

A Tool for Empathetic User Experience Design

by

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ABSTRACT

Study in user experience design states that there is a considerable gap between users and designers. Collaborative design and empathetic design methods attempt to make a strong relationship between these two. In participatory design activities, projective ‘make tools’ are required for users to show their thoughts. This research is designed to apply an empathetic way of using ‘make tools’ in user experience design for websites clients, users, and designers.

A magnetic wireframe tool has been used as a ‘make tool’, and a sample project has been defined in order to see how the tool can create empathy among stakeholders. In this study fourth year graphic design students at Arizona State University (ASU), USA, are participating as users, faculty members have the role of clients, and Forty, Inc., a design firm in the Phoenix area, is the design team for the study. All of these three groups are cooperating on re-designing the homepage of the Design School in Herberger Institute for Design and Art (HIDA) at ASU.

A method for applying the magnetic tool was designed and used for each group. Results of users and clients’ activities were shared with the design team, and they designed a final prototype for the wireframe of the sample project. Observation and interviews were done to see how participants work with the tool. Also, follow up questionnaires were used in order to evaluate all groups’ experiences with the magnetic wireframe. Lastly, as a part of questionnaires, a sentence completion method has been used in order to collect the participants’ exact thoughts about the magnetic tool.

Observations and results of data analysis in this research show that the tool was a helpful ‘make tool’ for users and clients. They could talk about their ideas and also

designers could learn more about people. The entire series of activities caused an empathetic relationship among stakeholders of the sample project. This method of using 'make tools' in user experience design for web sites can be useful for collaborative UX design activities and further research in user experience design with empathy.

DEDICATION

This research is dedicated to the memory of my dad, the one who was always motivating me to continue my study and make big things happen.

Thank you dad, I will never and ever give up...

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PREFACE

As the author of this research document, I have been working for four years in the field of user experience design. In this short period of experience, I have used several wireframe tools. However, for many times I have noticed that people such as my boss and users of that specific mobile or web application, can work as well as me when they are using pencils. As a part of the design process, I was responsible to show them some wireframes and ask their feedbacks. They could participate and draw something on the paper as what they really need in that project. To me it was like the magic of my design activities. It was not only gave me design ideas but also was helping me to hear more words from their thoughts.

When I came back to school to continue my study in master of science in design, I have always had this dream to find a way that helps me to hear more and more from my users and clients in a web design project. I have always wanted to keep my designs based on human needs and let them to experience more happiness in what they do with an application. Therefore, I wanted to try and see what happens if we apply a physical tool in the process of user experience design for a digital product? I wanted to engage people more and more in this process because as a designer I am responsible to bring emotion into human experience. I believed that this research could be a start point for my goals in the field of design.

On the other hand, wireframe design is a task in user experience design process that has less graphic features and with simplest rectangles and lines in addition to sample text you can have an acceptable wireframe. A perfect wireframe for a web or mobile project needs a lot of expertise and passion to do; however, most of people can draw

simple things then they can have less fear to participate in this part. This gives them more confidence to talk if they will be asked to talk about what they want. They can have less focused to drawing and participate in discussions easier with a basic visual elements that they can share with designers.

What we see in this document is only a part of my dreams. In this research I am only focusing on the influences of a physical tool on human emotion about a UX design project. I hope in future studies other aspects of this kind of engagement can be discussed and analyzed.

CHAPTER 1

INTRODUCTION

1.1 Purpose of Study

The growth in the number of mobile and web applications has been phenomenal. Each application must take into account certain group(s) of users that use the product, whilst at the same time trying to make profit for the application owners. In today's markets, many consumer deliverables are comparable with respect to their features, quality, and user friendliness. This forces designers to find new ways to differentiate their products from competitors. It has also been stated that one of the parameters that can improve people's life experience of being good is emotion. (Diener & Lucas, 2000). Therefore, today a popular practice amongst designers is to focus more on the emotions and feelings of the user in the design and development phase of a product (Mugge et al, 2009).

It has been cited that User Experience (UX) is a somewhat unknown and foreign area of knowledge, to some degree being discussed vaguely by researchers (Hassenzahl & Tractinsky, 2006). At the same time, the number of software projects are ever increasing (Trendowicz, 2014). Therefore, the demand for effective user experience design makes it crucial for the success of all these projects.

