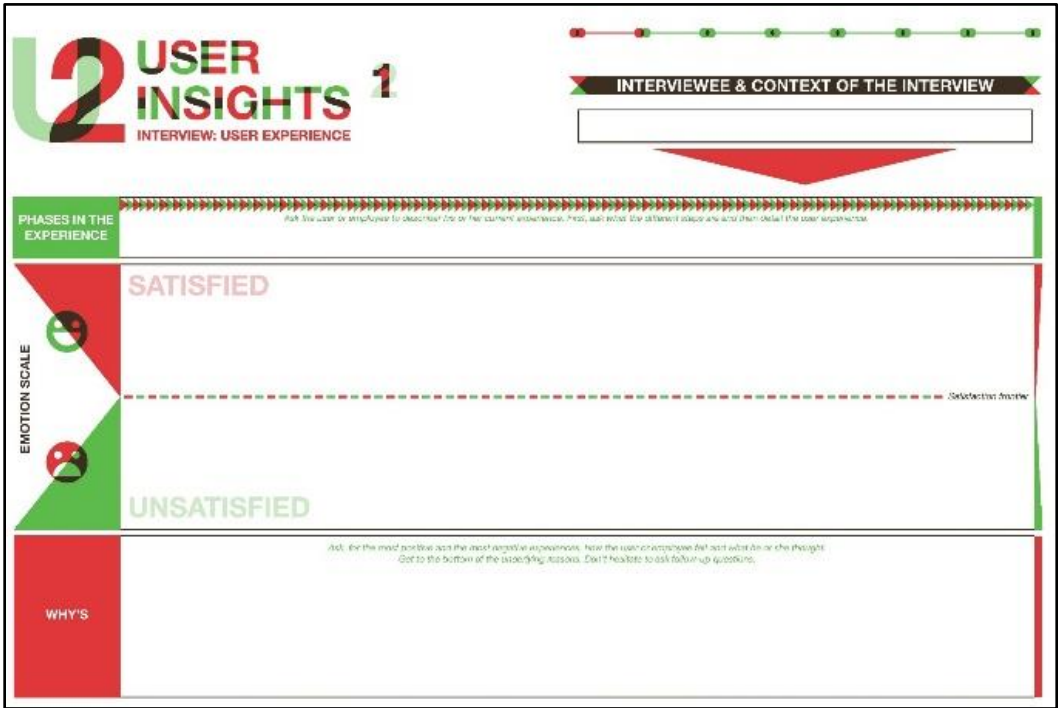
Figure 2.20 User experience interview tool (Service Design Toolkit, n.d).

2.4 The Integration of Research for Design into Design Education

Owen (1991) states that "design education, except for engineering design and some architectural design, has had the tradition of the fine and applied arts as its model, where personal exploration substitutes for research" (p.31). Having been mainly emerged from Bauhaus style studio-based courses, industrial design education has demonstrated a similar trend and focused on creating beautiful and useful objects through individual interpretation; mostly learnt from a master-apprentice system (Cross, 2007; Dooren, Boshuizen, Merriënboer, Asselbergs & Dorst, 2013; Kolko, 2005).

As stated earlier (see section 2.1.2.3), the need for evidence-based design solutions is obvious for the design profession. Complex, ill-defined nature of design problems —for which all the necessary information to produce the single right solution cannot be available— can no longer be satisfied with individual interpretations (Buchanan, 2001; Cross, 2007; Kolko, 2005). Also, thanks to the advancements and changes in industry and technology along with the environmental and social problems, the complexity of design problems are increasing.

Rodber and Wormald (2007) stress that the changes happening in the process of product development having effects on the profession of industrial design. They believe, this change presents some implications for design education and requires corresponding developments. Actually, their article's name is quite self-explanatory of their aim: Aligning industrial design education to emerging trends in professional practice and industry. According to them, if this alignment is not guaranteed, there is the danger of young industrial designers will be outdated and alienated to their profession. In addition to that, McDonagh (2006) states that aligning design education through skills is not enough, and future designers should have the ability to learn new skills and adapt themselves to the changing conditions.

2.4.1 Differences between Expert Designers and Novice Designers

Cross (2007) claims that the skills of expert designers to solve ill-defined design problems are highly developed. These skills of expert designers are mostly implicit activities; evolved in time through a common practice and routine; and usually presented in an undivided process consisting of unconscious, automatic steps (Dooren et al., 2013). However, novice designers like design students may not possess these skills simply due to the lack of experience in design practice. In teaching, it is found important to make these steps explicit (Demirbilek, 2004; Dooren et al, 2013; Turhan, 2013).

As a result of their study comparing experts and students in design process, Atman et al. (2007) find that problem scoping and information gathering activity is the main difference regarding the skills of experts and students. According to Atman et al. (2007), experts invest more time in the problem scoping and information gathering activity whereas students invest less. They also highlight that sometimes students can be stuck in this activity and show no significant progress towards solution generation within the context of inquiry. This problem scoping and information gathering activity is highly related to research for design and is predominantly carried in the front end of the design process (McDonagh, 2006). Making this activity explicit for novice designers, and providing guidance and motivations now stands as an important role of design education (Demirbilek, 2004).

As designers now being immersed themselves in the front end of design, according to Kiernan and Ledwith (2014), this has implications for design education and skills in the area of research, such as ethnography and observation, are now critical skills for design students. By the same token, McDonagh states that all stages of the design process involve some research activity, however; the extension of them should be broaden, especially the ones targeting to understand user needs. She finds methods such as empathy, ethnography and observations useful for developing design education in relation to understanding user needs. In the same vein, Rogers & Anusas (2008) state being able to conduct ethnographically-oriented design research will be an important differentiator among design graduates.

CHAPTER 3

STUDY I: DEVELOPMENT OF THE EC TOOLKIT V1

In this chapter, initially the overall methodology of the study is presented. In order to keep the related information close to each other and provide a coherent narrative, the methodological approaches employed for the each study phases are explained more in detail in the study's related sections.

3.1 Research Approach

While exploring and explaining 'qualitative research' (see Section 2.1.1) and the 'nature of design research and its categories' (see Section 2.2.1) in the literature review, I already revealed some characteristics of the methodological approach adopted in this research study. Main research approach incorporated into research is qualitative in nature and demonstrated itself in the form of field studies, observations, semi-structured interviews and content analyses. In relation to design research, the study undertaken has the characteristics explained in the following paragraphs.

Design research is carried out in this study within its use in the academic context (see Section 2.2.1). Sato (2009) defines a specific area in the academic context called domain-specific design research. Domain-specific design research aims to generate knowledge in relation to specific design concerns and this knowledge is translated into design practice through design methods, guidelines and design principles specific to this domain (Sato, 2009). Generated knowledge within this thesis study has been translated into a toolkit, which guides design students in the domain of user observations for design, and informs the design discipline about how this translation can occur. That is why this study could be perceived as domain-specific design research in the academia.

This study can also be characterized as a research for design activity (see Section 2.2.1). By designing materials to facilitate user observations, applying and testing them within the field studies; recording and communicating the steps involved throughout the process; I applied a research activity through the iterations of design (i.e. Experience Chart Toolkit for design education).

3.2 Research Stages

Before starting this study, I had an interest in design methods and tools accompanying them. However, this interest was too broad and missing a focal point. My thesis supervisor's foresight on lack of guidance for design students on practical application of user observations marked the beginning of this study. Following to her suggestion, I made a quick review of the related literature and found this area promising to study. With this motivation, I carried out the study through three main stages: Study I, Primary Research and Study II.

Study I - Development of the EC Toolkit V1 (see Section 3.3): This study started with the development of a guide for user observation, namely the EC Guide based on the findings of literature review along with the evaluation of set of user observation questions presented to design students in the third-year industrial Design studio course at METU. It continued with the evaluation of the EC Guide through a pilot session with two graduate design students, and the revision of it in the light of the pilot session findings.

Primary Research - Integration and Evaluation of the EC Toolkit V1 within an Undergraduate Design Project (see Chapter 4): After the integration of the EC Toolkit V1 within an undergraduate design project, I conducted semi-structured interviews with the students who had participated. Later, I communicated the analysis of the interviews, and findings and their interpretations.

Study II - Development of the EC Guide V2 (see Chapter 5): This stage involves iterative development of the EC Guide V2 within the light of the findings gathered from the Primary Research and a focus group session conducted with graduate design students. The aim of this stage is to provide a final proposal in the form of a design toolkit, namely the EC Guide V2.

3.3 Development of the EC Toolkit V1

Study I started with the development of a guiding tool for user observation, which is later named as *Experience Chart Guide (EC Guide)*, to be used by design students while capturing user observations. This marked the beginning of the research for design activity to satisfy the aim of this study. It was followed by a pilot session in which I tested the initial version of the EC Guide. In the light of the pilot session's findings and their interpretations, I revised the EC Guide. Once the revision was completed, I continued with the creation of additional materials which would support user observations captured via the EC Guide. The EC Guide together with these supporting materials created a toolkit, which I called *Experience Chart Toolkit*. The materials within the EC Toolkit are indicated in Table 3.1 and their development process is further explained in Section 3.3.6.

Table 3.1 The components of the EC Toolkit with their brief explanations.

EC Briefing: Written briefing on what is expected from user observation captured via the EC Toolkit, with a particular focus on the utilization of the EC Guide during these observations and the purpose of parts situated within the EC Guide.
EC Consent Form: Prepared to inform participants of user observations and to have their consent to participate in the research.
EC Guide: Tool for design students that guides and facilitates user observations captured in the field.
EC Poster Template: A digitally editable format to create the presentation medium of findings and insights of user observations.
EC Poster Example: An example of the EC Poster for design students to inform about and make familiar with the presentation format.

The EC Toolkit was firstly integrated into and evaluated within the third-year Industrial Design studio course at the undergraduate level at METU. In 2014-2015 academic year, Spring semester's final project, namely *the OpenKitchen Project*, was the project of this integration and evaluation. Actually, the development of *the OpenKitchen Project* briefing by the studio team —of which I was also a member— demonstrated overlaps with the development of the EC Toolkit. The learning outcomes and objectives of Industrial Design third-year studio course and *the*

OpenKitchen Project itself provided the base knowledge and quite a few criteria to consider while shaping this toolkit. That is why it is important to mention about the nature of education in third-year Industrial Design studio course at METU —with a focus on user observations. It is also crucial to touch on *the OpenKitchen Project* to understand some of the rationale behind the decisions taken while developing the EC Toolkit.

3.3.2 User Observations in Third-Year Industrial Design Studio Course

In the third-year industrial design studio course, user research has a prominent role and its integration into user-product interactions is defined as one of the course objectives. In the catalog definition of this course, user research through interviews; participatory observations and design sessions; and generative research tools and methods are indicated among the course learning outcomes. In this definition, the interpretation and integration of findings —gathered through abovementioned design research methods— into design solutions is also highlighted as one of the outcomes (ID302 Industrial Design IV, n.d.).

User observations have been systematically incorporated into the third-year industrial design projects focusing on diverse household appliances since the spring semester of 2011. In these observations, design students are mostly asked to conduct user observations through field visits on several household activities such as coffee brewing, cooking and baking. These observations are carried out to inform and inspire the front end of design decisions, which aims to result in concept designs for household appliances. Table 3.2 shows these educational projects in which user observations are carried by the design students in the area of household appliances.

In general within these projects, the studio team provides students with a written brief for user observations and verbally communicates what is expected. In the written brief, there are sets of questions to be addressed by the students while observing the users. Those questions have been developed gradually and adapted to each year's project of focus. As the initial step for this study, I evaluated these questions. I particularly focused on the ones for the latest project namely, 'Engaging

and Sustainable Design Solutions for Turkish Coffee Making and Serving Experience' which took place in Spring 2014.

Table 3.2 The educational projects held in the third-year Industrial Design studio course at METU including user observations.

Description of the Project	Date
"My Sustainable Mini Oven" in Collaboration with Profilo: Rethinking and Re-contextualizing Mini Oven with Serving Units in Relation to Sustainable Design Considerations	2011, Spring Semester
Making Tea as an Engaging Practice: Electrical Tea Maker with its Serving Set in Collaboration with Esse	2012, Spring Semester
Engaging and Sustainable Design Solutions for Tea Making and Serving Experience	2013, Spring semester
'Engaging and Sustainable Design Solutions for Turkish Coffee Making and Serving Experience'	2014, Spring semester

3.3.3 The OpenKitchen Project

> "In our current linear system of production and consumption, products are designed, manufactured and consumed in short life spans, leading to their rapid disposal and an increase in waste and resource use. This problem is aggravated in electric kitchen appliances, where a specialized product is designed for each and every function – cookers, mixers, juice makers, soup makers, etc. In response to this, open-source design approaches can be adopted to develop more open-ended solutions."

The above is quoted from *the OpenKitchen Project* brief (Appendix A), developed by the third–year industrial design studio team and explains the problem background and motivation of the project. The aim of the project is defined as to find sustainable design solutions for a flexible, open–source cooking platform. This cooking platform should support several food preparation scenarios in which users are actively and creatively involved in product assembly, maintenance, repair, and upgrade.

The user group of the project is defined as "technophile" users, who are interested in and competent with technology. It is furthered narrowed down to two

"technophile" user groups: (i) young couples/housemates, (ii) young professionals working in a small Technopark office. The project brief included a business model for *the OpenKitchen Project*, teaching goals of the project, sustainable design considerations for the design students to take into account, and the project phases of the project. The project phases of the project are indicated below and the phase including the user observations phase is explained in detail. The rest of the explanations and other information in the project brief is available in Appendix A. A calendar showing the distribution of these phases within the project duration is shown in Appendix B.

1) Literature search and user observations (design research phase): The literature search phase includes a review and analysis of various topics related to the project context. User observations phase covers user visits, interviews and observations to identify problems and gain insights into the usage patterns. Based on the results of the literature search and user observation, the student teams will suggest insights, findings and project dimensions.
2) Disassemble-assemble session for electric appliances
3) Idea generation
4) Participatory scenario building and modeling session
5) Preliminary evaluation
6) Design detailing and final evaluation.

The studio team decided that the students would work in teams due the complexity and comprehensiveness of the project, and the related workload for completing the project phases and requirements.

The main difference of this project than the previous household appliances projects is its focus, as it is more activity-based rather than being product-oriented. It aims to understand the experiences of people around an activity, and produce design solutions accordingly.

3.3.4 Development of the EC Guide

I started to develop the EC Guide to be used in the field of observation as the main component of capturing user observations. The aim of creating a tool is to facilitate user observations conducted by design students and make them pay attention to

important aspects. Design students lacking experience in design research and user observations may need this guidance.

As signaled before, there were three main sources of knowledge I referred to while developing this tool. Initially, I interpreted and categorized the set of user observation questions given in 'Engaging and Sustainable Design Solutions for Turkish Coffee Making and Serving Experience' project carried out in 2014. Criteria from *the OpenKitchen Project* also played a significant role during this development phase. Both of these sources, with the support of literature review created the content of the EC Guide, while the structure of the EC Guide is defined through the inspiration and information gathered from literature review. I will explain the content creation of the EC Guide in the further sections more in detail.

The main structure of the EC Guide was inspired from "tools for sequencing and layering user experience" (Section 2.3.2) and the necessity of supporting user observations with additional data collection method, in this case, interviewing. That is why, I structured the EC Guide through three consecutive parts: Pre-use Interview, Experience Chart and After-use Interview.

I found the *Experience Chart* an appropriate name to describe the nature of user observations in this thesis study. Especially during the actual user observation and in the After-Use Interview part, the aim is to understand and document user's experience in relation to activity of inquiry, in a sequence of phases.

In the following sections, I will mention the development of Pre-Use Interview and After-Use Interview parts together, as they bare similar characters in terms of inspiration and information source. Later, I will mention about the Experience Chart Part —although being in the middle of the user observations via the EC Guide process, it has a different format than the others.

3.3.4.1 Pre-use and After-use Interview Parts

The content of Pre-use Interview and After-use Interview parts are predominantly adapted from the guiding set of user observation questions offered in the brief of the previous project, as I stated before. This brief was chosen, because it was the latest one when I was developing the EC Guide. Table 3.3 shows how the questions are evaluated for categorizing and adapting them into the EC Guide.

Table 3.3 User observation questions of 'Engaging and Sustainable Design Solutions for Turkish Coffee Making and Serving Experience' project.

Q-1: "What are the characteristics of the user? Take notes about age, gender, profession, level of education, level of income and other important features."

Part: Pre-use interview	**Category:** User Characteristics

Adaptation: Category area is simply divided into six in relation to the mentioned elements (i.e. age, gender, profession, level of education, level of income and other important features) in the question. *Other features* is allocated more space, as the number of the questions that the researchers would generate by themselves is unknown.

Q-2: "How would you describe the use environment for the Turkish coffee maker? Note down what the use environment is like: Where are the product, its accessories and consumables (coffee, sugar, etc.) placed and/or stored? Is it moved before/during/after use? How is it placed in relation to its environment (cupboards, sink, worktop, etc.) and other products around it? Also inquire about atypical use environments and occasions, such as living room, balcony, garden, meeting room and open office."

Part: Pre-use Interview	**Category:** User Environment

Adaptation: The question is translated into the EC Guide in two subcategory: *features of the user environment* and *spatial arrangement of product in relation to other products.* An additional subcategory is found relevant to include, *approximate number of users of the product,* as the input might lead to design considerations, i.e. customization, personalization, etc.

Q-3: "What are the characteristics and features of the Turkish coffee maker (e.g., physical characteristics, technical features, controls, displays, additional functions, accessories, etc.) and the coffee serving accessories?"

Part: Pre-use Interview	**Category:** Product Features

Adaptation: Except from the *accessories*, given elements in the parenthesis are subcategorized, as it is important to understand how users interact with the product's present features to achieve a specific activity.

Q-4: "What are the reasons identified by the user for choosing that particular Turkish coffee maker over other coffee making utensils and/or coffee makers?"	
Part: Pre-use Interview	**Category:** Product Features
Adaptation: The question is translated as a subcategory named as *selection criteria for choosing that particular product*, as this criteria might reveal the expectations, preferences, etc. of users in relation to the activity of inquiry.	
Q-5: "What are the phases of a Turkish coffee making and serving experience? What are the critical issues taken into account during preparation, cooking, serving, cleaning and storing?"	
Part: Experience Chart	**Category:** not applicable
Adaptation: This question created the basis of the EC Chart. It has been further developed with the integration of a timeline and other elements, which are covered in detail in the Section 3.3.1.2 in this chapter.	
Q-6: "What are the significant experiences of the user with their Turkish coffee maker (e.g., maintenance and repair history, complaints or appreciated features, accidents and safety issues, frequency and occasions of use, etc.)?"	
Part: After-use Interview	**Category:** Positive-Negative Experience
Adaptation: The question is subcategorized as follows: *repair-upgrading history, negative experiences, appreciated features* and *accidents. Frequency of use* was not much related to experience compared to others; and *occasions of use* is thought to be mentioned in other subcategories and eliminated in order to simplify the guide.	
Q-7: "Are there other values and functions ascribed to the Turkish coffee maker (e.g., alternative usage scenarios, such as boiling water, etc.)?"	
Part: After-use	**Category:** Atypical Use
Adaptation: The question is found highly valuable as the answers might inspire combining functions within a design solution. It is simply translated as *atypical or alternative use scenarios*.	

Pre-use Interview Part: Pre-use Interview part has the characteristic of a warm-up session. The information sought in here mostly depends on easy-to-answer questions by participant, and the researcher's overall impression in the field of observation. It includes three categories: *user characteristics, user environment* and *product features*, and content creation of these categories is available in Table 3.3. Figure 3.1 shows how these categories come together in the EC Guide.

User Characteristics	
Age:	Gender:
Level of income:	
Level of education:	
Other features:	

User Environment
Approximate number of users of product:
Features of the use environment:
Spatial arrangement of product in relation to other products:

Product Features
Physical features:
Technical features:
Controls and displays:
Additional functions:
Selection criteria for choosing this product:

Figure 3.1 Pre-use Interview part of the EC Guide.

The categories within the pre-use interview intentionally demonstrate correlation with the highlighted elements of the frameworks and Spradely's (1980) guiding dimensions mentioned in "Tools Supporting Observations around a Guiding Taxonomy" (see Table 2.5 in Section 2.3.2). Table 3.4 show this correlation.

Table 3.4 The correlation between subcategories of Pre-Use Interview with common elements in guiding taxonomies for the participant observations.

Pre-use Interview Part	User Characteristics	User Environment	Product Features
Spradley (1980)	Actor	Space	Object
AEUIO framework	Users	Environments	Objects
POEMS framework	People	Environment	Objects
Shadowing framework	People	Space	Objects

Another element which is common in the frameworks and the Spardley's guiding dimensions is *activity*, which seems to be missing in the Pre-use interview. Since the main concern of the EC Guide is activity itself; *activity* element has not a special category for itself for this Pre-use interview part.

After-use Interview Part: This part has the characteristics of a wrap-up session. It consists of three categories: *positive-negative experiences, atypical use* and *user suggestions*. Figure 3.3 shows how these categories are situated in the EC Guide. The content of the first two categories is adapted from the user observation questions explained in Table 3.3. In addition to these two, I felt the necessity of adding user suggestions which would reveal valuable insights about participant's relevant expectations.