This research is aimed at exploring the feasibility of using a new tool in User Experience Design projects, which can possibly bring emotions and feeling into discussions between design project stakeholders and describe their concerns surrounding a web project. To be more specific, this research attempts to look at a certain steps in UX

design, wireframe design, and see how a wireframe tool could be meaningful for users, clients, and design teams.

The research is focused on the user experience design and short-term user evaluation of a participatory design session in three forms. A prototype of the proposed tool was used for participatory design with three groups of eligible participants, followed by an interview and a survey after finishing the activity.

1.2 Significance and Rational

Nowadays a transformation is occurring whereas people that have been known as consumers are now becoming innovators next to the producers (Hippel, 2005). Understanding existing problems among users in order for them to talk about their needs and feelings has gained a lot of attention in user-centered design (Koskinen et al., 2003). There have been many researches done in past years to find effective contextual and emotional parameters suitable for design challenges (Kouprie & Visser, 2009). ‘Empathic design’ (Koskinen et al., 2003) helps designers in order to find tools and approaches to “walk in their clients’ shoes” (IDEO, 2008).

Literature review shows that there are several scholars who have proved that considering the experience of the users in their context is an important task for designers to do (Buchenau & Suri, 2000). Besides, a number of tools and guidelines for this goal have been developed (Suri, 2003) to help designers in order to imagine themselves in a user’s situation and grasp what they really feel about a context (Kouprie & Visser, 2009).

However, this type of engagement needs all the stakeholders in a web design project to be involved. Therefore, this research attempts to create a deeper understanding of user experience design for these applications, whilst considering specific requirements

in these types of products to recognize what is a good way of using empathic design in user experience design for web applications? Finding an answer for this question is important, since the number of online projects is increasing rapidly, and designers must be careful to keep these applications very user friendly for their users. Therefore, this can be considered an important issue alongside the many issues that exist among today's web development communities. In other words, the first important aspect to keep in mind is the users experience in the time period of having this experience (Whiteside & Wixon, 1987). Carroll and Thomas (1988) have introduced this discussion with a closer correlation to the term 'fun':

'We realize that many people will read this article as a joke. To this extent, we are the victims of our own analysis: there are risks in being serious about fun. Still though, we continue to see, without humor, the prospect of a decade of research analysis possibly failing to provide the leverage it could on designing systems people will really want to use by ignoring what could be a very potent determinant of subjective judgments of usability (Carroll & Thomas, 1988, p. 23).'

Considering the issue of fun as an important key for the creation of a unique user experience that helps create a better experience for the end users, we must answer the question how can stakeholders have fun in a UX design project? And how can we measure this experience of fun?

Moreover, "user experience design is a creative task" (Hauser, 2007), where significant events attribute to this task. Such events can occur suddenly in the creative process or are only known to have existed looking back on what occurred when the main

design idea began to emerge (Dorst & Cross, 2001). Therefore, in order to capture all creative ideas in a design question, it will be better to collect all possible insights in a design process. In a user experience design project, these insights can come from several sources: project owner insight, end user insight, and design team insight, since the designer, the user and client are stakeholders of a web project (Miller, 2011). Therefore, this research focuses on the client, users, and the design team, and experiments and design activities will be done by taking into account these categories of stakeholders.

The aim of this research is to use a wireframe tool which can be easily used by the aforementioned stakeholders, and then to evaluate how this tool effects their feeling about a project, creativity, and ensuring a fun experience during UX activities.

Emphatic tools are believed to be becoming more important for the process of user experience design in web applications, since the number of web projects is increasing and web applications have become a tool for millions of businesses around the world to communicate with people, make revenues, and create an experience. There is a reason behind each application; these reasons should be clarified for all in a project, and then they can share their insights about a specific domain.

1.3 Scope and Limitations

The research is an experimental study that was undertaken in the state of Arizona. Participants are living in the Phoenix area and they are categorized in three groups: the design team of five people, ten undergraduate fourth year students of the graphic design program at the Design School of Herberger Institute for Design and Art in Arizona State University (HIDA at ASU) and three faculty members of HIDA.

In this research, a magnetic wireframe tool will be used as a ‘make tool’ (Sanders, 2002). All groups participate in specific design sessions, in order to have hands on time with the magnetic wireframe tool and talk about their thoughts, feelings, and experiences. The same sample project will be given to all participants. This research only focuses on the evaluation of participants experience with the magnetic wireframe tool as a ‘make tool’. The output of their activities with the aforementioned tool helps the research to see whether they could understand several aspects of the tool or not.