Figure 3.2 shows a diagram developed by Sanders and Stappers (2012) which represents time course experience of people. According to Sanders and Stappers (2012) how people experience the current moment is related to the past through their memories and the future through their dreams. They believe that by observing and documenting people's current activities, then making them recall their earlier experiences, and reflecting on what is discovered to search for underlying reasons of user experience; real needs and desires of people can be reached.

Sanders and Stappers (2012) talks in a broad perspective. However, their perspective is very applicable to the observation of a single activity. In that sense, in the EC part, researchers will be observing and documenting the current activity of user. Remembering earlier experiences is fulfilled mostly through positive-negative experiences: as its subcategories are related to what happened in the past, such as repair-upgrading history, accidents, etc. For the future expectations and dreams, user suggestions part is situated in the After-use Interview part. Its subcategories are self-explanatory in that sense: *suggestions for improving the product* and *dream product features.*
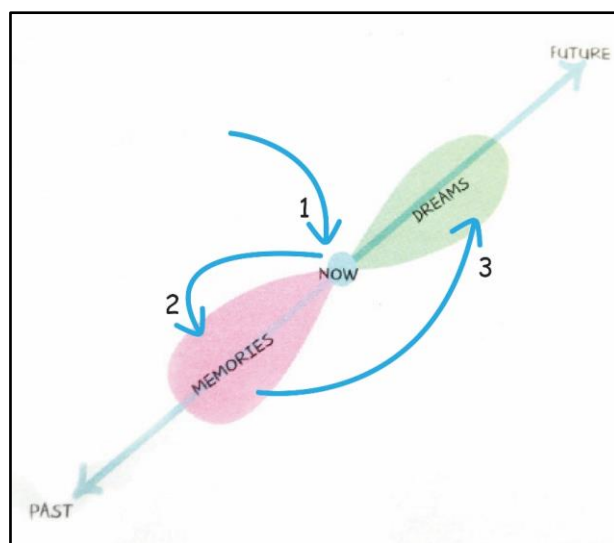
Figure 3.2 "The path of expression" representing time course experience of people (adapted from Sanders & Stappers, 2012, p. 75).

Compared to the Pre-use Interview part, the information sought in the After-use Interview part requires relatively more concentration and elaboration by the participants, as the latter entails memorizing the past experiences and generating the expressive inputs referring somehow to the future. This is another reason why subcategories related to memories and dreams are positioned in the After-use Interview part. Thinking about these subcategories just after finishing the activity observed in Experience Chart part would be easier and more productive for the participant. Also, in this part, researchers can ask more questions in relation to what they notice in the Experience Chart part.

	Positive-Negative Experience
Repair-upgrading history:	
Negative experiences:	
Appreciated features:	
Accidents:	
	Atypical use
Atypical or alternative use scenarios	
	User Suggestions
Suggestions for improving or modifying:	
Dream product features:	

Figure 3.3 After-use Interview part of the EC Guide.

3.3.4.2 Experience Chart Part

The Experience Chart part is dedicated to capturing and documenting the observations while the user is executing an activity. Its main structure is inspired from the examples in "tools for layering and sequencing observation" given in the literature review (see Section 2.3.3). Among these examples, the diary format suggested by Ogur (2014) has been taken as the primary model to build the Experience Chart part on, mainly because of two reasons: Firstly, this tool was exploring an electric household appliance in its example which is highly relevant to the product explored in *the OpenKitchen Project*. Secondly, I believed that the way the diary questions the feedbacks coming from the product along with the positive-negative experiences could provide valuable information for design students to consider. A caption of this diary format is shown in Figure 3.4. The way it explores the activity of focus through layers is adapted into the Experience Chart part.
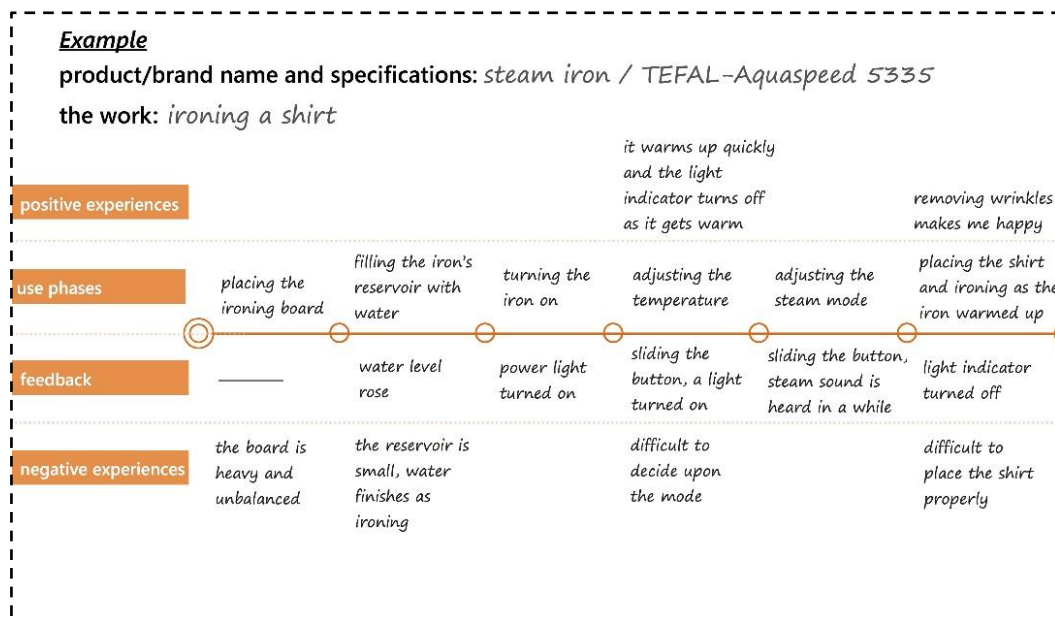
Figure 3.4 A section from Ogur's Diary Format (2014).

The Experience Chart part (see Figure 3.5) directs researchers to take notes into the three layers of designated areas: *sensorial feedback, use phases* and *experience observations, comments.* At the top the chart, some exemplary use phases are given to make design students pay attention. Below, there are two charts of note taking

which are identical in terms of their content. The aim of having two charts is to provide enough space for researchers while taking notes while capturing the activity.

In the middle of the charts, *use phases* layer is indicated, to be filled with phases in relation to the activity, such as storing, plugging in. *Sensorial feedbacks* layer located at the top of the *use phases* layer is for indicating the feedbacks coming from the environment or the product that user experiences specific to the spotted use phases. At the bottom of *use phases* layer*,* a relatively a larger area is assigned for taking notes on observed experiences and other related comments corresponding to the spotted use phases. Design students are also encouraged to indicate the nature of observed experience as positive, neutral or negative, if possible in this layer.

When the three main parts of the EC Guide were ready, I pulled all of them together and created a format printable to A3 and A4. My concern was to make this EC Guide easy to carry, foldable, printable on a common paper format. In its final form, the EC Guide is developed digitally as two-sided printout, and when the printout is folded, it is ready to use. A3 size paper format is more appropriate in terms of the space it provides.

Plugging in, Preparation (e.g. filling water, food preparation, etc.) Turning on, Specific Task (boiling, grilling, warming-up, etc.), Serving, Turning off, Selecting Modes, Preheating, Checking food, Cooling down, Unplugging, etc	
Sensorial feedback (auditory, visual, etc.)	
Use Phases	
Experience observations, (assign each comment with +, for positive; 0, for neutral -, for negative experiences)	
continue here	
Sensorial feedback (auditory, visual, etc.)	
Use Phases	
Experience observations (assign each comment with +, for positive; 0, for neutral -, for negative experiences)	

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Figure 3.5 The Experience Chart part of the EC Guide.

3.3.5 Pilot Session: Testing EC Guide for User Observation

In order to check the applicability of the EC Guide for user observations, I conducted a pilot session. The goal of this pilot session was to check the clarity of the questions and the categories included in the EC Guide. It was also to evaluate the feasibility of the EC Guide's structure and the researchers' experience while exploring and completing different parts of this guide. In addition to those, documenting the pilot session through still images provided me with the visual materials to develop the EC Poster Example (see Section 3.3.6.) which eventually became one of the componenets of the EC Toolkit.

3.3.5.1 Participant Selection

I selected the participants intentionally based on the following considerations. Firstly, both were fresh industrial design graduates of METU and they were in their first year of master's degree in the same discipline. They were once novice design researchers, but definitely more experienced than the study's target group. This posed some limitations as the EC Toolkit had been planned to be tested with the third-year industrial design students. However, I believed that new graduates can build an emphatic connection, since they were in the place of the third-year students' positions. Secondly, both participants were research assistants in the Department of Industrial Design at METU and were assisting the third-year Industrial Design studio in 2014-2015 academic year. I believed that their flourishing academician sides and their familiarity with the current students would provide me with insightful comments. Thirdly, this tool has the potential to be implemented in the following years for graduate research considering the depth and breadth of the guide.

3.3.5.2 The Session

Once the selected participants confirmed their attendance in the pilot sessions, I informed them briefly about the purpose and the requirements of the session. As user observations via the EC Guide necessitates a user executing an activity with the help of a product, and at least one researcher observing this activity; we decided

on the role of each participant for the pilot session. One of the participants became the researcher to conduct user observation by using the EC Guide. The other participant would play the role of the user by carrying out a specific activity. The participant being observed was enthusiastic about smoothie making with a specialized household product for this activity. Smoothie is "a creamy beverage made of fruit blended with juice, milk, or yogurt" ("Smoothie", n.d.). We decided this as the activity to be observed and made an appointment for the user observation.

The user observation took place in the actual use environment. In this case, it was the user's kitchen. Before the session, I explained the aim of the EC Guide more in detail. I had a dual role in the pilot session. I participated in the sessions as one of the researchers observing the user, and enacted the role of documenting the process through taking photographs. My other role was also to observe the session as the researcher of this thesis study. During the sessions, I took notes on my personal notebook about the difficulties encountered, insights provided and comments made by the participants along with my personal observations.

Once the user observation via the EC Guide ended, I conducted semi-structured interviews with the participants in order to get their inputs and insights. The feedbacks included the difficulties that the researcher experienced while utilizing the EC Guide; potential problems that the undergraduate students might have; and the suggestions for clarifications and possible alterations within the EC Guide to improve it further. I recorded these feedbacks on my personal notebook. I also took notes on an empty EC Guide, and recorded the inputs on the relevant parts of the Guide.

3.3.5.3 Revisions on the EC Guide in the Light of Pilot Session Findings

The overall findings from the session were suggestions for clarifications, alterations and improvements aimed at the EC Guide. These suggestions were predominantly on the content of the EC Guide. Regarding the overall structure of the EC Guide, there were not any suggestions given. I communicated the findings of the session with the help of following concepts: *statement* refers to the issues verbally communicated during the session; *suggestion* refers to suggestions provided by

participants for the stated issues; *remark* refers to what I noticed and observed during the session and through the examination of the EC Guide completed in the session; *interpretation and action* refers to how statements and suggestions provided by participants —sometimes along with observed remarks— are interpreted; and what kind of changes are made and/or actions taken accordingly. I used abbreviation of *RP* for the research participant, and *UP* for the user participant in the pilot session.

Findings of Pre-use Interview: Most of the findings of the Pre-use Interview Part directly refers to subcategories of it. I developed Table 3.5 to communicate them effectively by indicating their referred subcategories

Table 3.5 Pilot session findings of the Pre-use Interview part in the EC Guide and their interpretations.

Professional status in User Characteristics
Statement: Professional status phrase found very "formal" and not very "undergraduate-friendly".
Suggestion: Changing it with the word *occupation.*
Interpretation and action: Wording in terms of the use of simple and relevant language is important for eliminating confusions. Although it was not a crucial action to take, a simple Google search revealed that the word occupation has more coverage referring to what I meant by professional status. Thus, I replaced *professional status* with *occupation* —as design students might be more familiar with this word.
Level of income in User Characteristics
Statement: Asking participants their level of income might set participant at unease, since this question might be personal for some users.
Suggestion: Eliminating this question if it is not crucial for the sake of observation or giving a "scale of income" on which researchers can mark their best guesses. Observing the living environment and the context of use appears to be more important and relevant.

Table 3.5 Pilot session findings of the Pre-use Interview part in the EC Guide and their interpretations (cont.)
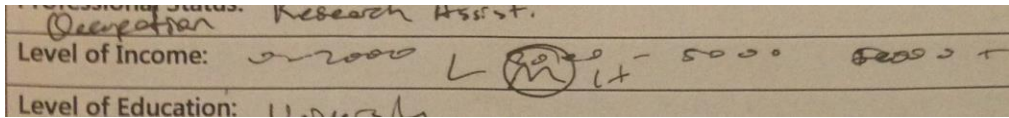
Remark: It is realized that two suggestive options are given in filled out EC Guide: one is for indicating the level of income through three available options L, M, H; standing for low, medium or high. Other was indicating the level of income over given numerical scales as 0-2000, 2000-5000, 5000 +.

Interpretation and action: Questioning personal details about the user might make both participants and researcher uncomfortable. The suggestions for making this part more structured through providing scales is interesting and easier to apply guesses. Designers might feel comfortable with graphical representation of answers among which they can choose. As the action, I reevaluated the necessity of this question and decided to take it out from the EC Guide, in order not to make any part involved in the observation uncomfortable. I assumed that if income related information was found crucial by researchers, it could be questioned in the *other features* subcategory.

Other Features **in User Characteristics**

Statement (i): The word *feature* was found "not appropriate" when it refers to people.

Suggestion (i): Using the word *characteristics* instead of *features.*

Interpretation and action (i): The statement found simply true. However, instead of the using the suggested word *characteristics*, the word *information* is used as I found it more inclusive.

Statement (ii): Design students might feel lost as the information sought in *other features* is too open-ended and vague.

Suggestion (ii): It is suggested to include some examples about what other features might be. Given examples are: "Does the participant cook at home? How many times a day does the participant cook? How often does the participant cook at home? Does the participant live alone?

Table 3.5 Pilot session findings of the Pre-use Interview part in the EC Guide and their interpretations (cont.)

Interpretation and action (ii): I found that including exemplary questions to guide design students would be relevant as they might feel short of producing their own questions. As the topic of user observations in *the OpenKitchen Project* focuses on food preparation, many of the generated examples in the pilot session participants would make sense. However, I found these examples too specific and including all of them might discourage design students to generate their own questions. Providing a balance between directing design students and enabling room for their self-exploration is important, as the latter would nourish their approach to research and their questioning skills. However, when I think retrospectively, a more general question could be included, such as "what are the food preparation habits of participants?" I added exemplary questions as l*evel of engagement with technology,* because of *the OpenKitchen Project*'s context.

Product Features

Statement: It is not clear whether researchers need to ask the features of product to user or they have to decide and investigate them by themselves. If the latter is expected, then it is found "superfluous" to try to understand the product features in the field of user observation.

Suggestion: Users might be asked to talk about the product by themselves in order to look for a different kind of information such as "user's familiarization with his/her product."

Remark: In the filled out EC Guide, RP indicated the name of the product and its brand into an area created by dividing the *physical features* subcategory area When I asked the reason, RP explained that by doing so, the features of the product can be searched later through the Internet. This would save time, and more detailed information can be reached regarding the product and its features.

Table 3.5 Pilot session findings of the Pre-use Interview part in the EC Guide and their interpretations (cont.).

Interpretation and action: Data collection method should be communicated to design students clearly to eliminate any confusions, especially for the *product features* category. Product features can be observed and noted down in addition to asking the participant. Also, time spent with the user in the field is precious and the necessity of actions should be questioned thoroughly. In the case of *product features*, observed remark about noting down the name and brand of the product was found promising. In the light of this note, *name of the product* and *related task* subcategories are placed in the *product features.* In that way researchers can search for the product details after user observations through various mediums such as the Internet and product reviews. At the end, this user observation aims to understand the activity, product is an intermediary to understand it. As a revision, apart from the *selection criteria for choosing that specific product*, the rest of the subcategories are collected under a new subcategory, *characteristics and features of the product,* as exemplary prompts to pay attention to.

Additionally, I made two changes but these were not inspired from the pilot session findings. As first, instead of using the term *user environment*, I used the term *use environment*, since the latter is more related to the observation of an activity. As second, I changed the sequence of *product features* and *use environment* with each other as presenting this part from small scale to a larger one appeared to be more appropriate and meaningful. Figure 3.6 shows the final version of Pre-use Interview part after the revisions.

PRE-USE INTERVIEW

User Characteristics

Age: Gender:

Occupation:

Level of education:

Other information (level of engagement with technology, number of people sharing the same house, etc.):

Product Features

Name of the product:

Related task:

Characteristics and features of the product (physical characteristics, technical features, controls, displays, cooking/grilling features, additional functions and accessories, etc.):

Selection criteria for choosing that specific product:

Use Environment

Number of users:

Features of use environment:

Spatial arrangement of product in relation to other products:

Figure 3.6 Revised version of the Pre-use part in the EC Guide.

Findings on Experience Chart part: The Experience Chart part was filled by RP quite similar to the anticipated use of it (Figure 3.7), and it was claimed to be "comfortable to work with" by RP. The suggestions given for this part were mostly for improvement. Findings are explained in Table 3.6.
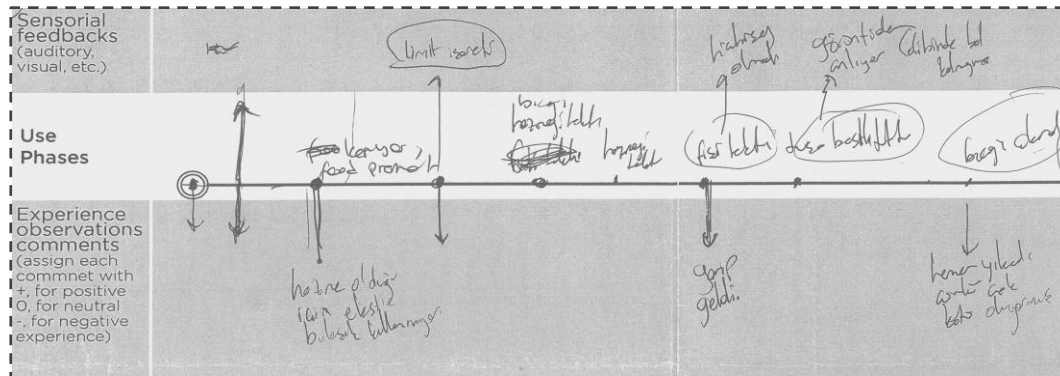
Figure 3.7 A section of the filled out Experience Chart part in the EC Guide in the pilot session.

Table 3.6 Pilot session findings of the Experience Chart part in the EC Guide and their interpretations.

Exemplary Use Phases
Suggestion: RP suggested to add "storing" at the beginning and end of the given examples, inspired by UR's act of taking a part of the smoothie maker from the drawer.
Interpretation and action: "Storing" as a use phase example is found interesting for possible insights it may provide such as; what happens to the product when it is not in use. Thus, it was added in the revised version of EC.
Sensorial feedback in **Experience Chart**
Suggestion: UR suggested that it might be useful to provide examples for sensorial feedback as well.
Remark: RP was able to spot two sensorial feedbacks, both of which were visually communicated to user: RP also indicated the lack of an expected feedback by noting down "nothing happened" corresponding to the use phase "plugged in".

Interpretation and action: Sensorial feedback might be challenging to spot, as they might not be very obvious. Spotting sensorial feedback might be more challenging for undergraduate design students, as they would less experienced than RP. For the revised version of Experience Chart part, I tried to provide some examples, such as on/off light illuminated, referring to visual feedback; alarm sound, referring to auditory feedback; coffee smell referring to olfactory feedback, etc. However, they seemed to be too specific and not very inclusive. As an action, I removed the initially stated "auditory, visual, etc." in the parenthesis under the "sensorial feedback" and simply left its interpretation to the researcher.

Use phases in **Experience Chart**

Remark: RP put dots on the chart before indicating a use phase. Later, RP drew arrows starting from this dot to connect it with the corresponding experience observation, comment note.

Interpretation and action: Indicating the position phases and making visual connection with corresponding experience could help design students while navigating during the observation process. For this reason, I added predefined dots into the chart to direct researchers.

Experience observation, comments in **Experience Chart**

Remark: RP asked questions in order to clarify and understand the underlying reasons behind some of the observed phenomena while UP was still engaging with the activity. UP was also talking during the process and was giving explanations about some of her actions. For example, the RP indicated "washed" as one of the use phases, while UP was washing the used blade of smoothie maker. During this washing period, UP stated that the part being washed "should not wait [as dirty]". RP noted down this statement on the experience observations, comment part in relation to that specific use and asked UP the reason of this. UP stated that "if it [dirty blade] waits too long, I need to wash it with a brush" implying the remains on the blade can get dry, and it is hard to remove when it is stayed like this. Following that, RP indicated in parenthesis "washes with a brush if it [dirty blade] waits too long" under the statement "should not wait".

Table 3.6 Pilot session findings of the Experience Chart part in the EC Guide and their interpretations (cont.).

Interpretation and action: User observations via the EC Chart as being participant observation are in the form of observer as participant (see section 2.1.2.2), as the identity of researcher is obviously known by the observed user, and the aim of the researcher is to collect information about the activity of inquiry rather than participating in the activity. That is why communication between the researcher and the user during the observation is acceptable. However, abovementioned remark also proved to be useful as asking questions for better understanding of phenomena reveals more related insights. In other word, conversation between researcher and user might be fruitful for clarification and thorough understanding of the experience of user, and this could be encouraged. For this reason, I indicated the following statement in the revised version of Experience Chart part the following statement: "You may encourage user to talk through the process by asking questions."