In the first session, each of the faculty members will be asked to participate in a participatory design session to sketch what they want to see for the homepage of the Design School at Arizona State University in a simple wireframe style with paper and pen. Then the magnet wireframe tool will be given, and they will be asked to decorate pieces based on their preferred setup. We repeat this process three times. Then they will be asked to fill their specific questionnaire and also talk about their feelings with short interview questions.

In the second session, ten students, who are the potential users of this sample website, will be asked to do repeat the same process that faculty members had done individually, and then share their feelings and talk about their insights and what they want to see in the homepage. At the end they will fill the questionnaire and also answer short interview questions.

In the last design session, the design team members are trying to do work with their normal process for designing a wireframe based on the specification for this project. Then they use the proposed wireframe tool as their new option to do the wireframe design. Pictures of each wireframes along with a summary of comments, which have

been done in each of the last thirteen (13) sessions, will be shared with them and they should try to consider those in their design process. After that they will be interviewed with several short questions and then they will be asked to express their feelings during the process of wireframe design with the magnet tool. At the end they will deliver a finalized idea with the magnetic wireframe for the homepage of the project

The result of this research is important in order to understand the initial user feedback toward this innovative way of empathic design for user experience design in web applications. It can also be used as a do it yourself (DIY) method (McKellar & Sparke, 2004, Gelber, 1997) for UX design projects which involves all major stakeholders and forces them to think and create something that represents at least part of their ideas.

Limitations of the research include the size of the sample website project, which needs to be designed. It is difficult to generalize the outcome and findings in a limited time for participants. Obviously if the activity can be done for a full size web user experience design project, more insights and feedbacks could be collected, and responses could have more details about several aspect of the sample project for all stakeholders. Besides, all of participants in users and client groups have a background in design, but not specifically in user experiences. This has its own cons and pros; however, since the topic is new, it is preferred to have participants who at least have design backgrounds and knowledge in order to collect more accurate design solutions.

On the other side, the other limitation in this project is its participants. Most of the users and clients are familiar with user experience and especially wireframe design activities. The sample project is in the design school and on the positive side this can help

the research to understand more about several aspect of this tool because of their familiarity with the tool. This brings valuable comments about the tool that can be modified for future research, then the tool can be applied on non-designer groups with more understanding and higher quality. It is believed that their familiarity with the concept does not influence on their conversation and the focus of this research. First of all it is important to see how they work with the tool and then it is valuable to see how their results can help design team members to build the final design. Therefore, in this research design there should not be any issue caused by their familiarity with the process. This even eases steps of the research and opens more doors about the research concern.

1.4 Research Questions

The research looks at the quality of using magnetic wireframe to have empathetic user experience design in web projects. Here each question, its rationale and the hypothesis for each question in this research will be discussed.

1. Can the magnetic wireframe be used with all stakeholders in a UX project?

Rationale: Everyone should be able to use ‘make tools’ in order to project their ideas and thoughts (Sanders, 2002).

Hypothesis 1: Magnetic pieces enables everyone to design their dreams for a website with any level of knowledge about design.

2. Can design teams learn more about users and clients when they are using magnetic wireframe as a ‘make tool’?

Rational: Capturing users’ perception about their experience and evaluate those, are crucial in design process for designers (Nurkka et al., 2009).

Hypothesis 2: Users and clients' designed wireframe along with their comment about a website, can help design team to understand people's needs and thoughts.

3. In what aspects the magnetic wireframe can improve stakeholders' experience?

Rationale: The importance of evaluating user's experience with a product (McNamara & Kirakowski, 2006). McCarthy and Wright also believe "how the person felt about the experience, what it meant to them, whether it was important to them, and whether it sat comfortably with their other values and goals." (McCarthy & Wright, 2005, McCarthy & Wright, 2004).

Hypothesis 3: Magnetic wireframe tool is able to help participant to have a fun experience and also helps them to imagine their ideas in a clearer and faster way, with more creativity.