Remark: RP neglected to indicate the perceived nature of observed experiences as (+) positive, (0) neutral, or (-) negative. RP explained later that there was simply no time for that while hurrying for noting down the other elements in the chart. My observations also support what RP stated.

Interpretation and action: Observing user while engaging with a household activity may include quite a few steps occurring in a fast pace. Requesting inexperienced design students to pay attention to many considerations may be challenging and demotivating for them. That is why I decided to eliminate this part to be filled out during the main observation period for the revised EC Guide. I concluded that observed experiences can be reevaluated with respect to the nature of the experience while analyzing the collected data after the observations.

Experience Chart in General

Suggestion: RP suggested and UR agreed that a filled example could be provided for the Experience Chart part to effectively direct researchers.

Interpretations and action: An exemplary filled out chart might be more beneficial to communicate the aim of Experience Chart rather than verbal and textual instructions provided. However, due to the two reasons, I did not provide an example: Firstly, I did not want to constrain design students in terms their interpretation of the Experience Chart part, contextually and graphically, and wanted to examine the style applied. Secondly, there was not enough space in the layout of the EC Guide to provide such an example.

Apart from the abovementioned changes, I added an explanatory text on the top right corner about what would be expected from this part. Also, I moved the exemplary use phases to the top left corner. The revised version of the Experience Chart part is available in Figure 3.8.

Findings of After-use Interview Part: For this part, the participants did not generated any suggestions. Apart from the *negative experiences* subcategory, RP was able to note down insights for the rest of the subcategories provided by the UP. However, when I examined and interpreted the content of these insights and their associated subcategories, I reached to the conclusion that some of the answers could have been placed into different subcategories rather than their current place. For example, indicated experience for the *repair-upgrading history* was "Blade for chopping onion has been lost. Since never had been used, the participant does not know where it is." This insight is a past experience referring to negative connotations. However, as UP provided the answer for *repair-upgrading history* subcategory, RP noted down it here although it was more related to *negative experiences* subcategory. I did not find this a remarkable error as I anticipated that the provided insights would be later evaluated by the researcher. I did not make a considerable change in the After-use Interview part. The final version can be seen in Figure 3.9. I only changed the *negative experiences* with *complaints*, as I was not explicitly questioning positive experiences. Either I was going to add another subcategory as *positive experiences*, or change the *negative experiences* with something different. I chose the latter.

EXPERIENCE CHART

This chart will help you identify the specific use phases related to the product. A list of possible use phases are given on the right side, to which you can refer as you fill in the chart. Document your insights into the users' tasks specific experiences and indicate the sensorial feedbacks provided to user if any. You may encourage user to talk through the process by asking questions.

<u>Exemplary Use Phases</u>

Storing / Plugging in / Preparation (e.g filling water, food preparation, etc.) / Turning on / Selecting mode / Task specific action (e.g boiling, grilling, warming-up, cooling down, etc.) / Unplugging / Restoring / Other phases

SENSORIAL FEEDBACKS

USE PHASES

Start

EXPERIENCE OBSERVATIONS

SENSORIAL FEEDBACKS

USE PHASES

Finish

EXPERIENCE OBSERVATIONS

Figure 3.8 Revised version of the Experience Chart part in the EC Guide.

AFTER-USE INTERVIEW

Positive-Negative Experiences

Repair-upgrading history

Complaints:

Appreciated features:

Accidents:

Atypical Use

Atypical or alternative use scenarios:

User Suggestions

Suggestions for improving or modifying:

Dream product features:

Figure 3.9 Revised version of After-use Interview part in the EC Guide.

3.3.6 EC Toolkit: Development of Supporting Materials for the EC Guide

The EC Guide and its parts take care of user observation, once the researchers arrives at the field. However, user observations as a research activity require more than going into the field and observing user. As indicated in Section 2.3.1, there are considerations to pay attention to and to apply within an observational research in order to make the best out of the user observation such as increasing the rigor of the findings and operating within an ethical framework. Yet, design students as being inexperienced in user observations may not be aware of these considerations or unable to apply them. Especially in design education, considerations referring to the whole process of the user observation should be communicated to design students, and the steps involved should be made explicit, if the aim is to provide students with observational research skills as a learning outcome. For this reason, I developed additional materials mostly referring to the considerations applicable to before and after user observations; and created the EC Toolkit including these materials and the EC Guide.

In order to identify additional materials to provide a holistic user observation research, I followed a strategy represented in the Table 3.7. I initially listed the considerations, and matched them with the materials and knowledge sources which were already present at that moment. These sources were the EC Guide for user observations; the project brief for *the OpenKitchen Project* almost in its final form; the phases of the project and the activities to be held within studio, including literature search activity and disassembly-assembly session for electric appliances. Also the studio team was about to prepare a design research brief to inform the design students about literature search and user observations phases, which were decided to be supported with a critique session prior to their presentations. Following to this matching, I developed supporting materials for the considerations not having a correspondence or the ones requiring more elaboration through additional support. They are highlighted in Table 3.7.

Table 3.7 The development of the supporting materials for the EC Guide.

	User observation considerations	Supporting Material	Nature of Support
BEFORE USER OBSERVATIONS	**Research planning** (defining the goal and scope of the user observations)	The *OpenKitchen Project* brief	Provides criteria for the goal and the scope to be interpreted and considered by the students.
	Learning the domain (making researchers familiar with the activity of focus)	Literature search presentations	Students learn about the domain during preparing their presentations; listen to each other's presentations which are also shared online.
		Disassemble assemble session for electric appliances	Students get familiar with the working principles of the related products in a studio activity.
	Participant Selection (selecting the right type of participant to be observed)	The Open Kitchen Brief	Target user group is explicitly indicated in the project brief, students select the participants accordingly.
	Preparation for the field (making researchers ready before going to user observation)	EC Briefing (in design research brief)	Students gets familiar with the user observations via EC Toolkit through a written text.
		Critique sessions for Design Research	Students make themselves familiar with the EC Toolkit, and ask clarifying questions in the session.
DURING UO	**Introduction**	EC consent from	Students submit the form to their participant to inform them about the research.
	Warm-up	Pre-use Interview part	The main parts are presented in EC Guide and their aims are explained in detailed in Section 3.3.4.1 and Section 3.3.4.2.
	Main observation period	Experience Chart part	
	Wrap-up	After-use Interview part	
AFTER UO	**Analyzes and interpretation**	EC Poster Template	Students prepare their posters in a semi-standard format.
		EC Poster Example	Guides students during the poster preparations.
	Presenting and sharing	EC Posters as delivery	Students present their posters and listen to each other's presentations

EC Briefing in Design Research Brief: I developed the EC Briefing to be incorporated into Design Research Brief for *the OpenKitchen Project* (see Appendix C). In the design research brief, the user observations via the EC Toolkit are defined as the second design research activity, to be conducted after literature search activity. For the whole design research phase, the studio team identified eight diverse topics in relation to cooking processes (Table 3.8) to be later assigned to eight teams. The teams conducted their literature search and user observations on their assigned topics.

Literature search briefing: The aim is to make students familiar with the project topic prior to the idea generation phase of the design process. This familiarization also empowers students before conducting user observations, by helping them gain knowledge about the domain before they go into the field. The studio team suggested the following considerations to take into account while searching the literature: cooking processes; how related product works; safety issues and measures; product maintenance and product part replacement; effective use of resources for household appliances; and existing open source and DIY examples. Potential sources of literature search are suggested: online resources such as websites, library databases and e-journals, forums, blogs and videos; online and offline books, magazines and other published material; observations at technical services, and observations at shops and shopping malls. The delivery format of the literature search is specified as PowerPoint presentations.

EC Briefing for user observations: In the written briefing for user observations, each team was asked to carry out two user observations on the specific cooking types assigned to them. I suggested one of the team members to be responsible for documenting the observation through photographs and video recordings, and the other team members to take notes on the form provided. I introduced the Experience Chart Guide to be utilized in the user observations by mentioning about its parts as below:

> - Pre-use interview includes user characteristics, product features and use environment.

- The experience chart part explores use phases while the users are preparing, cooking, serving, cleaning, etc. While observing the user, you will take notes on the experience chart to highlight task-related experiences. The chart will help you identify the specific use phases related to the product. A list of possible use phases are given on the experience chart, to which you can refer as you fill in the chart. Using this chart, you will be able to document your insights into the users' task specific experiences both visually and verbally. You are required to take photographs for each use phase.

- After-use interview involves an evaluation of the users' positive and negative experiences, atypical use situations and overall suggestions.

EC Consent Form: I adapted the consent form from previous years. The students provided the participants with that form prior to the user observation. The aim of preparing a consent form is to make it explicit for design students that they have to inform and have their participant's consent in order to conduct a research within a research ethics framework.

I developed the consent form over an existing one provided to students for the previous year's project. In this consent form, the following information and statements were included: who is responsible for the carried research; the aim of the research in relation to cooking process; what will be done with the gathered and recorded data during the observations, and a statement related to confidentiality of the study. Also, the participant's right to withdraw from the research anytime without giving any reason is communicated as written. Before starting their research, the students are encouraged to communicate verbally the details stated in the EC Consent form to the user.

EC Posters (EC Poster Template, EC Poster Example): The EC Posters are the final presentation mediums of the captured user observations by design students. Its design is semi-standard, which gives flexibility to the student within a predefined main layout. This layout is in line with the EC guide and its elements, so that design students can easily relate and transfer the information into the EC Posters. Due to the semi-standard nature of the posters, the students can easily navigate within the posters prepared by other teams to find out the necessary information.

The EC template, as its name suggests, is a digitally prepared template through which the students can create the EC Posters. Preparing a template instead of solely leaving the presentation approach to the design students makes the elements to be involved in the poster explicit. Figure 3.10 is the exported image of EC Poster Template prepared in Adobe Illustrator program. It consists of two main parts. Largest area in this template is allocated to use phases accompanied with corresponding insights gathered from the user observation. It is the interpreted and analyzed version of findings transferred from the Experience Chart part in the EC Guide. Below, this second main part consists of four elements: a space for an image to show the use environment; pre-use interview part summarizing the findings of the related part; after-use interview part summarizing the findings of the related part; and finally conclusions & dimensions part in which students present at least four conclusions and six dimensions based on these conclusions.

The EC Poster Example (Figure 3.11) is prepared to guide and inform design students on how to prepare their posters by use of the EC Poster Template with the information gathered through the EC Guide. It uses some of the data and images gathered from the pilot session, and includes textual explanations on how to present the insights under use phases and how to communicate the interview insights in the template.
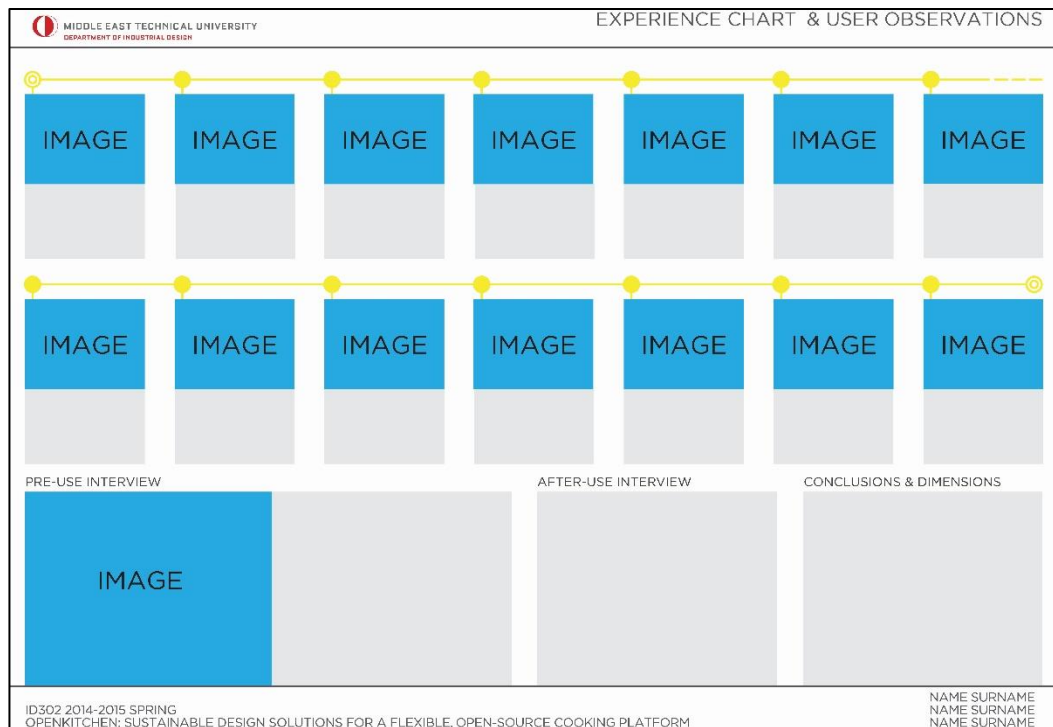
Figure 3.10 Rendered image of the EC Poster Template
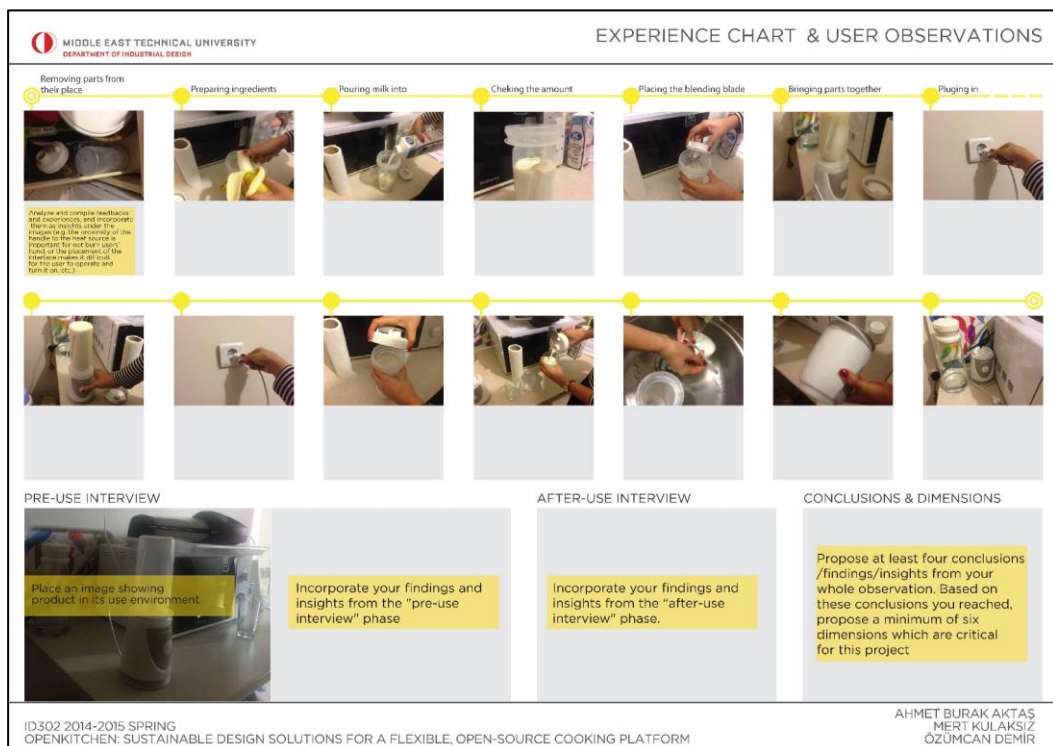
Figure 3.11 The EC Poster Example

CHAPTER 4

PRIMARY RESEARCH: INTEGRATION AND EVALUATION OF THE EC TOOLKIT V1 WITHIN AN UNDERGRADUATE DESIGN PROJECT

This chapter explains the integration and evaluation of the EC Toolkit V1 within a third-year undergraduate design project, namely *the Open Kitchen Project.* The Project was carried out in the Department of Industrial Design at METU from March 24th to May 22nd. The details about the project are already covered in Section 3.3.3 as it has informed the development of the EC Toolkit V1.

Integration involves the introduction of the EC Toolkit V1 to the design students; elaboration on it through the critique session; and students' presentations of their user observation findings through the EC Poster V1. Evaluation covers the semi-structured interviews conducted with the students; analyses of these interviews together with the EC Guide V1s used by students during their observations and the EC Poster V1s that they had presented; and the communication of findings with their interpretations and related suggestions.

4.1 Introductory Session

The OpenKitchen Project started with an introductory session in the studio. The project brief was handed out to the students, and the studio team went through each item in the brief to explain in detail what this project is all about.

25 students participated in *the OpenKitchen Project*. The studio team asked them to form eight teams —seven of which consisting of three team members, while the remaining one consisting of four. Following the formation of teams, a representative student from each team drew lots to decide on their team numbers. Teams numbered from one to eight had been already assigned with cooking types

in the design research brief. In doing so, which team to conduct the design research on which cooking type was also identified (Table 4.1).

Table 4.1 Teams and their assigned cooking types for the design research

Team 1: Toasting
Team 2: Grilling
Team 3: Tea/Coffee Making
Team 4: Warming-up, bain-marie
Team 5: Boiling (egg, water, pasta, soup, etc.)
Team 6: Steam cooking
Team 7: Roasting, baking
Team 8: Frying

After the formation of teams, the design research briefs were distributed. The studio team explained what was expected from the literature search phase, and I explained the same for the user observations phase. During my explanation, I introduced the EC Guide V1, its parts, how to navigate through the parts of the EC Guide V1, and how to present the findings and the insights gathered. I let them know that all the elements of the EC Toolkit V1 would be available at *ODTUClass*, the online file sharing platform of METU.

The studio team planned the calendar for the design research phase of the project as shown in Table 4.2. Prior to the presentations both literature search and user observation activities, the studio team held critique sessions related to them.

Table 4.2 Calendar for the OpenKitchen Project's design research phase.

March 24th	Introductory session (to the project and to the design research phase)	Approx. 3.30 hours (in total)
March 27th	Critique session (on the literature search and the user observations)	Approx. 3.30 hours (in total)
March 31st	Literature search presentations	Approx. 4 hours (30 minutes for each)
April 3rd	User observation presentations via the EC Posters	Approx. 4 hours (30 minutes for each)

4.2 Critique Session

The studio team divided into two for this critique session. I facilitated the critique session for the user observations phase, and the rest of the studio team gave critiques on the literature search phase. Students came prepared to this session. For the literature search critiques, they brought their draft presentations consisting of their preliminary findings. For the user observations, I had already asked them to make themselves familiar with the features and elements in the EC Toolkit. I had also encouraged them to conduct a rehearsal before coming to the critique sessions. They brought print outs of the EC Guide V1 and the EC Consent form V1, and I made the EC Poster Template V1 and the EC Poster Example V1 available on a notebook computer.

None of the teams appeared to complete a rehearsal session. I also noticed that the majority of them did not thoroughly examined the elements of the EC Toolkit V1 and did not select their participants yet. It seems the priority was given to the literature search as its presentation was earlier than user observations.

I talked to each team for approximately 10-15 minutes. During the session, I reemphasized a few points such as documenting the observation through taking pictures, defining the role of team members, finding the right type of participants and informing participant through the EC Consent Form V1 before the observations. I made a short demonstration for each team on the anticipated use of the EC Guide V1 during the observations and showed how to transfer gathered information into the EC Posters V1.

Atypical use category and *spatial arrangement of product in relation to other products* subcategory were explained in detailed, as some teams could not find out what they mean. The difference between *sensorial feedback* and *experience observation* was not clear for some teams as well. Team 6 shared their concern on conducting one of their user observations in the office environment as stated in the design research brief; because, their topic was steam cooking and it was not common in offices. In this case, I suggested them to find another environment different than the home as a substitute to the office.

4.3 Presentations of the User Observations via the EC Poster V1s

Each team presented their posters in the studio (Figure 4.1). The presentations were open to all students. The studio team evaluated those presentations, made comments about the findings and insights. They gave formative and summative feedbacks both on the findings and the insights, and how those were delivered via the EC Toolkit V1. I noted down feedbacks from the studio team in relation to the EC Poster V1s along with my personal insights. In the following stages of this study, I also incorporated those insights for the development of the second version of the EC Toolkit V1.

Figure 4.1 Images from the EC Poster V1 presentations.

When the presentations were finished, the studio team asked the students to hang their posters on the studio's wall (Figure 4.2). The purpose of this was to make all findings available and easily accessible to all the studio members. At the end, the purpose of making each team to focus on different cooking types in relation to the project was providing the studio members with comprehensive findings, which could not be reached by a single team within the given time.
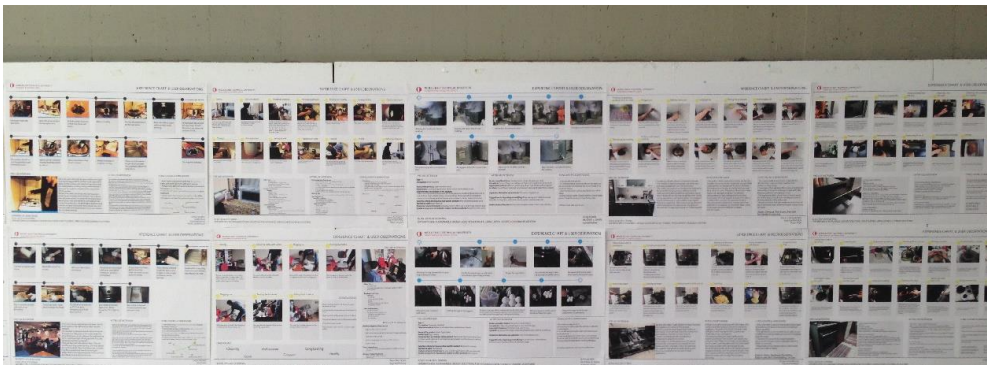
Figure 4.2 Caption from the displayed EC Poster V1s on the studio wall.