1.5 Conceptual Framework

The conceptual framework illustrates the relationship between different research fields regarding user experience design with empathy (Figure 1.0). As shown in the figure, the research will evaluate the possibility of providing a bridge between user participatory co-design and empathic design in the context of user experience. It seems, since user experience design is a user based topic, those other areas can make a good connection with user experience design processes, since they have user-based approaches as well.

The critical issue in this framework is to look at the feasibility of bringing collaboration on the UX table. Empathic design potentially collects a vast amount of

knowledge about the user, so having this in the proposed framework will enable the potential of knowing more about the stakeholders and their feelings in a UX project.

On the other hand, participatory co-design is a method that approaches stakeholders in a design session and lets them create a design prototype with limited materials in order to express their ideas and thoughts about a design challenge. The intersection between empathic design and participatory design can be called ‘make tools’, which can be participatory design toolkits that are able to bring empathy into a design project.

IDEO (2008) proposed both participatory design and empathic design as helpful methods in order to “develop the approach” to create a design product (IDEO, 2008), but as separate methods. This research tries to combine these two methods and see how they can be helpful in the area of user experience. In other words, a participatory ‘make tool’ is going to be used for user experience design process for all stakeholders of a web project.

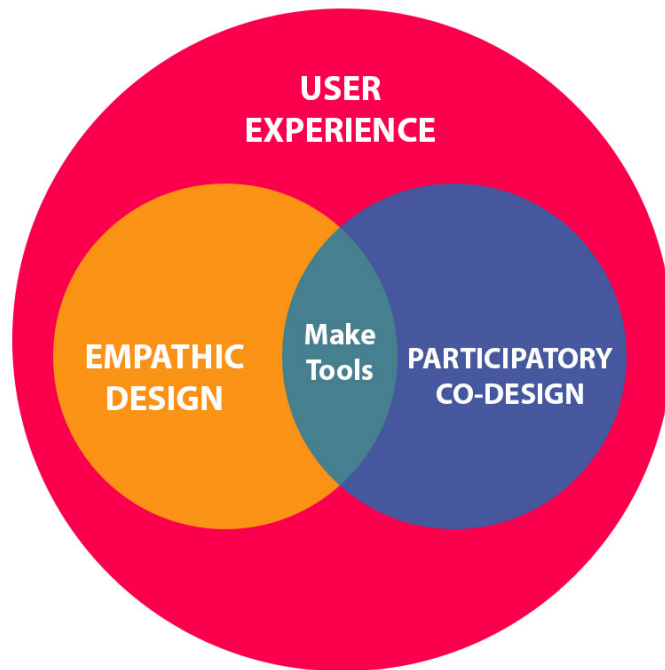


Figure 1.0. Conceptual Framework

Moreover, this framework can be analyzed from different points of views based on stakeholders' groups for a UX project; once as a designer, another time as a user, and also as a client to see what points will be discovered in each specific group and what issues will be touched upon more closely in each category.

This research attempts to first present all of these important areas (user experience, empathic design, and participatory co-design) and then propose a tool, which is compatible with the combination of empathic design and participatory design, which helps each group to have a positive cooperation in the process of user experience design, specifically in wireframe process. This tool can open a lot of doors for all stakeholders to share their feeling and make their conversations with more clearer and meaningful experiences.

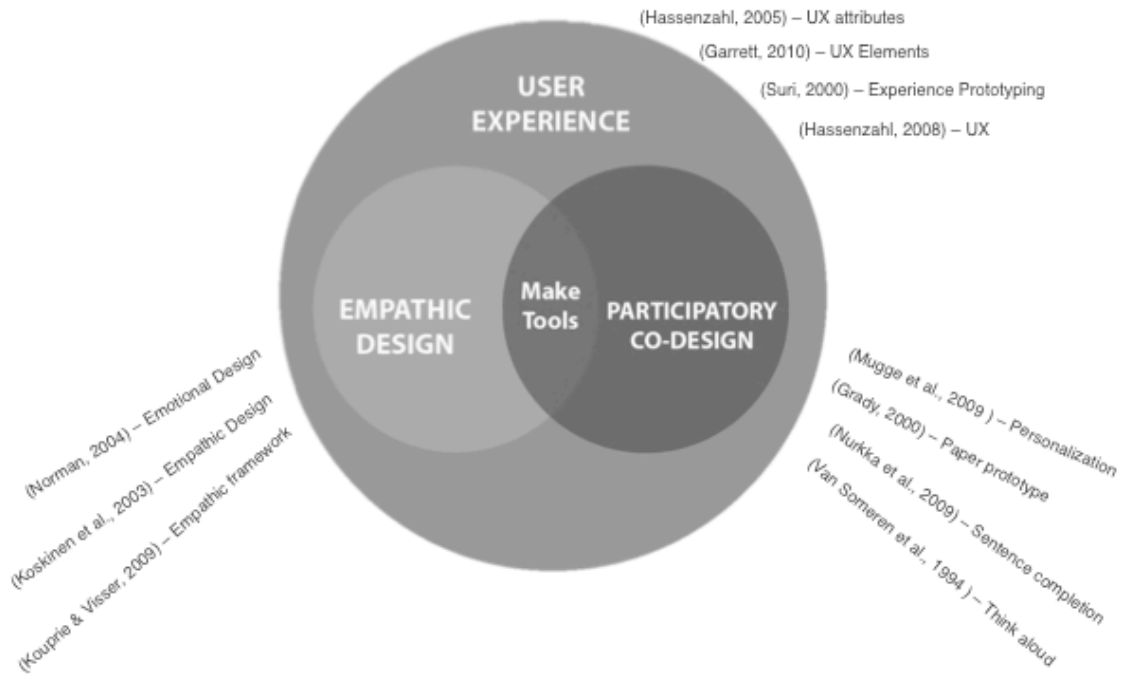


Figure 1.1. Conceptual Framework, Level 2

1.6 Definitions of Three Main Areas in This Research

In this research participatory design is going to be used as a tool for bringing empathy in user experience design process for web projects. Therefore, there are three main areas, which need to be clearly defined. There is a complete discussion about them in the literature review section. However, in order to start the discussion, it is necessary to clarify the difference among these three terms.

There are several definitions for user experience; however, this research focuses on Hassenzahl's definitions of UX. He defines UX as a momentary that primarily evaluates feeling (good-bad) while interacting with a product or service (Hassenzahl, 2008). In this research product and service are limited to web applications. Also, in this research the term 'UX' is just the shorted term for user experience.

Empathic design led to the view that designers should be more sensitive to users, be able to understand them, their situation, and feelings: to be more empathetic (Kouprie & Visser, 2009).

Besides, participatory design as a collaborative design tool has been used in several researches in design. There are also several aspects of participatory design, which need to be clarified and some of them, which have a relation to this research, will be reviewed in the second chapter of this research document.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This section will provide a critical review and comparison of different ideas, research, theory and implementations, as well as further design opportunities in the field of user experience design. It begins with clarity of definitions, steps, and tools used in this field. These discussions have tried to clarify what is really happening in user experience design process to see potentials. Different aspects of user experience design will also be reviewed. Additionally, literature about empathic design and actual frameworks for this part of the research questions were reviewed. The review also examined and compared different research in co-design and participatory design to discover how the participatory design works and what are the stories behind it. Last, the literature review addressed the importance of seeking out new tools for participatory design with empathy.

The relationship between user and product could be one of the keys for this research's questions, therefore material related to this have also been reviewed. Moreover, since creativity is attached to the design process, it would be meaningful to see what connects creativity to the design process. Also some reviews have been done in order to evaluate other ways of collaboration with users in the process of user experience design.

2.1 User Experience

Hassenzahl believes “user experience (UX) is a strange phenomenon” (Hassenzahl & Tractinsky, 2006, p. 91). He also says user experience supports all aspects

of the interaction of user with the whole product and services around it (Hassenzahl, 2006). In another discussion the concept of user experience is associated with a wide variety of meanings (Forlizzi & Battarbee, 2004), which consists a spectrum from beauty to hedonic, and functional features of a product (Hassenzahl, 2006).

Hassenzahl (2008) in another article about UX says: “User Experience (UX) is not just old wine in new bottles” (Hassenzahl, 2008). It tries to widen the horizon of interactive technology in a high quality way, and also tries to have closer connection to humans in order to create a good experience around a product (Hassenzahl, 2008). Regarding this description, Hassenzahl added a definition; he believes a “Good UX” is the consequence of fulfilling the human needs for autonomy, competency, stimulation, relatedness, and popularity besides being in touch with the product or service. In another research he calls these features hedonic qualities of a product (Hassenzahl, 2005). On the other hand, pragmatic quality will be mentioned. They should facilitate the way that a product can achieve its own functional goals. He puts hedonic quality against pragmatic quality and in another article uses these two qualities to describe a model of user experience.