Figure 4.3 One of T2's EC Poster V1s prepared on toasting activity.

4.4 Semi-structured Interviews

In order to get feedback on the user observations completed via the EC Toolkit V1, I conducted eight semi-structured interviews with the participation of each team. As a qualitative data collection strategy, semi-structured interviews employs a set of predetermined but open-ended questions (Ayres, 2008).

I started to interview each team with the participation of all the team members. However, one participant from Team 8 left the approximately 32 minutes long interview after the first 11 minutes due to personal reasons. I audio recorded each session and took interview notes. Duration, date and the number of the participant information regarding the interviews are shown in the Table 4.3.

Table 4.3 Duration of the interviews conducted for Primary Research.

Teams	Number of Participants	Interview Date	Interview Duration (mins)
Team 7	3	April 7th	37:28
Team 1	3	April 10th	31:23
Team 4	4	April 10th	28:15
Team 8	3	April 13th	31:48
Team 2	3	April 15th	28:10
Team 3	3	April 15th	26:24
Team 6	3	April 15th	28:48
Team 5	3	April 22nd	20:47

I piloted the interviews with Team 7, after the EC Poster V1 presentations held on April 3rd, and finalized them with Team 5. I planned to conduct the interview with Team 5 on the April 17th; however, I postponed it due to the one of their member's absence. The difference between the duration of these two interviews — approximately 16 minutes— might stem from the time passed after Team 5 conducted and presented their user observations, as this might cause difficulties to for T5 remember the user observations. In addition to that, followings might be also reason for this time difference: Only one member of the Team 5 conducted both of the user observations, which made naturally other two members to answer specific questions not applicable; and I, as the interviewer might became more competent

in questioning and navigating through the materials in the interview protocol (section 4.4.1).

4.4.1 Participant Profile

25 Industrial Design students studying full time at the Department of Industrial Design in Middle East Technical University (Ankara, Turkey) participated in the interviews. They represented all the students taking the third-year second semester Industrial Design studio must course.

There were three students who were not from Turkey: two from Iran and one from Indonesia. One of them was the member of Team 1 and was quite competent with Turkish. She has chosen Turkish over English as the interview language. Other two were members from Team 3 and Team 8. These teams' interviews were conducted predominantly in English, however; Turkish is also used frequently for clarifying some questions to the participant whose first language is Turkish.

4.4.2 Interview Settings

Pilot session took place at the 4Y10 classroom of METU Faculty of Architecture. It was a quite small classroom. It had a big table on which protocol materials could be spread easily and the participants could move around it comfortably. It also had a projector through which I could show the EC Poster Template V1 and the EC Poster Example V1 digitally. However, after the pilot session I found gathering around a big table setting me and participants apart and not creating a very interactive setting. Also, I found this environment kind of 'serious' and 'cold'. For the rest of the interviews, I used the Archive room of METU Department of Industrial Design, located in the Faculty of Architecture. This environment was more 'friendly' in my opinion and navigating through the protocol materials was easier. Figure 4.4 shows a picture representing the interview setting in this room. The participants sat on the three chairs in the same row which were facing to the protocol materials and the chair on which I sat.

Figure 4.4 Representation of the interview setting for the Primary Research.

4.4.3 Interview Schedule and Protocol

In the interview schedule, I categorized the interview questions into four main parts in relation to different stages of the EC Toolkit V1 application. The overall aim of those questions was to understand the difficulties that students encountered during the user observations, and their suggestions for improving the components of the toolkit. Prior to asking those questions, I added an introduction part to explain the aim of the interview.

From the introduction of user observations via the EC Toolkit V1 as an assignment to the presentation of findings; the students were introduced with and they have created quite a few materials such as the EC Guide V1, the EC Poster Template V1. In order to make best out of the semi-structured interviews and help students to recall their processes and related experiences, I supported the interview schedule with these materials, i.e. protocol materials. Table 4.4 shows main parts of the interview schedule, and the accompanied protocol materials to these parts.

Table 4.4 Interview schedule parts and their accompanying protocol materials for Primary Research.

Parts	Focus	Protocol Materials
0	Aim of the interview	- Consent forms for interviewed team members to sign
1	Introduction to UO via the EC Toolkit V1	- Design Research Brief, - EC Consent form V1 - Empty EC Guide V1
2	UO via the EC Guide V1:	- Empty EC Guide V1, - EC Guide V1s filled out by the interviewed team
	2. A) Pre-use Interview part	
	2. B) Experience Chart part	
	2. C) After-use Interview part	
3	The Interpretation of data and preparation of the EC Poster V1s.	- EC Guide V1s filled out by the interviewed team - EC Poster V1s prepared by the interviewed team - EC Poster Template V1 - EC Poster Example V1
4	Closing remarks	Same as above

Although there was an environment change after the pilot session, the protocol of the interviews were same for all the team interviews. Table 4.4 shows in which order relevant materials are presented to the participants. Also, I presented all the protocol materials in the format that the participants utilized during their engagement with the user observations. For this reason, I showed the EC Poster Template V1 and the EC Poster Example V1 on a notebook. Table 4.5 shows the final content of the interview schedule as it is used during the interviews. After the pilot sessions, I only made small changes in the wording of the questions.

Table 4.5 Content of the interview schedule for Primary Research.

0. Aim of the interview

This interview is for getting feedback from you about the user observations that you completed within the OpenKitchen Project. You were expected to collect data from users with the help of the EC Guide and then to transform gathered information into EC Poster in a format provided to you. We would like to know how you would assess the whole process, and get some suggestions for improvement. So that, we can develop it for upcoming projects.

This interview is not a part of course evaluation/grading. Information gathered during this interview might be used for thesis studies, in design process, scientific publications and in presentations. Interview will be recorded through audio-recording and it should be around 30 minutes.

1. Introduction to User observations via the EC Toolkit

Introduction to the EC Toolkit, with a particular focus on the EC Guide, and explanation on how to use this toolkit for user observations were communicated to you in a written brief and verbally. Then we gave you time to explore this toolkit and had a critique session afterwards to clarify the unclear parts regarding the user observation via the EC Toolkit.

Questions: (i) How would you assess the introduction to user observations via the EC Toolkit? To what degree was it clear to you before conducting user observations? **(ii)**What would you suggest for improving the introduction part?

2. User observations via the EC Guide

Questions: (i) Approximately how long did each of your user observation take? **(ii)** How many of you participated in each of the user observations? **(iii)** What kind of preparation did you make prior to user observation (i.e. making a rehearsal, or sharing roles for taking notes, taking photo)?

2. A) Pre Use Interview Part: *In this part, you get information about the user, product features and use environment of this product. How would you evaluate this part in general? What kind of process did you follow in this part?*

Table 4.5 Content of the interview schedule for Primary Research (cont.)

Questions: (i) How would you assess this part regarding its positive and negative sides? **(ii)** How would you assess the categories and subcategories in this part? Are there any categories or subcategories that you had difficulties in particular? Are there any categories, subcategories or questions that you would like to add here? **(iii)**What would you suggest to improve this part?

2. B) Experience Chart part: *While observing the user in a task related activity, you were expected to take notes on the Guide regarding the feedbacks, use phases and experience observations. Simultaneously you recorded voice and images. Could you tell about your process for each of the observation?*

Questions: (i) How would you evaluate this part regarding its positive and negative sides? **(ii)** While you fill out the chart, did you had any difficulties? If yes, could you please explain what these difficulties were by giving examples? Do you have any suggestions to eliminate these difficulties? **(iii)** To what degree it was helpful to you having a short explanation in here? **(iv)**To what extent did you make use of exemplary use phases given on the guide? **(v)** Were you able to take notes about feedbacks on this guide? **(vi)** Were you able to take notes about experience observations on this guide? **(vii)** To what extent was the Experience Chart clear to you in terms of its graphics? **(viii)** In general what would you suggest to improve this part?

2. C) After-Interview *Part: In this part, you collected information about user's positive-negative experience with the product, atypical uses of the product and ask for user suggestions. What kind of process did you follow in this part?*

Questions: Same as the Pre-use Interview part questions.

Table 4.5 Content of the interview schedule for Primary Research (cont.)

3. Preparation of the EC Posters
By analyzing and interpreting the information and materials gathered from user observations, you have prepared your EC Posters in a format provided to you. In general, could you explain your process? **Questions: (i)** How would you assess this poster preparation process regarding its positive and negative sides? **(ii)** To what extent was it clear to you how to transform information and materials gathered from user observation into EC Posters? **(iii)** To what extent was the EC Poster Example helpful to you? What would you suggest for the improvement of the EC Poster Example? **(iv)** How would you assess the EC Poster Template given to you regarding its positive and negative sides? What would you suggest for the improvement of the EC Poster Template? Can you give examples on the EC Posters that you prepared? **(v)** Were you able to adjust this template according to your needs? If yes, how? Considering the whole process, do you have any additional suggestion for improving the EC Poster preparation?
4. Closing Remarks
Questions: (i) For the later stages of the project, how and to what extent do you plan to make use of the EC Posters prepared by you and your friends? **(ii)** You have completed user observations for previous projects as well but you were not provided with a guide and directions on how to transform information gathered from these observations. Could you please make a comparative evaluation? **(iii)** Do you have any additional comments?

4.4.4 Data Analysis

Team interviews provided rich qualitative data. I verbatim transcribed the data recorded in order to protect the richness of the content. I decided to study transcribed data through two main phases: organization phase, and analysis phase.

Organization phase: Initially, I transferred the transcriptions for each team's interviews into a single Office Excel worksheet in order to navigate between them easily (Figure 4.5). I created eight sheets in total corresponding to eight teams. Within each sheets, I followed the steps and considerations mentioned in the following paragraphs.

Figure 4.5 A caption from organized transcriptions of the interviews for Primary Research.

Since I interviewed the members of each specific team together, I indicated each member's comments in a separate column in order to keep the individual perspective. I found this separation important as members frequently discussed with each other and occasionally provided opposing comments. Also, most of the user observations were conducted either individually or by two members. Therefore, user observations related experiences were not only different among the teams, but between the members of the same team as well.

While indicating the members' comments, I followed the order of answers as they provided in the interviews. I also made use of headlines in line with the interview schedule parts as shown before in Table 4.4. In addition to that I used light grey and dark grey backgrounds to group some successive comments to indicate that members were talking about the same topic. Simultaneously, I took notes in relation to these grouped comments according to what they specifically refer to. By doing so, I started to have some themes which would later direct me in the in the analysis phase.

One thing I realized during this organization phase was that the participants usually provided answers referring to issues of user observations, other than its questioned part. This was highly present in the 'introduction to user observations via the EC Toolkit V1' part. That is why I occasionally felt the necessity of repeating the question by emphasizing "was it clear to you what you were going to do with in your user observations via the EC Toolkit V1?" However, never did I interrupt the participants and I let them express their answers when they were not talking about the introduction part specifically. While analyzing the answers given, I transferred these answers to the related parts of the EC Toolkit V1 findings and evaluated them within these parts.

Analysis phase II: Once I completed organizing each team's interview according to parts of the interview, I started to reorganize them by bringing together each teams comments referring to the same or similar context. For example, Figure 4.6 shows the distribution of the Pre-use Interview part findings in line with its categories — user characteristics, product features, use environment, with an additional sheet named as 'general' including the findings referring to the whole Pre-use Interview part.

Figure 4.6 Caption from Pre-use Interview part findings in an Office Excel worksheet showing the sheet referring to it subcategories.

Later, I combined the findings in relation to commonalities where possible, and interpreted them as highlighted with yellow background in the Figure 4.7. While doing so, I made use of the submitted EV GuideV1s from students in relation to themes where possible (Figure 4.8). For example, if I was engaging with the findings in relation to *spatial arrangement of product in relation to others,* I checked the related parts in the guides. If something significant to my understanding had appeared, I indicated it as well. I made use of the presented EC Poster V1s for the 'interpretation of data and preparation of the EC Poster V1s' part. Finally, I communicated the combined findings and their interpretations as they presented in the following section.

Figure 4.7 Caption from Pre-use Interview part findings showing the findings aligned to specific themes.
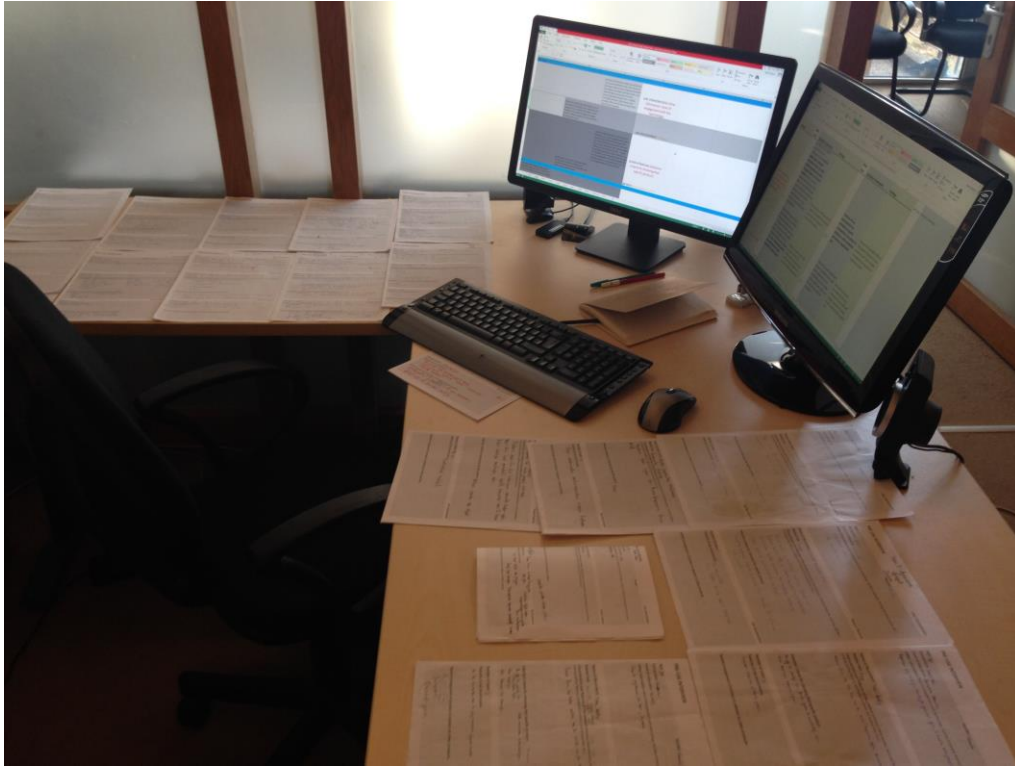
Figure 4.8 Examining the submitted EC Guide V1s while interpreting the findings of the interview conducted for Primary Research.

4.5 Findings and Their Interpretations

While communicating the findings and their interpretations, I abbreviated the team names, e.g. 'T1' for 'Team 1'. I tried to indicate the individual perspective of members instead of ascribing their statement to their whole team in such cases: when a finding coming from an individual statement opposing to other team members; and when the statements referred to a user observation conducted by an individual —which was very common. I signaled such cases by using phrases such as "one member from T1".

4.5.1 Introduction to User Observations via the EC Toolkit V1

This part stands for the introductory session for user observations via the EC Toolkit V1 —with a particular focus on the EC Guide V1—; the EC Briefing V1 presented in the design research brief; and the critique session for clarifying issues prior to the user observations conducted by the design students.

Six teams out of eight (T2, T3, T4, T5, T6 and T8) explicitly expressed that they found the introduction part clear, by providing general comments such as "helpful" and "clarifying". Apart from this general finding, I communicated the more specific ones in relation to the following topics: the clarity of the EC Toolkit V1; the perceived workload; the benefits of the critique session, the benefits of providing examples; and making learning outcomes explicit.

The clarity of the EC Toolkit V1: T2, T4 and T8 particularly stated that even without an introductory session, the EC Guide V1 was "self-explanatory" enough to understand when it was reviewed in detail. T2 expressed that they felt worried during the introductory session, because the initial explanations on the EC Toolkit V1 was vague for them and not relatable to their previous knowledge or experiences. However, T2 found the EC Toolkit understandable after reviewing it in detail.

The perceived workload: For T7, the high number of the categories and subcategories made them frustrated as the first impression. However, later they understood that each of these were proved to be critical for user observations, and they needed to be addressed. Although communicated for the EC Poster V1s preparation, T3 complained about the workload of the EC Toolkit V1, as they had other classes and responsibilities. They stated that actual user observations was not taking too long, but managing time for the arrangements was challenging within the time given for the submission.

The benefits of the critique session: Members from T5, T6, T7 and T8 put emphasis on the benefits of having a critique session before conducting the user observations. As a general comment, T6 simply pointed out that it was "helpful" and T7 mainly indicated that "not-well-understood" parts were clarified. T8 specified an issue regarding the difference between *experience observation* and *sensorial feedback* positioned in the Experience Chart part in the EC Guide V1 and the elimination of this issue thanks to the critique session.

The benefits of providing examples: T5 and T7 indicated how useful it was to go through the EC Poster Example V1 during the critique session in order to get an

idea of what was expected from the user observations. T5 explicitly demanded an example of the Experience Chart part in the EV Guide V1 showing the anticipated use of it.

Making learning outcomes explicit: T1 suggested that it should be explicitly communicated to the design students the benefits and learning outcomes of user observations captured via the EC Toolkit V1, while introducing it. By knowing these, design students might be motivated to engage with the user observations more enthusiastically.

Interpretation and suggestions: To start with, the number of the positive feedbacks about the clarity of the introduction part is pleasing. However, solely relying on design students' statements could be limited for the improvement of this part. Through the triangulation with the rest of the interview findings and the findings reached through the examination of the submitted EC Guides V1s, I realized that a more comprehensive introduction part was needed. For example, quite a few teams stated having difficulties while identifying *sensorial feedback* and differentiating them from the *experience observations*, during the Experience Chart part of the interview. Also, I noticed that the content of some notes taken on the Experience Chart part did not match with their assigned layers —*sensorial feedback, use phases* and *experience observations*, when I examined the submitted EC Guides. These findings were not shared by the majority of the design students. Nonetheless, they definitely imply the need for interventions in this part to make novice designers familiar with the user observations via the EC Toolkit V1.

The critique session was proved to be useful in making students familiar with the user observations via the EC Toolkit V1, but not thoroughly. The main reason behind this is that the students only tried to discover these issues by looking at the materials provided in the EC Toolkit V1, but they did not try to engage with them. Although they were encouraged to rehearse before coming to the critique session, none of them appeared to conduct this.

Rehearsing requires a dedication of time and motivation to arrange it. The students might feel overwhelmed under the perceived workload, and might not be willing to

arrange a rehearsal by themselves. This was evident when some of the students felt worried because of the perceived density of the EC Toolkit V1 and the requirements of it. At this point, the studio team can step in and organize the rehearsals. Otherwise, the design students would actually take a pen and try to take notes on the EC Guide V1 when they are conducting their first user observation assignment without rehearsing.

Rehearsal session can be conducted in the studio environment and can be specific to the Experience Chart part, as this part has the most unfamiliar characteristics for the design students. The rest of the parts could be demonstrated by a studio team member. Each of the students could try take relevant notes on the EC Guide V1 when observing one participant (this could be a member of the studio team, or a guest). Later, all the members of the studio could talk about the detected issues. Alternatively, rehearsals can be conducted with each team separately with the involvement of one studio team member. By doing so, it would be easier for the studio team to identify issues specific to the individuals and also students could ask questions for clarifications. As it was the case with the EC Poster Example V1 in the critique sessions, 'showing' instead of 'telling' proved to be a more efficient way for the design students to understand user observations via the EC Toolkit V1. In that sense, 'doing' would result in having a better understanding of the toolkit by leaving the students with the experience of it.

Apart from the rehearsals, introduction could be made more visual and the EC Briefing V1 could be more detailed in terms of explaining elements and directives in the EC Toolkit V1. A PowerPoint presentation could be used with examples showing the utilization of the EC Toolkit V1, instead of just telling. This can be later made available online for the students to refer to. The EC Briefing V1 can turn into a booklet explaining the process step by step, and providing the considerations more in detail. This would also be useful for the novice design researchers who are not design students conducting user observations within an educational project. A booklet consisting of guides would make the EC Toolkit V1 self-exploration. These PowerPoint presentations and the booklet should also include the items explaining the benefits of conducting user observations via the EC Toolkit V1 and potential

learning outcomes, as some students requested. Although I had verbally communicated to the teams the rationale behind the toolkit and what it would provide, it seems that this requires more emphasis.

4.5.2 User Observations via the EC Guide V1 Details

Details about the user observations conducted in the fields can be found in Table 4.6. None of the teams conducted a rehearsal session before going to the field. That is why it is not given in the table. I explained the rest of the details below:

Presented User Observations: Teams submitted 18 user observations in total for evaluation. The required number of the user observations per team was two, but T1 and T6 submitted one extra user observation. T1 did so because they decided to work individually from the beginning to the end; therefore they found each member to engage with one single user observation fair. T6 conducted three user observations in order to vary the participant profile and use environment —one home, one outdoor and one industrial kitchen. T8 also stated that they had conducted three user observations, but they did not submit one of them due to its perceived low quality.