2.1.1 A Model of User Experience

Hassenzahl (2005) proposes a model for user experience from two different perspectives of users and designers. In Figure 2.0, both models can be reviewed.

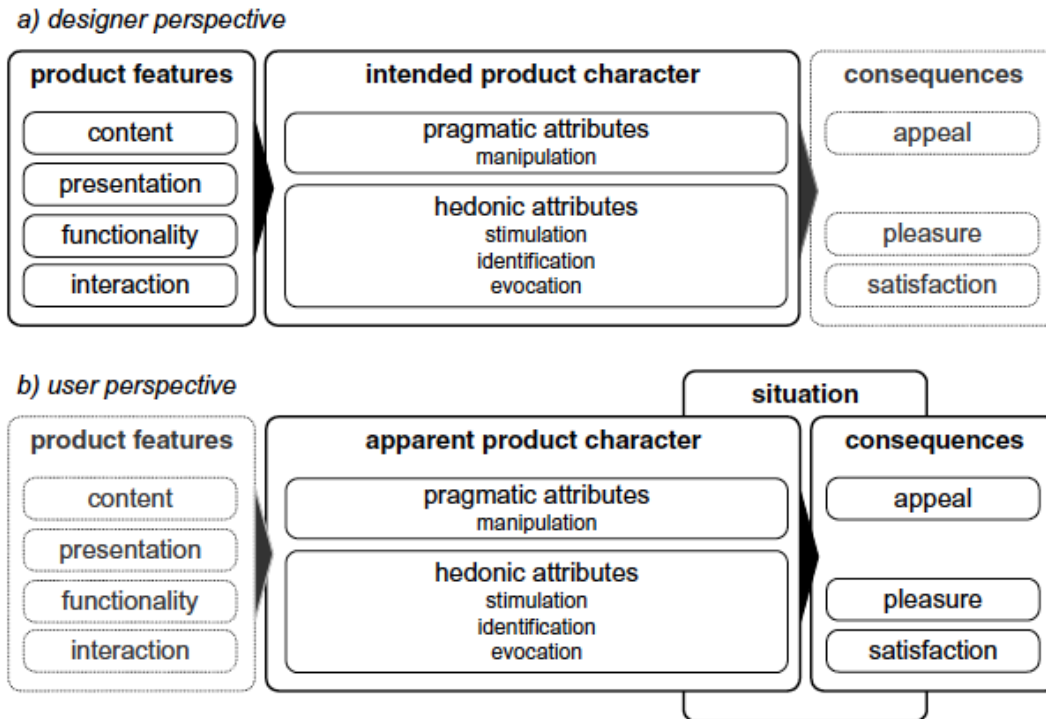


Figure 2.0. Key Elements Of The Model Of User Experience From (A) A Designer Perspective And (B) A User Perspective (Hassenzahl, 2005, p. 32).

Based on this figure it can be observed that, a product has specific features such as content, presentational style, functionality, and interactional style. Typically, a designer is choosing these features, and they are making product character. Hassenzahl believes “a character is a high-level description” (Hassenzahl, 2005, p. 32). Cognitive studies show that the function of character is to reduce cognitive complexity and also to create particular strategies for handling the product (Hassenzahl, 2005).

On the viewer side, they first catch the product's features. They make characters of a product for themselves and will try to define hedonic and pragmatic attributes of a specific product (Hassenzahl, 2005). Then the whole apparent character lets them judge a product by saying "It is good/bad" (Hassenzahl, 2005, p. 32). It will also allow other consequences such as emotional and behavioral consequences. However, the

consequences of a particular product character are not always the same. They are moderated by the specific usage situation (Hassenzahl, 2005).

This discussion talks about the importance of creating products, which make valuable consequences. There is an important issue here, how designers can make sure that they are delivering a product that is meaningful and has decent usability? And how they can make a good 'situation' for users to get transferred from apparent product character to consequences? In order to answer these issues, it can be valuable to see what the pragmatic and hedonic attributes are.