Participated members: All team members were required to participate in the user observations, but only two out of 18 conducted with the full participation. This might stem from time constraints to conduct two user observations and dynamics between the team members. I indicated the team members separately, e.g. T1-a, to represent who participated in which user observation. One member of T4 and two members from T5 did not participated in any user observation in the field.

Duration: T4's second user observation took two hours because they had interviewed two people and observation took place in a public environment, an open buffet kitchen. T5's user observations took 10 minutes because of the fast pace of the activity —boiling activity through a kettle and milk boiler.

Table 4.6 Details of presented user observations via EC Toolkit V1.

Teams	Presented User Observations	Participated members	Duration (including the interview parts)
Team 1	UO-I	T1-a	Less than 30'
	UO-II	T1-b	Less than 30'
	UO-III	T1-c	Less than 30'
Team 2	UO-I	T2-a, T2-b	Between 20-30'
	UO-II	T2-c	Between 35-40'
Team 3	UO-I	T3-a, T3-b	*Data is not available*
	UO-II	T3-c	*Data is not available*
Team 4	UO-I	T4-a	60'
	UO-II	T4-b, T4-c	Around 120'
Team 5	UO-I	T5-a	Around 10'
	UO-II	T5-a	Around 10'
Team 6	UO-I	T6-a, T6-b, T6-c	45'
	UO-II	T6-a, T6-b	30'
	UO-III	T6-c	More than 60'
Team 7	UO-I	T7-a, T7-b, T7-8	90'
	UO-II	T7-a	Around 25'
Team 8	UO-I	T8-b, T8-c	Between 40-45'
	UO-II	T8-a	Between 40-45'

4.5.3 Pre-use Interview Part

This part's findings are communicated through its categories; user characteristics, product features and user environment**.** Although the interpretation of some of these findings were generalizable for the parts in the form of interviews, I provided them under each category in order to not to remove the specifics.

User Characteristics

The findings of user characteristics category are communicated under three topics: questioning personal details about the user: setting participant at ease; and the presence of other people during the interview.

Questioning personal details about the user: T4 and T8 explicitly communicated their concerns on some of the questions directed to the participants; such as age and level of education. T4 stated that they skipped asking a woman participant her age for whom they thought it would be offensive to ask due to her perceived old age. On the other hand, T8 stated that they asked the question of level of education to their participants, however; they shared that one of their participants felt "uneasy" and "embarrassed" while answering the question regarding the level of education, since he was a primary school graduate and this level of education is perceived unqualified by him.

Setting participant at ease: T2 mentioned that questioning the level of engagement with technology made their user "feel bad" as "she [the user] was not that much into technology and she assumed that she should be a person engaging with technology a lot in order to participate in such a research." Following this comment, T2 stated that they tried to set the participant at ease by indicating that the degree of engagement with technology is just a question, and it is not a criteria to participate in their research.

The presence of other people during the interview: T4 skipped asking the *level of education question* to ask a male participant, because his boss was present in the interview environment and they thought that male participant might get uncomfortable answering this question nearby his boss.

Interpretation and suggestions: To begin with, some questions might make both parties involved in the research feel uncomfortable due to cultural and individual sensitivities: for researchers while asking the question; for participants while answering the questions. This concern was also evident for the *level of income* subcategory which was eliminated after the pilot session. Same can be applied in

here or it might be made explicit for design students to indicate their observational notes rather than asking directly for the related parts.

Additionally, in the observation, user should not feel like that they are tested. This should be made explicit to the design students. One other issue which could make the participant uncomfortable during the interview is the presence of others. Novice researchers might be suggested to conduct interviews privately, if possible.

4.5.3.1 Product Features

The findings of product features category were communicated under two topics: product name and its brand; and the selection criteria for choosing the specific product.

Product name and its brand: T4 shared their confusion in selecting one single product to give details about it —such as name, characteristics and features of the product— as the environment they visited had more than one product from different brands used for the same observed activity. To be clearer, the activity they observed was bain-marie and they visited a cafeteria in order to observe that. However, there were more than one type of products used for the bain-marie activity. T5 and T8 stated that for some products it was challenging to find out the product name since these were not indicated on the product.

Selection criteria for choosing the specific product: One member from T4, by referring to their EC Guides, stated that "I guess the participant did not buy this product, he was an employee using this product." Later on that member added that "I guess the answer for this question was obvious to us as the product was the most rational choice [for the activity of inquiry in the context]." For the same questions, T5 and T6 stated that users may not be knowledgeable about why they chose the product used in the activity; T5 by claiming that in general users usually buy the product without giving it a thought and T6 quoted from participant by saying "Well, it is just an oven."

Interpretation and suggestions: When a questioned category aims for a very specific answer and the researchers are not able find out it, they might feel

frustrated. The goal of noting down the product name and its brand was to be able to get information about the product used in the activity of inquiry later on. This aim should be communicated to researchers, and identifying product name and its brand could be suggested as a way to achieve this aim.

The *selection criteria for choosing the specific product* subcategory appeared to involve problems according to the statements of some of the teams. Interestingly, it is one of the subcategories filled in almost every submitted EC Guide and taken notes are quite satisfactory. However, the related statements of some teams represent something larger as a finding. Common characteristic of these statements is that they are based on assumptions, and these may retract researchers to question the subcategory, or blame the quality of answers provided by the user. Each question has a purpose in the EC guide, but not all of them could lead to satisfactory answers from the user. Design students should also be encouraged to evaluate given answers more in depth, although they might appear to them insignificant.

4.5.3.2 Use Environment

The findings of use environment are communicated under two topics: Documenting the use environment; and the clarity of subcategories in the use environment.

Documenting the use environment: T8 expressed that instead of explaining the use environment with notes, just taking photographs of it might have been easier. T2 specifically mentioned that they did not ask any questions about the environment and just took notes about what is present in this environment. One member from T5 made use of sketches while documenting the environment on the EC Guide (Figure 4.9).

The clarity of subcategories in the use environment: T1 confused about whether *spatial arrangement of product in relation to other products* subcategory refers to the products that the user groups (such as for storing purpose) and keeps them together; or all the products that are used for that observed activity. T8 had difficulties to distinguish *features of use environment* from *spatial arrangement of product in relation to other products*.
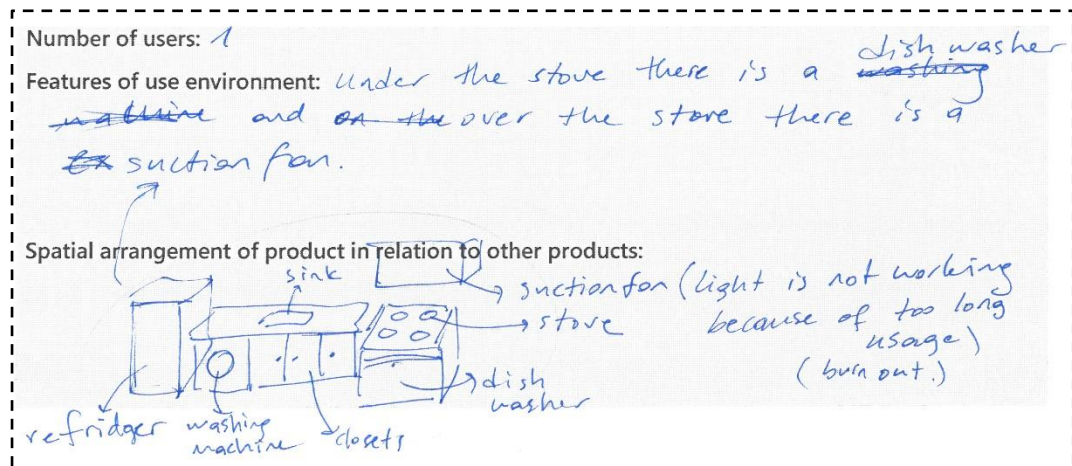
Figure 4.9 An example use of sketches for the use environment category submitted by one member of the Team 4.

Interpretation and suggestions: There are different ways of documenting the use environment such as photography and field notes. The aim of providing subcategories (*number of users, features of use environment* and *spatial arrangement of product in relation to other products)* for the use environment was to make the design students observe carefully what is happening in the environment instead of just taking photographs. This should be emphasized or expressed in a different way, graphically and/or contextual, so that design students do not perceive this category as a substitute for taking photographs. Also, the way of questioning the use environment could be made explicit, since it might confuse the researchers whether they are going to ask it to the user or document what they have observed. T5's sketch representation could be an inspiration for finding a new way to questioning and documenting the use environment, and representing the spatial arrangement of the product in relation to other products. For example, making the diagrammatic relationship between products in the environment and their relation with each other in the use environment could be encouraged.

4.5.4 Experience Chart Part

The Experience Chart part can be contextually divided into two main areas: auxiliary information area at the top of the page consisting of an *explanatory text* and *exemplary use phases;* and the chart in the remaining area which involves three layers of information —*sensorial feedback, use phases* and *experience observation*.

The chart part was designed for taking the relevant notes during the observation, by one or two members of a team; while other member documents the observation through still images.

4.5.4.1 Auxiliary Information

Explanatory text: This short paragraph summarized the expected use of the Experience Chart part in the EC Guide V1 as follows:

> *This chart will help you identify the specific use phases related to the product. A list of possible use phases are given on the right side, to which you can refer as you fill in the chart. Document your insights into the users' tasks specific experiences and indicate the sensorial feedback provided to user if there are any. You may encourage user to talk through the process by asking questions.*

Some teams paid attention to it. T3, T5 and T8 stated that they read it before the critique session, and asked for more clarifications about its content during this session. T4 and T6 stated that they didn't give attention to it before and after the critique session; however, they believed that I covered the content during the critique session. Rest of the teams either did not recognize it or gave no importance to the content of it. An interesting comment came from T7, when one of their members stated that "maybe there could have been an explanation on what was important to pay attention to, for example [look at the] sensorial feedback; so that we would not have missed it". The content of the summary was very similar to what T7 desired. When I showed them the text, they were surprised, and they expressed that the text was not noticeable because of its "long" paragraph format. In the same manner, T4 characterized the text as "long and boring". Both of the teams compared the nature of the text with exemplary use phases and suggested explanatory text to be in the similar format, such as in phrases or in short sentences. This suggestion was also indicated by T3 and T8 later on.

Exemplary use phases: These phases are given as examples for design students to refer to while filling in the use phases in the chart, which are:

Storing / Plugging in / Preparation (e.g. filling water in, food preparation, etc.) / Turning on / Selecting mode / Task specific action (e.g. boiling, grilling, warming-up, cooling down, etc.) / Unplugging / Restoring / Other phases

At least one member from all teams, explicitly or implicitly, stated that they found these examples quite helpful and made use of them before, during and after the user observations. Before the user observations, by examining these given exemplary use phases, the students became more attentive during the user observations. For example, T6 stated that "these examples [exemplary use phases] made us think about what we would usually take for granted" referring to the discovery of "[user] carries the egg boiler in his bag" note inspired from the storing example. During the user observations, the students made use of the exemplary use phases as a quick reference and most of them filled in the chart from among these examples. For example T2 stated that "we directly selected things [phases] from here [exemplary use phases] that we would not have thought of [otherwise]". After the user observations, especially the ones who did not use the form during the user observations made use of the exemplary use phases while preparing the related part in their posters.

Interpretation and suggestions: Explanatory text had been created as a short reminder —being supplementary to what was communicated in the EC briefing and in the introductory session in detail. For this reason, I actually tried to keep its length as short as possible. However, I found this text right now to be very general and not informative enough for novice researchers in terms of 'what is a sensorial feedback'; and 'what is expected from experience observations'.

Suggestion about providing *sensorial feedback* in the form of phrases is challenging as it is rich in types, —such as auditory, visual, and olfactory; and these types can be varied within themselves as well. Still, what is suggested is very relevant and should be considered for the following developments of the EC Guide, simply because explanatory text is overlooked and exemplary use phases are heavily utilized.

A significant conclusion can be drawn as novice designers prefer working with small bits of information that are easy to recognize and process; and they prefer examples showing visually what the expectations are rather than textually and verbal communication of these expectations.

4.5.4.2 The Characteristics of Submitted Experience Chart Parts

The Experience Chart part was anticipated to be filled out during the main observation period. However, it turned out to be that only 6 out of 18 conducted and submitted user observations had this part completely or partially filled out during the main observation period. Due to infrequent utilization of this important part during the user observations, a thorough understanding of the reasons behind is crucial for the later stages of this thesis study including the further development of the EC Guide.

Table 4.7 summarizes the characteristics of 18 user observations in relation the Experience Chart parts in the submitted EC Guides by the students. Two criteria were dominant while describing these characteristics: when this part is filled out and the attitudes of students towards filling this chart out (if they filled it out). At the end, I reached five dominant categories for the submitted EC Guides:

- Solely filled out during the user observation
- Partially filled out during the user observation; revised afterwards
- Filled out after the user observations but prior to poster preparations
- Filled out just for the sake of submission, mostly after the prepared posters
- Left empty

Table 4.7 Characteristics of the submitted Experience Chart in the EC Guide V1s.

Teams	UO	Number of members	Characteristics of the submitted EC Guide V1s
Team 1	UO-I	1	After UO, for the sake of submitting
	UO-II	1	After UO, for the sake of submitting
	UO-III	1	After UO, for the sake of submitting
Team 2	UO-I	2	After UO; prior to the posters
	UO-II	1	Solely UO during
Team 3	UO-I	2	Left empty
	UO-II	1	Partially UO during, revised afterwards
Team 4	UO-I	1	After UO; prior to the posters
	UO-II	2	Partially UO during, revised afterwards
Team 5	UO-I	1	After UO; prior to the posters
	UO-II	1	After UO; prior to the posters
Team 6	UO-I	3	After UO, for the sake of submitting
	UO-II	2	After UO, for the sake of submitting
	UO-III	1	Solely during UO
Team 7	UO-I	3	Left empty
	UO-II	1	Solely during UO
Team 8	UO-I	2	Partially UO during, revised afterwards
	UO-II	1	After UO; prior to the posters

Solely filled out during the user observations: Three out of 18 user observations, Experience Chart part was claimed to be filled out solely during the user observation phase. One of them was from T7 but they just indicated two use phases and two experience observation notes. Other two user observations were from T2 and T6, both of which conducted individually, and they were more in detail compared to T7. Figure 4.10 shows a caption from the Experience Chart part from T2's user observation. T2 and T6 explicitly shared their strategy as initially noting down very short reminders on the Experience Chart part, then later on elaborating on them. T2 did this when user was not engaging with a new phase — such as waiting for water to boil. T6 completed the missing parts right after the main observation period, but still in the field of observation.
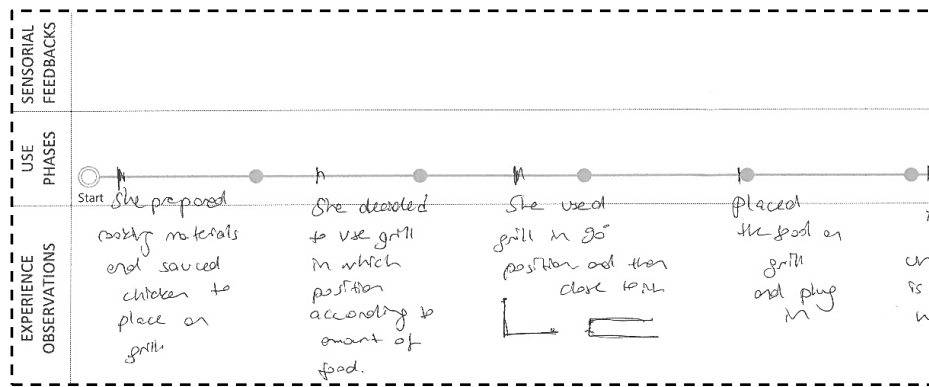
Figure 4.10 A caption from the Experience Chart part filled out solely during the user observations.

Partially filled in during the user observation; revised afterwards: In three out of 18 user observations teams made changes after the observations had been completed in the field. One of them from T3 was conducted individually; and revised in order to just make a clean copy of it without any additions (Figure 4.11). The other two were from T4 and T8, both of which were conducted by two members; and they made revisions not only to make a clean copy of their submissions but also to add the notes that came to their mind later on. T4, for example, stated that they had added sensorial feedback in this way.
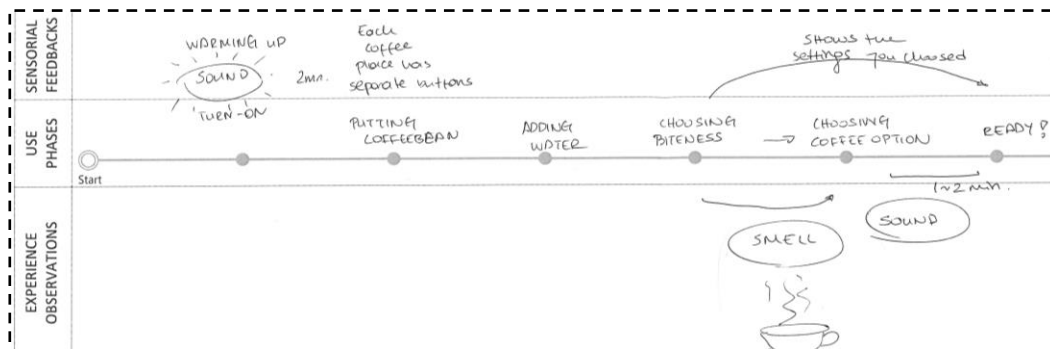
Figure 4.11 A caption from the Experience Chart part partially filled in during the user observation; but revised afterwards by T3.

Filled out after the user observations but prior to poster preparations: In five out of 18 user observations, teams filled out their Experience Chart parts by going through the audio-visual recordings and simply remembering their observations. What makes this category interesting and promising for the later development of

the Experience Chart part is that some of the teams use the EC Guide V1 as a 'worksheet' to study their observations and analyze their findings prior to poster preparations. Figure 4.11 shows a caption from one of T4's user observations, conducted individually. That member explained his/her process as follows: watching the recorded video and highlighting some issues; a follow-up conversation with the participant over highlighted issues; watching the recorded video again while filling in the related layers of Experience Chart part, as an important tool for the analysis phase.
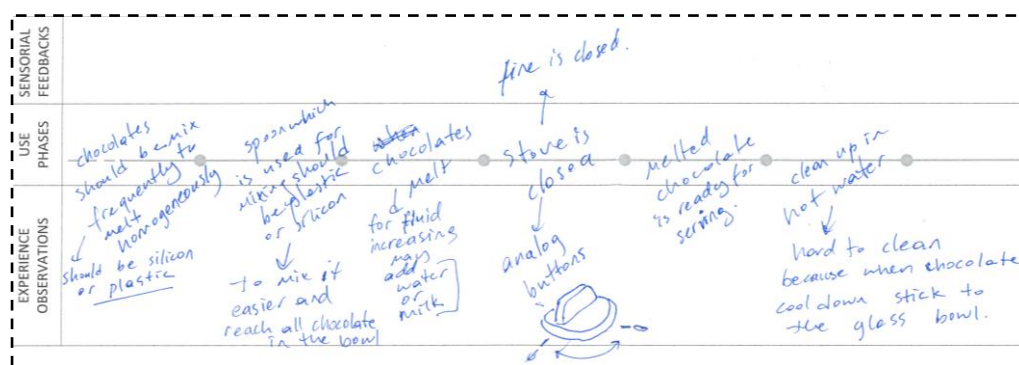
Figure 4.12 A caption from Experience Chart part filled out after the user observations but prior to poster preparations by T4.

Filled out just for the sake of submission, mostly after the prepared posters: In five out of 18 user observations, the Experience Chart part was completed just because they were going to be submitted. Some of them were filled out after the poster preparations. T1 stated that they just filled it out "for the sake of submission" while T6 stated that "it was a duty and we did [filled out] so". However, T6 also stated that they made use of it as a guide and seeing this Experience Chart part made them more attentive while observing.

Left empty: In two out of 18 user observations, the Experience Chart parts were submitted empty. One of the user observations were from T3 and they stated that "we did not want to write them down again just for the sake of filling it out, as we had already prepared our poster."

Until now, the findings communicated are rather statistical (e.g. 3 out of 18 conducted user observations) and mostly factual as stated by the students; and they

are also characterized with reference to the attitudes of the design students while making use of the Experience Chart part (e.g. filled out for the sake of submitting). However, I have given little or no information about the content and the quality of the taken notes on this chart, in relation to the layers of it —sensorial feedback, use phases and experience observations. Because it requires a different analysis method due to the high number of variants. To illustrate some of the variants affecting the content and quality of the taken notes on the sensorial feedback layer are: the type of the activity; the type of the product; student's knowledge on sensorial feedback; when it is filled out; how many of them are identified; how sensorial feedbacks are reflected on the posters if they are not identified in the Experience Chart; the type of the sensorial feedbacks such as auditory, visual, tactual, etc. That is why, I will only communicate the findings that I found remarkable about these layers:

Remarks on the *sensorial feedbacks* notes: The number of the indicated *sensorial feedbacks* were not so many and they were mostly limited to the auditory (e.g. beep sound) and the visual (e.g. light on) types. Also, the content of the some taken notes in this layer were actually *experience observations.* However, there were a few detailed and interesting notes. Two examples are given below:

(i)   T4's UO-I, conducted individually on bain-marie activity;

Use phase: open the stove and put the sauce pan on it:
Sensorial feedback: "spark voice [sound] of the stove; fire is on [appeared]".

(ii)   T8's UO-I, conducted by two members on French frying activity;

Use phase: "throw [potatoes] inside [the pan]"
Sensorial feedback: "perceives the frying through seeing [potatoes changing color]".

Remarks on *use phases* notes: Taken notes in here are significantly high in number compared to other layers; and the content of the notes were quite satisfactory. Most of them were placed in the use phase layer but some of them were also indicated in the areas dedicated for other layers. Exemplary use phases given at the top of the page proved to be very helpful while filling this layer out.

Remarks on the *experience observations* notes: Notes taken in this area were not rich in number as anticipated but their content was quite satisfactory. It included explanations on the rationale behind some *use phase,* user's emotion and behaviour regarding the use phases, user's comments, etc. Sometimes they were combined with use phases and depicted in long sentences. Sometimes sensorial feedbacks were included here.

When we look at the filled out Experience Chart part, a general finding reflects that the difference between the layers either was not taken into account or the students were not able to differentiate the layers from each other.

Interpretation and suggestions: Initially I should emphasize that 'filling out the Experience Chart part', during or after the main user observation period —and sometimes not filling it out—, is not the same with the 'making use of the Experience Chart part' or 'completing the Experience Chart part' for the user observations. For example, in T2's and T6's user observations, charts were filled out solely during the main user observation period. However, for T2, the sensorial feedbacks were missing in the chart; and for T6, the corresponding poster was lacking of sensorial feedbacks and experience observations —there were just use phases in the form of long sentences representing the process. On the other hand, T4's Experience Chart part, which was completed after the user observations, was quite detailed and it corresponded to the anticipated use of the chart, in terms of the content and the position of notes.

Experience Chart part was a tool for conducting user observations in the field, it was not the main aim. However, filling out the chart during the main observation period in the field still deserves emphasis as the novice designers could make the connection between what is observed and communicated on the site, and accordingly could ask user for explanations during or immediate after the main observation period through the help of these notes. Time spent with user is valuable and once the novice designers leave the observation field, it is hard to find user in the same setting to elaborate on the taken notes. Even if it was possible, this would be time consuming.

Replacing video recordings with the field notes is also related to this time issue. Instead of analyzing the recorded video and spending significant amount of time to do so; making use of the field notes supported with images assumed to provide valuable amount of information to inform and inspire early design decisions. Plus, video recording may be disturbing for some users, and there may be feedbacks which are not detectable in video recordings, such as smell. That is why, for the later developments of the Experience Chart part, this part is kept for making changes that would ease filling the pertinent information.

The difference between layers, especially the one between sensorial feedback and experience observation should be clarified, or necessity of differentiating them from each other in the field might be reevaluated.

One issue specific to this thesis study is related to students' EC Guide V1 submissions. I collected them to analyze for this study. Although I had communicated that these submissions were not going to be a part of the course grade/evaluation, the students had this tendency to perceive it as a submission to be evaluated. This could be a research limitation.

4.5.4.3 Problems Encountered

To what degree the Experience Chart is filled out during the main user observation period is covered in the previous sections. In this section, I will communicate the problems that the students encountered while filling out this part. I categorized them in relation to the following topics: the pace of the observed activity; multitasking; conducting user observations individually; and intervening in the natural course of the activity.

The pace of the observed activity: At least one member from each team, explicitly or implicitly, mentioned the fast pace of the observed activity as a challenge for notetaking. For example, T4 stated that the inputs during the observations were being communicated to research so swiftly that it was hard for them note down what they have observed without missing the next step in the activity. T4 and T7 stated that during the observation it was difficult to differentiate the sensorial feedbacks, use phases and experience observations, which also appeared through the analysis

of the submitted EC Guides in the previous section. T6 and T8 felt the necessity of stopping the user frequently to take pictures of the activity.

Multitasking: Some defined the user observation via the EC Toolkit V1 as an activity requiring multitasking that includes observation, note taking and paying attention to what user says. One member from T1 explicitly stated that he/she was not used to that kind of work.

Intervening in the natural course of the activity: Some teams explicitly expressed their concerns on distracting the natural course of the activity in order to fulfill the user observation requirements. For T4, asking user questions during the observations caused this concern. They exemplified it as "When we asked the user [a question], he stopped to think about it for a while, and then he went on." For T6, while observing the user, taking notes would change the behaviors of the user. For T8, they stopped their user in order to take a picture of a use phase they missed, due to its pace. They reenacted this phase. Later they stated that the user stopped frequently and posed for them to take pictures.

Conducting user observations individually: Although two of the user observations that were solely filled out during the user observations were conducted individually, T7 and T8 (one member from each) explicitly stated that conducting user observations alone via the EC Guide V1 was very difficult compared to their team work. Because they had to document the observation through both observation notes and photographs.

Interpretation and suggestions: The fast pace of the observed activity is proved to be a remarkable challenge for note taking while observing, especially for the observation of electric household appliances. As the pace of the studied activity could not be changed, the workload could be distributed into more than one phase. For example, observations might be conducted with little intervention from the novice designers; and later novice designers could talk with the user for explanations and clarifications. Also, notes could be taken roughly and analyzed later on in terms of what they refer to —*sensorial feedback* or *experience*

observation. By doing so, perceived multitasking character of the user observations via EC Toolkit V1 could be eased as well.

Concerns on intervening in the natural course of the activity is pleasing as this signals that some students have concern on the rigor of findings they reached — which would a valuable researcher characteristic for design students to gain. However, in such participant observations, the effects of observer's presence in the field is hard to eliminate.

Documenting the activity through images might be translated into a new form. Design students can be encouraged to take pictures of the important details, after the observation through making the user reenact some phases where possible.

User observations were expected to be conducted in teams. That is why it is natural that some individually conducted user observation is more challenging than teamwork. However, in each of the user observations, the EC Guide V1, actually was filled out by one member. In other words, when we remove the necessity of taking pictures, difficulties while filling out the Experience Chart part is the same, whether in teamwork or individual work. In addition to that, individuality is preferred more than teamwork in this assignment. That is why, user observation via EC Toolkit to be conducted by an individual could be a consideration for the later developments. Plus, this toolkit could be used by novice designers who are not design students; or a design student may want to utilize the toolkit by himself/herself for his/her other projects in the future.

4.5.4.4 Graphical Representation

The number of the findings specifically derived from the graphic quality of the Experience Chart part were high in number. I communicated the significant ones to my understanding under the following topics: order of layers; the linearity of the chart; the number of the use phase's indicators; and emphasizing the areas for note taking.

Order of layers: The graphical representation of areas allocated for three layers along with the order of this layers confused some teams. T8 stated "when we look

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at this chart, it looks like we note down the sensorial feedbacks initially. However, first thing we actually do is to fill in use phases [which is located in the middle of the chart]."

The linearity of the chart: One member from T2 stated that sometimes the user gave information in a use phase referring to actually another one that comes before or after. She expressed his/her frustration and confusion as "where am I going to write this down now?" T3 also communicating displeasure with linearity and suggested having nonlinear direction like a "board game path" or "zigzag pattern". They stated that "it [note taking] became something like random writing instead of being something linear."

The number of the use phases' indicators: The presence and the number of the indicators representing the use phases yielded debatable comments. According to T1, T2 and T6; the high number of indicators gave the impression that all of these indicators should have a corresponding use phase. For T1, this has a frustrating effect as leaving some of the indicators unfilled made them felt like they did not pay enough attention. They found 14 indicators "excessive" and "restricting". They suggested to provide only three indicators as exemplary placeholders and leaving the rest up to the researcher's interpretation. T2, similar to the T1, found the number of indicators "somehow stressing". However, they praised the existence of these indicators and their numbers in terms of encouraging researchers to discover more use phases. In the same vein, T6 stated "…although this chart is basically a blank page with some dots on it, it simply encourages you to be more attentive."

Emphasizing the areas for note taking: T1 suggested that dividing sensorial feedbacks and experience observations into areas corresponding to the use phases might have encouraged them to take related notes. T5 suggested the use of arrows starting from use phase indicators facing towards sensorial feedback and experience observation areas, in order to encourage the researcher to think more about the related parts. They actually used this as a strategy in their own Experience Chart part which they completed after the observation (Figure 4.13).
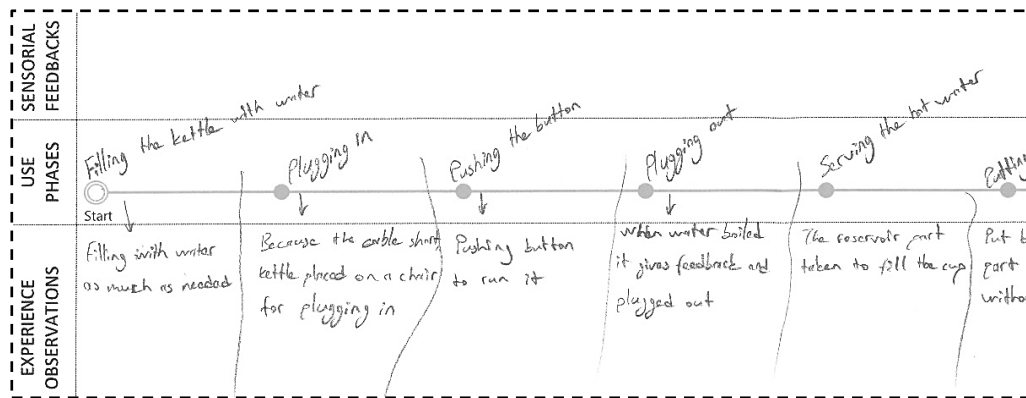
Figure 4.13 A caption form Experience Chart part completed during the main observation period by one member of the T5.

Interpretations and Suggestions: Although graphical representation of the Experience Chart part looks simple, every single element could have an effect on the way in which the design students interpreted the Experience Chart. There were two reasons for positioning use phases in the middle of the chart: (i) in order for researchers to relate the use phases with sensorial feedback and user observation; and (i) in order to separate experience observation from each other as much as possible so that analysis of them could be easier.

Displeasure and confusions caused by linear characteristic of the chart is significant to find ways to depict the chart in more designerly but flexible ways. In order to do so, a short study can be conducted to find out how designers will represent an activity process on a blank page. However, leaving all the decisions to the novice designers might not be helpful to guide them in an area that they are not very familiar with. Besides, some of them already demanded a more defined structure, emphasizing the *sensorial feedbacks* and *experience observations* areas to encourage them to take more notes on.

Finding a balance between the level of guidance provided and the degree of flexibility guaranteed is challenging. This was evident with the use phases' indicators. For this case, motivating students and encouraging them graphically to take more notes on the chart is more important, considering some of them may get upset, when are not able to do so.

4.5.5 After-use Interview Part

This part's findings and their interpretation are communicated through its categories which are: positive-negative experiences, atypical use and user suggestions. Prior to them, I communicate the findings and their interpretations referring to the whole After-use Interview part in the following paragraphs.

Sequential order of After-use part: Remarkably, the interview yielded in quite a few findings questioning the rationale behind the sequential order of this part. T1 stated that some user related aspects such as *level of engagement with the technology* is better understood after conducting the After-use Interview part. For them, categories and subcategories situated within this part could have been questioned before in the Pre-use Interview part. T3 and T4 mentioned the practicality of conducting two interview parts together. T4 actually conducted the After-use Interview part together with Pre-use Interview part as they were sitting at the table with their user already and they found it more appropriate to finish interviews at one go. T3 stated that having a second interview part was confusing for their user because he/she thought that this part was already over; and accordingly answered questions reluctantly by giving short answers.

Questioning some After-use Interview subcategories on the chart: One member from T4 suggested to question subcategories such as *accidents* and *complaints* during the main observation period and to relate this relevant information to the use phases. By doing so, the previous experiences of the user can be represented during the activity process by referring to where and when these experiences happen.

Interpretation and suggestions: User observations conducted via the EC Guide follow a linear structure, but the use of these is not imposed verbally in a linear way. However, this should also be made explicit both graphically and structurally to encourage novice designers to navigate through the parts situated in the guide; and eliminate potential hesitations to do so.

The aim of positioning this part after the main observation period was to take advantage of the user's immediate experience with the activity. However, for practical reasons and in order to eliminate the possible confusions on the user's

mind (that the interview part is over); categories and subcategories should be reevaluated within this part and can be integrated in different ways into the EC Guide, such as: combining them with product features or relating them with the use phases in the chart. Furthermore, all of the desired information might be available in the same page to the designers and they can build whichever connection they want between the current elements of the EC Guide V1.

4.5.5.1 Positive-Negative Experiences

The provided answer-questioned subcategory incompatibility: T2 and T4 stated that users sometimes do not provide answer for the questioned subcategory, but give related insights while the researcher is questioning another subcategory. For example member from T2 stated "…for the repair-upgrading history, user said nothing; however, when he/she was mentioning about the user suggestions, he/she mentioned about many complaints".

The subcategories yielding similar findings: T4 and T5 found some of the categories similar in content. T4 stated that "When users mention their complaints, reasons behind these are already accidents… So, when we asked about the complaints, we did not have to ask about the accidents". As a suggestion, one member from T4 stated giving subcategories as exemplary prompts in the parenthesis.

Students concerns on reliability and reachability of the findings: T1 and T5 stated that users might feel short of remembering their past experiences. T1 also questioned the reliability of the findings by stating "…at the very specific time when we asked, they [users] don't remember that they have their product repaired, however, maybe he/she did. I don't know whether this can be solved or not." Member from T1 suggested that after a few hours of filling in the EC Guide, users might evaluate the form by themselves and this could lead them to remember some more previous experiences. T5 suggested informing users before the user observation, like one week ago, and requesting from them to engage with the activity of inquiry by questioning the experiences they had. In this way, T5 claimed

that the number of the insights provided during the main observation would be richer.

Interpretation and suggestions: In a qualitative interview, naturally provided answers could refer to subcategories which have already been questioned or would be questioned later on. When the areas to note down these answer are strictly defined in the EC Guide, this might confuse novice designers during the user observations. However, at the end, the aim is getting the information and questioning subcategories seems like yielding the same results to support this. For example, user might not remember that he/she had a complaint about the part of product but this might be discovered when this part is repaired. That is why, indicating giving subcategories as exemplary prompt and staying away from too many partitions for each subcategory could be tried for the later developments of the EC Guide V1. By doing so, researcher can be inspired from these exemplary prompts and indicate related findings in a more flexible area.

Student's suggestion on reaching more information through engaging user to the research not only during the observation, but before and after as well is promising. Inspired from T5 statement, users might document their experiences with the activity in a diary format in line with the EC Toolkit. This would require more planning of activities, but could be fruitful.

4.5.5.2 Atypical Use

Clarification on *atypical use* category through examples: T1 and T6 suggested having examples —both for themselves and user to communicate—clarifying what might be *alternative or atypical use scenario*.

Observing atypical use instead of asking: One member from T7 claimed that findings for atypical categories cannot be reached by asking user "how do you use it alternatively". According to him/her it can be noticed during the main observation period.

Interpretation and suggestions: After verbally explaining and giving examples about it during the introductory and critique sessions, *atypical use* category is still

not clear for some of the teams. Question has to be revised and reevaluated to be presented in a different and user-friendly way.

Observing atypical use instead of asking, is promising but the statement that "findings for atypical use cannot be reached through asking user" is an assumption. Because atypical use of the product might not happen during the main observation period, as this period is specific to the activity. However, this statement is insightful as alternative uses of the product or secondary products for executing the activity can be observed during the main observation period and might provide inspiring insights. That is why, a typical use can be incorporated into the main observation period.

4.5.5.3 User Suggestions

Perceived capacity of user to generate suggestion: T1 stated that "[user suggestions] did not receive enough feedback. Because once users are directly asked about what kind of a product they want, they have hard times to communicate [their wants]". One member from T3 and T8 stated that provided answer usually is "No, I would not like to change anything else." or "No, I do not have any suggestions." Member from T3 stated that the way the suggestions are questioned maybe the reason, as he/she asked it simply a yes or no question as "do you have any suggestions for improving?" T8, on the other hand, mentioned about their strategy to make user think about more on suggestion. They presented their own examples by asking user "would you like to have something like this [their example], or how would you like it?"

Interpretation and suggestions: Users might have some difficulties to generate suggestions in relation to the questioned subcategory; however, this should not be attributed to the knowledge of users. What T8 followed as a strategy seems promising in terms of making user elaborate on given examples; however, it will most probably affect the user suggestions. Novice designers should be informed on how to guide users in order not to hinder users' own ideas. Also, different ways of questioning this part could be considered, such as card sorting. In card sorting, users are given cards with printed concepts and features in relation to the activity and

they can be asked to sort under various considerations (Hanington, 2012). This might facilitate the discovery of users' needs and desires.

The aim of the user suggestions category is not to receive direct ideas from the users, but it is to draw insights from their statements to understand their true needs and desires which might inform and inspire early design decisions. Novice designers should be made aware of this and accordingly, how to analyze the users' so called implicit statements to find out underlying reasons and possible inspirations could be made more explicit through workshops and rehearsals.

4.5.6 Preparation of the EC Poster V1s

Preparation of the EC Poster V1s can be evaluated under two main areas: Firstly, the Experience Chart part which communicated the use phases of the observed activity, accompanied with insights derived from the observation findings and still images depicting the use phases. Secondly, interview parts —which included the findings from the related parts of the EC Guide V1s— with conclusions & dimensions part —which were conclusive insights and keywords derived from the whole user observation findings. Figure 4.14 shows an example among the submitted posters that can be referred to understand the distribution of these areas in the poster layout.

Figure 4.14 One of T8's EC Poster V1s on frying activity.

Common steps involved in the preparations of the Experience Chart part in the posters are: checking the EC Poster Example V1 as a reference to poster preparations; sorting out all the images documented; indicating the use phases in the Experience Chart Template V1; selecting appropriate images for the use phases; and indicating insights derived from observation notes. Additionally, in quite a few user observations, the students made use of the video recordings. While T8 completed missing images by taking screenshots from the video, the members from T1, T3 and T4 stated doing the same for the whole poster. Among the ones who filled out the Experience Chart part in the EC Guide V1, during or after the user observations; the members from T2, T3, T4, T5 and T8 explicitly stated having made use of the information noted down in the guides.

Preparing the interview parts in the posters involves transferring the information noted down on the related parts of the EC Guide V1s through some adjustments along with the drawn conclusions and dimensions.

At least one member from almost all teams mentioned that presenting the findings were "easy" because of the provided EC Poster Template V1.

There were quite a few comments on highlighting conclusions & dimensions part in the layout of the EC poster V1. T3 and T7 suggested separating the part from other parts (After-use Interview and Pre-use Interview) in order put emphasis, as they believed this was the most important part of the interview summarizing the whole observation. Also, almost every team mentioned or applied in their posters the separation of conclusions and dimension from each other. For example, T8 stated that in the EC Poster Example V1, there was not any visual in relation to how to represent this part. They thought that maybe dimension can be mixed with the conclusions. Then they highlighted dimension with bold type face and separated this part. Figure 4.15 shows three examples of the representation of conclusion & dimensions part.
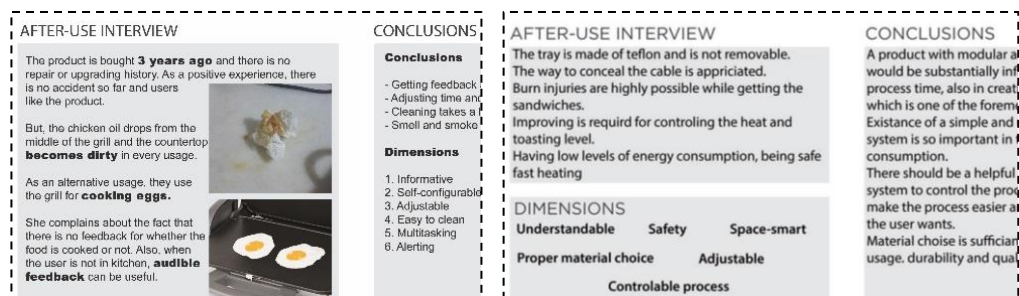
Figure 4.15 Some examples from conclusion & dimension part

4.5.7 Closing Remarks

When the students compared the user observations via EC Toolkit V1 with their previous observation and interview experiences, this revealed significant insights into novice designer's expectations from the user observations and interviews as part of the educational projects.

A great majority of the third-year design students at METU have followed the same educational track in terms of their studio projects. That is why previous experiences in relation to user observations and interviews were referred to usually the same projects: one of them was conducted with the "diaphone" users held in the second-year studio, for which they were just encouraged to interview and observe users of

diaphones but not provided with any supporting material. The other was a project held in the third-year studio, namely *#OccupyAlley*, which was a project on co-developing and envisioning future sustainability scenarios facilitating collective creativity on METU Campus. The students were provided with four predefined full interview questions prepared for campus stakeholders and encouraged to document their observation on campus through still images. Findings are communicated under three topics: boosted confidence, becoming competent, and flexibility of researcher with the EC Toolkit V1.

Boosted confidence: One member from T1 stated that he/she gets excited and "gets into a lather" during the interviews and the user observations, especially if he/she is not acquainted with the user. With the guidance coming from the EC Guide, he/she stated feeling more comfortable and claimed that did not miss any important consideration to question because of his/her excitement. One member from T2 by giving reference to his/her 'diaphone project' mentioned about the feeling of "insufficiency" although he/she went to the field by preparing several questions beforehand. He/she stated that conducting observations with a tool like EC Guide having related elements and coming from the design educators, gives "self-confidence" and the impression that "everything is fine right now" referring to every important aspect being covered, once user observations ended. T4 and T8 explicitly mention that observations via EC Toolkit was "easier to carry out" comparing to their previous experiences.

Becoming competent: One member from T7 stated that they were "more conscious" about what they were doing. They used to get "stuck after a while" in their previous user observation experiences, which was also stated by T6 as "After two main questions; do you have any problems, how do you use the product, we were stuck and looked into each other's eyes [team members] for someone to ask a question". One member from T5 stated that thanks to guidance coming from the EC Toolkit, they have learnt the principles of conducting user observations, by stating literally "we have learnt the job!"

Perceived fairness that comes from EC Toolkit V1: One member stated that expected outcome from the user observations as an assignment is the same, but for

the ones conducted without the EC Toolkit, little guidance is provided to reach the desired results.

Flexibility of researcher with the EC Toolkit V1: One member from T3 stated that the preparing questions by themselves was more productive and creative whereas the EC Guide is "more structured, easy to follow and grounded". One member from T4, compared to *#OcuupyAlley* project, stated that only having interview questions was constraining and the EC Guide was more flexible in terms of having guiding subcategories. T5 also stated the similar specifically for the Experience Chart part by telling that "it was open; how to use it depends on you [researcher]".

Interpretation and suggestions: Abovementioned comments are mostly pleasing as they suggested that the EC Toolkit V1 empowered the design students from a variety of aspects but predominantly from the self-confidence aspect. Also, design students have the sense of the necessity of conducting user observation in a systematic way as research, and they appreciated the guidance and acknowledged its benefits. It is also visible that design students by themselves could demand explicit guidance while operating in a given assignment within a design education project, from the design educators.

As it has emerged in the previous section as well, finding a balance between the levels of guidance provided and the degree of flexibility is challenging. It is hard to find a balancing point pleasing all the members who participated in this study as they have different expectations from design education and as they interpret 'flexibility' and 'guidance' in different ways.

CHAPTER 5

STUDY II: DEVELOPMENT OF THE EC GUIDE V2

This chapter involves the iterative development of alternatives to the EC Toolkit V1. In the light of the Primary Research findings and their interpretations, I made successive contextual and structural changes mainly on the EC Guide component of the toolkit; shared it with my thesis supervisor and we elaborated on these alternatives. This chapter also involves a focus group session and the interpretation of its findings to inform study. The Chapter ends with the final form of these alternatives, which I called the EC Guide V2.

During the process, I have developed quite a few alternatives but some of them were similar in nature. I communicated the ones having different characteristics from each other in this chapter. In the following sections, I will present the main considerations taken into account while developing these alternatives.

5.1 Alternative I

For the Alternative I, I explored alterations on the EC Guide V1 without changing the context and structure of it drastically. I mainly included the suggestions provided by the design students in the Primary Research. For this alternative, I focused on the Pre-use Interview part —as a representation of interview parts— and the Experience Chart part.

Figure 5.1 shows the Pre-use Interview part of the Alternative I. It consists of three categories: user profile, activity & product, and use environment. The changes in the layout and graphical elements basically aimed for a more flexible note taking experience.

Figure 5.1 Pre-use Interview part in Alternative-I

User profile: I intentionally changed the 'user characteristic' category name with the 'user profile' which still refers to the description of user attributes such as occupation, age, level of education; however, this time reflecting a range —not a single attribute (Courage & Baxter, 2005). I assumed that in the design research brief, design students can be informed that they do not have to ask user all the questions; rather they can indicate their observational notes. In this way, I assumed that the possible uncomfortable situations due to questioning personal details could be eliminated.

Activity & product: I included the word 'activity' as to give impression that this part is not only about the product itself, but the activity as well. By textually stating that "ask user to talk about their product", I emphasized that the students would collect information from their users. In this way, I tried to clarify the confusion whether the features of product will be observed or asked to user.

Use environment: I did not make a significant change in this part.

For the Experience Chart part (Figure 5.2), I made two highly demanded changes. Firstly, I removed the explanatory text about the purpose of this chart and replaced it with examples for *sensorial feedback*. Secondly, I provided an example for the chart showing how possibly to fill it out; by making use of one of the submissions of Team 4 from the Primary Research. I assumed, the students could be inspired from this examples, and take similar notes on the chart situated below this example.
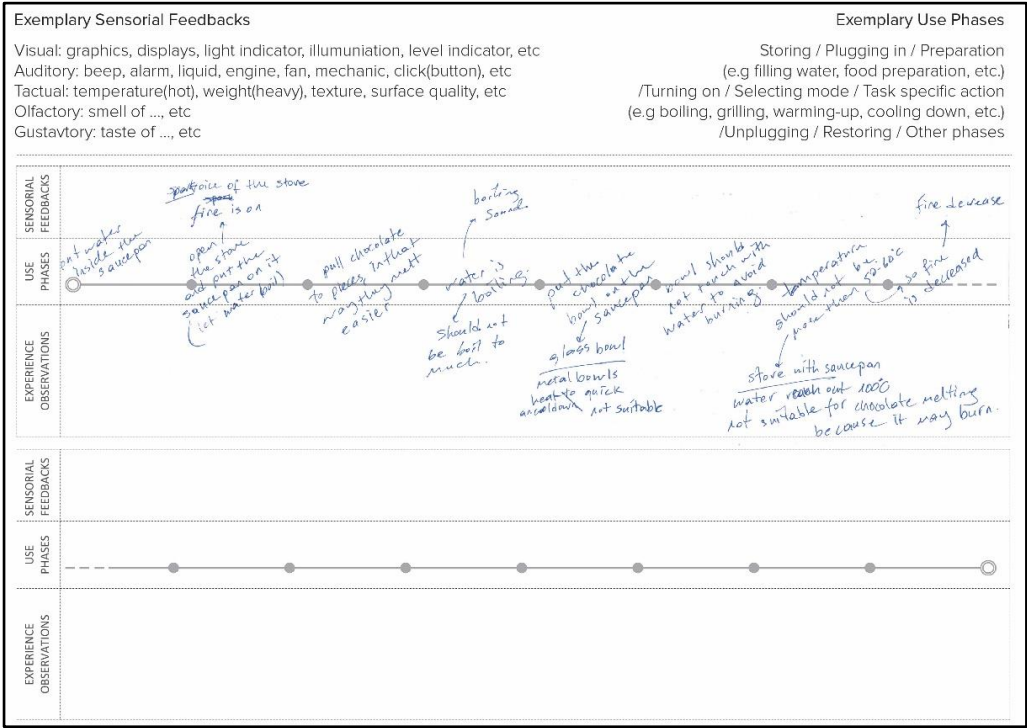
Figure 5.2 Experience Chart Part in Alternative I filled by a participant.

This alternative clarifies some issues detected in the EC Guide V1, and provides some examples suggested by the design students. However, it still does not account for two important outcome of the Primary Research. Firstly, this alternative does not address the issue of overloaded features of Experience Chart part, which was found challenging for filling it out during the main observation period —due the number of the layers to take notes on and the fast pace of the observed activity. Secondly, the connection between parts situated in the guide is still week and does not allow for a smooth navigation between each other.

5.2 Alternative II

I developed the Alternative II through making more radical changes on the contextual and structural characteristics of the EC Guide. This development is consisted of three stages: the development of a draft to be tested with graduate design students; a focus group session with these graduate design students, and changes made in the light of the focus group findings.

User observations via the EC Toolkit V1 required researchers to select their participants and making arrangements with them to conduct user observations. In an assumed scenario, product that is going be used in the activity could be learned from the user prior to user observations. By doing so, the design students could examine the product initially and make themselves familiar with its functions and features before the observations. Later on, while observing the user; they can build connections between the product and questioned elements in the Alternative II such as sensorial feedbacks, accidents, and complaints. For this purpose, I situated all the elements previously distributed to Pre-use Interview, After-use Interview and Experience Chart parts in one single page.

5.2.1 Focus Group

I conducted the focus group with the participation of four Industrial Design graduate students from the METU Department of Industrial Design. Two of them were Ph.D. students who are also working as research assistants in the same department whereas other two were master's students.

Before conducting the focus group, I had already asked one of them to be the user who is going to be observed and interviewed by the others. Following to that, user defined the activity to be observed as coffee brewing with De'Longhi ICM15240.BK coffee machine. I found a diagram of this product and placed in the draft Alternative II. The day after, I printed out the draft Alternative IIs and with all the participants we went to the user's house and the actual session begun at the user's kitchen (Figure 5.3). I audio-recorded the session and took observation notes simultaneously.

Figure 5.3 A caption from the focus group

All the participants were observing the activity at the same time. This might cause a limitation as they might be influenced by each other. Figure 5.4 shows one of the participants' filled out draft Alternative II.

Figure 5.4 A filled out draft Alternative II during the focus group session.

5.2.2 Findings from Focus Group Session

The main finding of the focus group was that none of the participants built any links between the product diagram and observation notes. When I asked the reason why, two participants explicitly stated that they had difficulties because there were so many criteria to pay attention to. One of them stated that:

"Now, we already read all of them [textual information on the guide] before the observation, that is true; but when we tried to catch [collect information about] all of them, naturally we skipped some information."

Another participant suggested the draft Alternative II to follow an order instead of taking all related notes in one go. This suggestion found support from others too. Following to their suggestion I developed the final version of Alternative II in a more structured way.

For the first part, I brought together the user profile and use environment (Figure 5.5). I placed the product in the middle of the use environment's note taking and sketching area, so that the spatial arrangement of product in relation to other products in the environment could be built.

I dedicated the second part for the evaluation of product features (Figure 5.6). In this part, a diagram of the product is situated in the middle and some questions derived mostly from the After-use Interview part in the EC Guide V1are located.

I dedicated the third part for the Experience Chart with a separate sensorial feedback area (Figure 5.7). Through this separation, intensity of the main observation part could be decreased.

Figure 5.5 User profile and use environment in Alternative II

Figure 5.6 The evaluation of product features in the Alternative II.
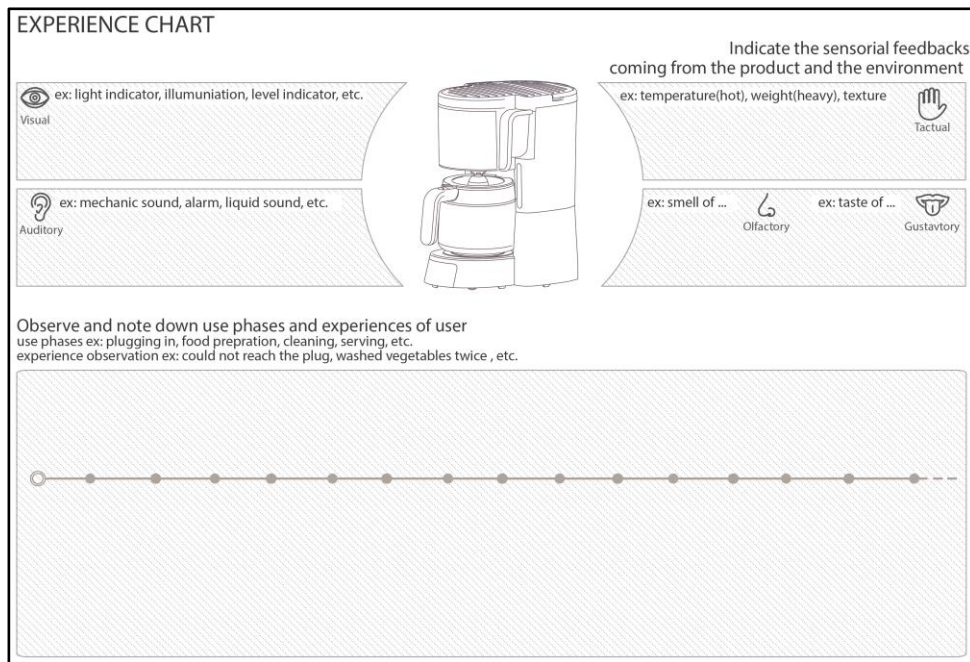
Figure 5.7 The Experience Chart part in the Alternative II.

5.3 The EC Guide V2

The EC Guide V2 led to the elimination of product related features to be questioned in the field of user observations. Product to be used in the observed activity naturally plays a crucial role in understanding user's experience with the activity. That is why, throughout the study, quite a few attempts have been made to collect product-related insights prior to or during the main observation period in the EC Guide, through various ways of integration. However, these eventually were not found promising mainly because of two reasons. Firstly, time spent with the user in the field is valuable. Instead of spending this time to evaluate the product, encouraging the design students to focus on steps involved in the activity found more promising. Consequently, user observations via the EC Guide are exploratory in the nature, rather than being evaluative. Secondly, the types of products involved in user observations may vary, and accordingly, different ways of questioning each type of product, might be required.

The parts of the EC Guide V2 are summarized and their aims are briefly explained in Table 5.1. Figure 5.7 and 5.8 shows how these features came together.

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Table 5.1 The parts in the EC Guide V2

Planned Order	Action	Aim
0 EMPATHY	Design students experience and explore the activity by themselves prior to observing the user.	Making design students familiar with the activity before, so that more attention can be given to the observed activity.
1 PARTICIPANT & ENVIRONMENT	Design students note down their general impressions about the user and the activity environment.	Getting insights about people, objects, activities and their relation to their environment.
2 OBSERVATIONS	Design students observe the user and take notes on the EC Guide V2.	Documenting observation via notes with minimum intervention to the user.
3 THINKING ALOUD	Design students go through their observation notes with the user while user enact the use phases if possible.	Clarifying issues and validating observation notes while documenting the details with still images during the enacting.
4 MEMORIES & DREAMS	Design students interview with participants about their past experiences (memories) and future expectations (dreams).	Getting more insights from user which might not be evident during the actual observation.

Figure 5.8 The front page of the EC Guide V2.

Figure 5.9 The rare page of the EC Guide V2.

As can be seen in Figure 5.7, the EC Guide V2 starts with the *empathy* part, which is one of the noticeable additions to the EC Guide. It is designated to be the initial phase of user observations. It is numbered as '0', since it is anticipated to be completed prior to the user observations.

In the *empathy* part, design students experience and explore the activity by themselves in order to get familiar with the activity before the user observations, so that they would be more knowledgeable about and attentive to the observed activity. They are encouraged to indicate their experiences in the dedicated area. Previously, desired familiarization with the activity was supported with secondary activities such as literature search of product features and details. The main aim of including such a part in the EC Guide V2 is to emphasize the importance of familiarization with the activity in the main component of the EC Toolkit.

One may question the necessity of including the *empathy* part in the guide, as this *empathy* part does not require user to be around or to participate. Placing the *empathy* party in the EC Guide V2 has two main reasons. As first, during the user observations, the students can refer to and recall their own experiences easily, and they can later ask users about the issues that they noticed during their own engagement with the activity. As second, while analyzing the findings of the user observations, they can also refer to their own experiences easily, as all the documented insights would be presented in a single guide.

Once the design students arrive to the field of observation, they initially indicate their impressions about the user and the activity environment in the *participant & environment* part. Compared to the EC Guide V1, what kind of information to express in this part is less defined, and this is left to the design students' interpretation. By doing so, more flexibility is provided to the design students in terms of what to question.

The *Observation* part, as its name suggests, is dedicated to the main observation phase. While the user engaging with the activity of inquiry, the design students can observe and take notes into this part, similar to the Experience Chart part in the EC

Guide V1. However, the *observation* part situated in the EC Guide V2 is less intense in terms of identifying certain type of information. Rather than coding the observation into three layers — *sensorial feedback, use phases* and *experience observations,* the design students are encouraged to document only use phases and corresponding observation notes to these phases. By doing so, the difficulties that the design students had while filling out the Experience Chart part in the EC Guide V1 during the actual observation period could be reduced.

In the observation part, the students are also advised not to interrupt user by asking questions and taking pictures frequently in order not to affect the natural course of the activity, as this was a concern for some of the design students participated in the Primary Research. Asking user questions and taking pictures of important details about the activity are transferred into another part, namely the *thinking aloud* part, in the EC Guide V2.

The *thinking aloud* part is another noticeable addition to the EC Guide V2. In this part, the design students go through their observation notes with the user while the user enact the use phases, if possible. One of the aims of this part is to clarify issues and validate observation notes with the user. Another aim of this part is to document the details with still images while the user enacts the activity. Since there would be no concern about affecting the natural course of the activity in this enactment, the design students could use their times and document details about the activity in a more relaxed way.

The *memories & dreams* part is the final part of the EC Guide V2. In this part, the design students interview with participants about their past experiences (memories) and future expectations (dreams). This part is similar to the After-use Interview part in the EC Guide V1 in terms of its content. However, in the EC Guide V2, this content is less strictly defined, and subcategories in the EC Guide V1 such as accidents, complaints, appreciated features, etc. are translated as just examples. In this part, there is also a visualization area on which both the users and the designer students can sketch some ideas and/or represent the insights gathered in a more visual and reflective way.

CHAPTER 6

CONCLUSIONS

The aim of this thesis was to explore what kind of guidance that design students need for conducting user observations; along with in which ways design students can be supported to conduct user observations as an effective research method for their design projects. Research questions generated to achieve this aim are answered with the insights and findings derived from the literature review; gradual development of a toolkit, namely the Experience Chart Toolkit V1; the integration of the toolkit into an undergraduate design project and the evaluation of this toolkit with the design students who used this toolkit for their projects through semi-structured interviews. Later on, alternative versions of the chart is generated and a final form of its main component, Experience Chart Guide V2, is suggested as a design direction. In this section, research questions will be revisited based on the findings and known limitations to the study will be mentioned.

6.1 Research Questions Revisited

Main research question of this thesis study was as follows:

What kind of guidance can empower design students in user observations conducted to inform and inspire early stages of design process in design education at undergraduate level?

Literature review has revealed that there are considerations that apply to the user observations as design research activity and these considerations refer to the variety of stages; from the preparation for the field to the presentation of findings. Following to that, Primary Research revealed that communicating these considerations (guidance); and providing means to recognize and apply these considerations (empowerment) to design students in the form of a toolkit referring these variety of stages of user observations (the EC Toolkit V1 in this study) proved

to be helpful, from the perspective of design students. A number of students' comments show the toolkit boosted their confidence; made them feel professional and competent during user observations by directing them how to operate in user observations and informing them how to communicate the findings reached.

The aim of the secondary questions in this thesis study was to provide a basis for the main research question. Desired guidance and empowerment indicated in the main research question were planned to be achieved through the discovery of the considerations and tasks involved in the user observations; and through finding out the ways to translate these into the design students in a friendly format. Considerations and tasks inspired the EC Toolkit can be perceived as embodied version of answers found to the secondary questions. That is why, visiting secondary research questions now would support comprehending the main research question.

(i) What kind of considerations and tasks are involved while conducting user observations as a design research method?

Starting with a wider perspective, user observations are data collection methods of qualitative research, in the form of participant observations. That is why the characteristics of qualitative research (see section 2.1.1.1) highly applicable to the user observations. However, design research generates its own criteria that changes the nature of these characteristics for user observations. When these characteristics and criteria taken into account together with insights gathered in this study, user observations should have the following considerations:

Focused participant's experience: Same as the qualitative research, the aim of the user observations is to understand people, their experiences and the meaning that they assign to these experiences. In qualitative studies, this understanding is achieved through spending significant amount of time with the people under study. However, designers and design students do not have the luxury of time. Time-constraints situated in the design activities necessitates focusing on a samples of experiences from people's lives such as preparing a dinner experience, brewing coffee experience, etc.

Dependence on natural setting: User observations should be conducted in the actual use environment of the observed phenomena (a product, an activity). It is context-dependent and requires paying attention to elements situated in the context and acknowledging their presence while communicating the findings.

Designer as the key instrument for data collection: Although instruments such as the EC Guide can be used to collect data during the user observations, researcher is the one who notices, collects and evaluates the data. Designers' personality and background highly affects what they notice; how they interpret the noticed elements and how they can relate these with the early stages of design. That is why, user observations are highly encouraged to be conducted by designers themselves.

Presence of observer: In user observations, the presence of observer and the actions of him/her (taking pictures, asking questions) might affect the natural course of the observed phenomena. It is hard to eliminate this effect completely as the user observations are in the form of participant observation. However, in order to minimize the effect of observer, in the EC Guide V2, the design students are encouraged to asking questions to user for clarifications and taking pictures of some details related to activity after the main observation period.

Multiple sources of data: While conducting user observations, designers should seek for collecting data in different forms to get more insights from the users and validate some of their findings in the field with user. Conducting interviews prior to or after main observation period, as suggested in the EC Guide V1; and making user talk about the observation notes, as in the "thinking aloud" phase in the EC Guide V2, can be helpful strategies for supporting and/or validating arguments.

Providing a holistic picture: When communicating the insights of the user observations, the designers are suggested to present a whole picture reflecting the content and the noticeable findings of the user observations at a glance; but also enabling an in-depth understanding of the observations by providing easy-to-reach details.

ii) How these considerations can be made explicit and communicated to design students to guide them while conducting user observations and communicating the findings of it?

Literature review, without specifically targeting the students, showed that the considerations for user observations are expressed mostly in two forms: guidelines and tools. Guidelines provide more general information in text format whereas tools are depicting these considerations in a more visual way. Guidelines are mostly referred before the user observations regarding how to conduct them and what to pay attention to during them; whereas tools additionally provides specific parts to document gathered information in a more structured and visual way.

For design students as novice designers, both forms are necessary along with verbal expression, considering their inexperience in user observations. That is why a toolkit consisting of multiple elements, both in the form of textual and visual representations, would be a helpful mean of explication of the considerations for user observations.

What kind of guidance can empower design students in user observations conducted to inform and inspire early stages of design process in design education at undergraduate level?

It is possible to suggest strategies to maximize the effectiveness of the user observations for design students. These suggestions will be presented specific to the stage: before, during and after user observations in the field.

Before going to the field of user observations: Main strategy prior to user observations is to make students familiarized with this phase. This familiarization can be further divided into two: familiarization with the topic of observation; and familiarization with how to conduct user observations in the field.

Firstly, in order to make students get the best out of their user observations; they should be made familiar with the topic of observation. By having a more comprehensive knowledge of what is going to be observed, they will be more attentive, and thus more qualified insights can be drawn from the user observations.

In order to achieve a desired level of familiarization with the topic of observation; students can make use of secondary source data, such as literature search, market search, watching online videos in relation to the topic of observations and technical services visits. Students are also encouraged to empathize with the topic of observation by experiencing it by themselves, in a possible way.

Secondly, students should be made familiar with how to conducted user observations in the field; how to make use of the observation guides and other materials, such as using cameras effectively. For this purpose, conducting rehearsal is highly suggested. Trying to engage with additional materials in the context of user observations for the first time in the field can cause problems for design students. For example, while trying to figure out the features of a camera to document user observations for the first time; students might miss details regarding the activity.

During the observation in the field: Primary Research revealed that although some parts of the EC Guide were not filled out during the user observations, the students made use of it quite efficiently, in terms of how to manage the observations and what to pay attention to during the user observations. That is why providing a tool such as the EC Guide (V1 & V2) is highly suggested. While providing such a tool, however, two prominent considerations should be taken into account.

As first, in such a guide, finding a balance between the level of guidance provided to the students and the degree of students' flexibility for their own interpretations should be considered. While providing certain guiding elements for design students is important as they may not be knowledgeable about what to pay attention to during user observations, it is also important to leave enough room for them to express their creativity as designers.

As second, in such a guide, the use of the visuals and examples along with short phrases instead of long instructional texts should be favored to direct design students. Because, information situated in such a guide is for having a quick reference while observing the user, and the pace of the observed activity may not

allow design students to read and process intense textual information during the main observation period.

After leaving the field of user observations: As the aim of user observations within the scope this study is defined as collecting data to inform and inspire design process, the collected data should be evaluated and communicated in a way to make use of the data during the process. In this study, the EC Posters were designated as the medium for this evaluation and communication. The design students were provided with a digitally editable template having similar features with the EC Guide to reflect their findings and insights. EC Poster Example is provided students to guide them while they prepare their posters.

Providing a pre-defined template for the presentation of findings is useful for design students from two aspects: Firstly, the students spend presumably less amount of time while preparing the posters as they know what and how to prepare their posters thanks to the pre-defined elements in the EC Poster Template. Secondly, when the prepared posters are shared with whole studio, students are able to spot desired information quickly in the posters as these posters are similar in the format.

6.2 Limitations of the Study

In this study, a research through design methodology is adopted while developing the EC Toolkit for user observations, and it has been assessed and evaluated within in an undergraduate project. However, the final suggestion for toolkits main component, the EC Guide V2, is not integrated and evaluated within a field study. A second field study would validate the findings and interpretations of the Primary Research. However, considering the amount of time and effort invested in the gradual development the EC Toolkit, it was challenging to conduct a second study and analyze it.

The evaluation of the EC Toolkit reflects design students' points of view regarding their experiences while they are using the toolkit. Although the EC Guide used by the students and the EC Posters prepared by them have been evaluated to a certain degree; the statements of students were main source of data for the evaluation. To what extent and how the findings and insights reached by the students through user

observations conducted via the EC Toolkit affected the later stages of the design process have not been evaluated by this study. It was mainly because the teams shared their user observations findings with each other, and it would have been be challenging to spot which team made use of the which EC Poster in the later stages of their design process.

The EC Toolkit is used for the observation of cooking related activities, mostly conducted via electric household appliances. The applicability of the EC Toolkit for other kind of activities is not explored and these activities may require additional considerations.

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APPENDIX A

PROJECT BRIEF OF THE OPENKITCHEN PROJECT

Middle East Technical University Faculty of Architecture Department of Industrial Design Spring 2014-15 ID 302 Industrial Design IV

Asst. Prof. Dr. Çağla Doğan, Asst. Prof. Dr. Harun Kaygan, Asst. Prof. Dr. Fatma Korkut, Part-time Inst. Mustafa Hasdoğan, Res. Asst. Ahmet Burak Aktaş, Res. Asst. Özümcan Demir, Res. Asst. Mert Kulaksız

Project II

OpenKitchen: Sustainable design solutions for a flexible, open-source cooking platform

1. Project Brief

In our current linear system of production and consumption, products are designed, manufactured and consumed in short life spans, leading to their rapid disposal and an increase in waste and resource use. This problem is aggravated in electric kitchen appliances, where a specialized product is designed for each and every function – cookers, mixers, juice makers, soup makers, etc. In response to this, **open-source design** approaches can be adopted to develop more open-ended solutions.

In this project you will work **in teams** to **develop a flexible, open-source cooking platform, which supports plural food preparation scenarios in which users are actively and creatively involved in product assembly, maintenance, repair, and upgrade.** Your design solutions should demonstrate **at least three** diverse cooking scenarios, while potentially enabling a wide range of cooking types.

User group and use context: The user group this project targets is "technophile" users, who are interested and competent with technology:

(1) Young couples/housemates
(2) Young professionals working in a small Technopark office

Business model: OpenKitchen® is a (hypothetical) global community of businesses, manufacturers and makers that develops open-source flexible design solutions for kitchen.

- We work with local manufacturers to provide locally produced component parts and design solutions (e.g. electric parts by Eksen Makine, glassware by Art&Craft and Paşabahçe, etc.).
- We work with local shops (e.g. Carrefour, Boyner, etc.) and our online shopping platform to bring our products to your home.
- We provide community support via our online platform in your native language, including
  - open-source assembly options,
  - suggestions for cleaning, maintenance and repair,
  - extra components to personalize, extend and upgrade your product,
  - sharing opportunities for parts that you no longer use or use infrequently.

2. Teaching goals

Demystification of technology: Designers of technological products should understand how these work in order to offer comprehensive design solutions for sustainability.

Empowering users as makers and maker communities: Users of technological products should understand how these work so that they can look after the products properly and do not have to or want to replace them. Users should be actively involved, not merely as consumers, but as **makers** of products, creatively participating in use and post-use, shaping their own products according to their needs and preferences. This requires product designs that are open to user intervention, as well as accompanying systems (e.g. online platforms, local communities, etc.) that make the sharing of product parts, skills and knowledge possible.

A new, "open" aesthetics: To challenge the prevailing modes of production and consumption, we need to challenge the sleek style of current kitchen appliances and other electric/electronic products: An aesthetics which brings together diverse materials, manufacturing techniques and production scales (mass production, crafts, etc.), designs that bring together standard components with locally produced and personalized components, etc.

Modularity and systems thinking: Instead of stand-alone products, designers should emphasize modular and scalable systems that afford alternative product and service elements in order to enable flexibility in assembly and use, allow product part replacement, upgrading, renewal, etc.

3. Sustainable Design Considerations

Empowering users as makers and maker communities: Enabling active and creative user involvement in a range of use phases, from product assembly (e.g. using modular or customized parts, including assembly options), to product cleaning and maintenance (e.g. replacing or renewing outdated or worn-out parts), to technical and aesthetic upgrading (e.g. modifying or adding new functionalities or altering design features such as form and colour). This also includes taking into consideration the local needs and preferences at each phase. Design solutions should maintain product safety while promoting user involvement.

Product-service system design: The design solution should be approached not as a standard stand-alone product (e.g. a grill), but as a product-service system (PSS) including **design templates**, connection and extension components according to which diverse manufacturers and end-users can develop their own parts and solutions, a community support component (e.g. an online forum), etc.

4. Project phases

- **Literature search and user observation:** The literature search phase includes a review and analysis of various topics related to the project context. User observation phase covers user visits, interviews and observations to identify problems and gain insights into the usage patterns. Based on the results of the literature search and user observation, the student teams will suggest insights, findings and project dimensions.

- **Disassemble-assemble session** for electric appliances.
  -
- **Idea generation:** At the idea generation phase, the insights and findings from the research phase will be developed into initial design ideas and scenarios.

- **Experience recall modeling (ERM) sessions:** The student teams will conduct exploratory ERM sessions with the participants they met during the user observation phase. The ERM will be used as an exploratory tool which will help users express and externalize their experiences, expectations and preferences.

- **Review of initial ideas and preliminary evaluation:** Each team will present two alternative design solutions to focus on. The evaluation of individual sketchbooks will be an important part of this phase.

- **Design detailing and final evaluation:** The students will finalize the design solution in detail, and prepare the final presentation for evaluation.

The final presentation will include the sketchbook, 2D boards and a 3D full-scale white model reflecting the important platform features.

5. Grading

Research phase (literature search, user observations and ERM): 20%

Preliminary Jury (including idea generation and <u>individual sketchbooks</u>): % 30

Final Jury (including <u>individual sketchbooks</u>): % 50

APPENDIX B

LITERATURE SEARCH AND USER OBSERVATION BRIEF
FOR THE OPENKITCHEN PROJECT

Middle East Technical University Faculty of Architecture Department of Industrial Design Spring 2014-15 ID 302 Industrial Design IV

Asst. Prof. Dr. Çağla Doğan, Asst. Prof. Dr. Harun Kaygan, Asst. Prof. Dr. Fatma Korkut, Part-time Inst. Mustafa Hasdoğan, Res. Asst. Ahmet Burak Aktaş, Res. Asst. Özümcan Demir, Res. Asst. Mert Kulaksız

Project   II
OpenKitchen: Sustainable design solutions for a flexible, open-source cooking platform

Design Research: Literature Search and User Observation
1. Literature Search

PowerPoint presentation: 31 March 2015, Tuesday 13:40

Each team will conduct a literature search on one of the cooking related processes listed below through a literature review and **technical service visits**:

Team 1: Toasting
Team 2: Grilling
Team 3: Tea/Coffee making
Team 4: Warming-up & Bain-marie
Team 5: Boiling (egg, water, pasta, soup, etc.)
Team 6: Steam cooking
Team 7: Roasting & Baking
Team 8: Frying

For each subject, you will take into account the following considerations:
- **cooking processes** including food preparation, cooking, serving, storing and carrying meals around;
- **how related products work**, development of related products, their types and features, their working principles, materials, heating types and technologies, materials, controls and displays (analog and digital), storage, portability;

- **safety issues and measures** (e.g. electric shock, burning, fire, etc.), product recall cases, and safety issues for diverse user groups (e.g. elderly, children, disabled, etc.), accidents;
- **product maintenance and product part replacement:** maintenance and cleaning, product part replacement, repair, upgrading, etc.;
- **effective use of resources for household appliances:** energy and resource conservation, and heating and cooling off products;
- **existing open source and DIY examples** (open-source design solutions and do-it-yourself projects) for kitchen appliances (browse Openstructures, Thingiverse, Instructables, etc.);

We expect your research to include (1) online resources such as websites, library databases and e-journals, forums, blogs and videos; (2) online and offline books, magazines and other published material; (3) your observations at technical services; (4) your observations at shops and shopping malls.

Each team will then prepare a PowerPoint presentation documenting the research. Include your major conclusions/findings/insights. Propose at least **four** conclusions/findings/insights. Based on these conclusions you reached, propose a minimum of **six** dimensions which are critical for this project: e.g., affordable, socially bonding, repairable, aesthetically pleasing, exciting, personalized, etc.

2. User Observations

Poster presentation: 03 April 2015, Friday 08:40-12:30

Size: 70 cm x 50 cm; Orientation: Landscape; Language: English. A separate format will be provided.

(15 minutes of presentation in total for each team)

Each team will carry out two user observations on the specific cooking type assigned to them. The observations will be carried out in a home environment and in an office. During your visits, observe the activities carried out while the users are preparing, cooking, serving, cleaning and storing, and the settings in which the activities take place. You are required to document your study with still images and video recordings. Please use the provided format for your sessions **(*ExperienceChart.pdf).** Please ask for permission before recording and/or taking any pictures. You will be provided with a consent form.

For user observation sessions, one of your team members will be responsible for photographs and video recording, and the other team member will be taking notes on the form provided. Each session will involve the following stages:

a. **Pre-use interview** includes user characteristics, product features and use environment.
b. **Experience chart** explores use phases while the users are preparing, cooking, serving, cleaning, etc. While observing the user, you will take notes on the experience chart to highlight task-related experiences. The chart will help you identify the specific use phases related to the product. A list of possible use phases are given on the experience chart, to which you can refer as you fill in the chart. Using this chart, you will be able to document your insights into the users' task specific experiences both visually and verbally. You are required to take photographs for each use phase.
c. **After-use interview** involves an evaluation of the users' positive and negative experiences, atypical use situations and overall suggestions.

APPENDIX C

CALENDAR FOR THE OPENKITCHEN PROJECT

METU DEPARTMENT OF INDUSTRIAL DESIGN 2014-15 SPRING SEMESTER - ACADEMIC CALENDAR   ID 302 Industrial Design IV

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
23.Mar	Project II starts 24.Mar	Literature search and user observation 25.Mar	26.Mar	Lit. Search & User Obs. Crits Assembly/ Disassembly Session 27.Mar	28.Mar	29.Mar
30.Mar	Lit. Search Presentations 31.Mar	Literature search and user observation 1.Nis	2.Nis	User Obs. Presentations Scenario Bldg. (Home) 3.Nis	4.Nis	5.Nis
6.Nis	Scenario Bldg. (Home Transformation) 7.Nis	Idea generation: Scenario building 8.Nis	9.Nis	Scenario Bldg. (Office) 10.Nis	11.Nis	12.Nis
13.Nis	Scheduled crits: block models of platforms + draft scenarios 14.Nis	15.Nis	16.Nis	preliminary jury toolkit production 17.Nis	User testing session I 18.Nis	19.Nis
20.Nis	User testing session II 21.Nis	22.Nis	23.Nis	user testing presentations 24.Nis	25.Nis	26.Nis
27.Nis	Scheduled crits 28.Nis	Design detailing and crits 29.Nis	30.Nis	1.May	2.May	3.May
4.May	Scheduled crits 5.May	Design detailing and crits 6.May	spring festival > 7.May	8.May	9.May	< spring festiv 10.May
11.May	Scheduled crits 12.May	Design detailing and crits 13.May	14.May	2D presentation and technical drawings critique 15.May	16.May	17.May
18.May	3D models 19.May	20.May	21.May	Final jury evaluation All day 22.May	Last day of classes 23.May	24.May
25.May	finals > 26.May	27.May	28.May	29.May	30.May	Exhibition setup 31.May
METU CCC Exhibition starts>> 1.Haz	2.Haz	3.Haz	METU CCC << Exhibition ends 4.Haz	5.Haz	6.Haz	7.Haz
8.Haz	9.Haz	10.Haz	11.Haz	12.Haz	< finals 13.Haz	14.Haz
15.Haz	16.Haz	17.Haz	18.Haz	19.Haz	20.Haz	21.Haz

ID 302 weekly course schedule: Tuesday afternoon between 13:40-17:30, and Friday 8:40-17:30

APPENDIX D

CONSENT FORM FOR THE PRIMARY RESEARCH

Orta Doğu Teknik Üniversitesi (ODTÜ)
Mimarlık Fakültesi Endüstri Ürünleri Tasarımı Bölümü

Araştırmanın konusu: Deneyim Çizelgesi tasarım aracının değerlendirilmesi ve geliştirilmesi.

Görüşme için katılımcı izin formu:

Bu araştırma Orta Doğu Teknik Üniversitesi Endüstri Ürünleri Tasarımı Bölümü yüksek lisans tezi kapsamında yapılmaktadır. Araştırmanın amacı, üçüncü yıl tasarım stüdyosu kapsamında geliştirilen Deneyim Çizelgesi tasarım aracının proje kapsamında öğrenciler tarafından değerlendirilmesi ve geri bildirim alarak bu aracın geliştirilmesidir. Görüşme sırasında elde edilen veriler yalnızca bilimsel amaçlarla, tasarım sürecinde, tez araştırmalarında, bilimsel yayınlarda ve sunuşlarda kullanılacaktır. Görüşme sırasında konuşulanları daha sonra tam olarak hatırlayabilmek ve gözden geçirebilmek için görüşme sesli olarak kaydedilecektir. Görüşme yaklaşık yarım saat sürecektir.

Bu formu imzalayarak yapılacak araştırma konusunda size verilen bilgiyi anladığınızı ve görüşmenin yapılmasını onayladığınızı belirtmiş oluyorsunuz. Formu imzalamış olmanız yasal haklarınızdan vazgeçtiğiniz anlamına gelmemektedir; ayrıca araştırmacının, ilgili kişi ve kurumların yasal ve mesleki sorumlulukları devam etmektedir. Çalışmaya katılım gönüllülük esasına dayanır. Araştırma, katılımcılar açısından herhangi bir risk taşımamaktadır. Görüşme sürecinin başlangıcında veya herhangi bir aşamasında açıklama yapılmasını veya bilgi verilmesini isteyebilirsiniz. İstediğiniz zaman gerekçe belirtmeksizin görüşmenin durdurulmasını talep edebilirsiniz. Araştırmaya katkıda bulunduğunuz için teşekkür ederiz.

Katılımcıların adları soyadları　　　　　**İmzalar**　　　　　**Tarih**

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THE EC POSTER EXAMPLE FROM TEAM 1

THE EC POSTER EXAMPLE FROM TEAM 2

APPENDIX G

THE EC POSTER EXAMPLE FROM TEAM 5

APPENDIX H

THE EC POSTER EXAMPLE FROM TEAM 8

MIDDLE EAST TECHNICAL UNIVERSITY
DEPARTMENT OF INDUSTRIAL DESIGN

XPERIENCE CHART & USER OBSERVATIONS

Peeling the potatoes putting them in water
Potatoes are skinned and dipped in water for a crispier feel when eating.

Plugging in
After the initial preparation the device is plugged into the socket in the wall.

Setting the timer
A single button timer helps the user to keep track of time for heating up the pan, the oil and cooking. The button can be pressed for a long time to be reset.

Turning it on
The turning on and off button enables the user to start and stop the cooking without resetting the timer.

Slicing the potatoes
The user slices the potatoes while waiting for the pan inside the appliance to preheat.

Opening the lid
The buttons located both left and right can be pressed letting both right handed and left handed users to avoid getting burnt trying to open the lid.

Putting in the oil
Just a tablespoon full of oil is put inside the pan for frying the potatoes.

Resuming the heating
The product resumes working after closing the lid and pressing the turn on/off button to heat up the oil to 170C approximately.

Putting in the sliced potatoes
The sliced potatoes are put in the pan without letting them pile up on each other.

Frying the potatoes
While the device is running the paddle located in the middle rotates and stirs the potatoes inside letting them fry evenly.

Seasoning with paprika
Actify is paused when the lid is opened. Seasoning is done to increase the flavor and resumes cooking when the lid is closed.

Locking the handle
The handle can be locked by lifting it horizontally until a "click" sound is heard. Then the pan can be removed from the housing for serving.

Serving the meal
Potatoes are placed in a plate to be served. The slices stuck in between the paddle and the pan cannot be removed because the paddle is overheated to touch.

Unplugging
After the frying is done the device is unplugged and the removable parts are put into washing machine while the main housing is cleaned with a moist sponge/cloth.

PRE-USE INTERVIEW

37 year old, Female, Statician, University Graduate
The product is used by two people. She works as a computer programmer and into technology.
Tefal Actifry is a product runs on electricity and known for its healthy frying by using a tablespoon of oil.
There are two buttons located on the product: one to turn it on and off and the other to set the timer. The lid can be opened by a mechanical button. This appliance is preferred because it cooks healthier than regular frying and requires less effort while cooking. Moreover, while cooking less odor is produced. The product is stored on the counter-top because it is used frequently.

AFTER-USE INTERVIEW

The product didn't break down for once yet. But the handles mechanism loosen down a bit, though. While cooking there can be pieces of food stuck between housing and and the pan and needs to be removed for it not to be burnt. If the piece of food burns while stuck it can damage the device. The device is appreciated for it does not require stirring while cooking and the timer enables the user to be able to multi-function while the device cooks the meal.
The user uses the appliance for roasting dried nuts and fruits for an atypical use. The device takes up too much space on counter top and couldbe a little bit smaller.

CONCLUSIONS & DIMENSIONS

- Since only a table spoon of oil is required to fry the food, this method is much healthier than shallow or deep frying.
- These type of fries decrease the chance of boiling over which may cause serious damage to users with their ability to cook with lower amount of oil.
- The appliances ability to hold track of time enables the user to spend a lot of time watching the process of frying whether it fries well or not.
- The product holds little place relative to conventional stoves on counter tops, allowing the user to have more free space.

Healthy, Compact, Time Saving, Portable
Eco-friendly, Sustainable

Dhafan RIDHARIZAN
Gülnihal KARACA
Kaan YAŞA

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OPENKITCHEN: SUSTAINABLE DESIGN SOLUTIONS FOR A FLEXIBLE, OPEN-SOURCE COOKING PLATFORM