2.1.2 Pragmatic and Hedonic Attributes

In the area of software products, literature review shows that pragmatic attributes of these products are "clear", "supporting", "useful" and "controllable" (Hassenzahl, 2005, p. 34). A pragmatic product is an instrumental product, which satisfies all functions that could be expected from those combinations of attributes (Hassenzahl, 2005).

Hassenzahl (2005) counts the rest of a product's attributes as hedonic attributes (Hassenzahl, 2005). He has chosen this term because, it is important to differentiate these two types in order to be able to consider each of them and let them become measurable. Pragmatic attributes try to cover individuals' behavioral goals, while hedonic attributes support the psychological aspects of being good. Also, in Cambridge Dictionaries Online (2014) the adjective of hedonic means something 'connected with feeling of pleasure'. Therefore, mentioning the 'hedonic' shows his belief in the powerful potentials available in pleasure, which is stronger than pragmatic attributes (Hassenzahl, 2005). The hedonic function of products can let them be identified as especial products and help remember them later. For example, "outstanding", "impressive", "exciting" and

"interesting" can be some of software products' hedonic attribute (Hassenzahl, 2005, p. 35).

In order to make a successful product, it seems both pragmatic and hedonic attributes must be developed in the best way to make a strong relationship between the product and its users. Regarding the last discussion from Hassenzahl (2005), he also discusses the combination of these two types of product attributes and shows different types of product characteristics based on this combination.

This discussion could provide a clearer view about product attributes and characters; however, there is an important consideration that must be taken into account regarding the 'evaluation' of a designed product. Evaluation is a significant task that designers must consider in the process of user experience design to see how the product can be fit with a specific user group and their products should be somehow measured and analyzed.

2.1.3 What Should be Evaluated?

McNamara and Kirakowski have published several articles regarding the evaluation process in user experience. Literature review in this area shows that *Functionality*, *Usability*, and *Experience* are the main three aspects of using a product that need to be considered when designing and evaluating technology (McNamara & Kirakowski, 2006).

In their research they argued that, functionality is a technical issue and directly in contact with the product (McNamara & Kirakowski, 2006). So evaluation tries to find out that what does the product exactly do. Usability measures the interaction among users and a product. The product should solve an issue for users, so obviously it should be

completely user oriented and satisfy user needs. Usability attempts to give the opportunity for users to see if the product exactly acts like what they really need. User experience covers a wider area of the connection and interaction of the user with the product to see if it really fits with users' nature (McNamara & Kirakowski, 2006).

According to literature review these questions might include “how the person felt about the experience, what it meant to them, whether it was important to them, and whether it sat comfortably with their other values and goals.” (McCarthy & Wright, 2005, McCarthy & Wright, 2004).

In order to measure and evaluate each aspect, literature review suggests valuable points, which need to be considered when the assessment is being done. Guidelines for all these three parts is presented (McNamara & Kirakowski, 2006, p. 28):

Assessing Functionality: This includes the product's features, whilst also evaluating performance, reliability, and durability of a product. In order to go more into the depth of the functionality, user comments can typically be a good tool to see if whether the presented function was close to what they assumed or not.

Assessing Usability: In usability user's comments provide the potential to evaluate ease of use, learnability, and the proposed steps of usage, manuals, and the accessibility of related services around it.

Assessing Experience: Literature review also shows there is no specific successful methods for evaluation in user experience (McNamara & Kirakowski, 2006). Some designers have used usability approaches and they are adding more human dimensions to it in order to evaluate the UX values. However, experience is usually characterized separately from the product features; a recent method presented and it called “design

reductionism” (Hassenzahl et al., 2001). After that, McCarthy and Wright (2005) proposed Felt-Life framework. This framework is in contrast with design reductionism, and it suggests that user experience cannot be counted separately from product features (McCarthy & Wright, 2005). They argued that, designers must value user experience in all part of their design process.

In this research, assessments of the last aspects seem more applicable in the process of user experience design. There is a powerful connection between users and a product, which needs to be evaluated in order to gain high satisfaction levels in designing with (or from) experience for specific goals of a product. Meanwhile, since user experience design is a professional task, it is worthwhile to review literatures from experts in this area. *Jesse James Garrett* is one of the famous user experience designers, who is professionally active in the UX design market (Garrett, 2010). He is a co-founder of *Adaptive Path* (www.adaptivepath.com), the user experience design firm in San Francisco, CA (Garrett, 2010). In the next session a review will be done to see spaces in user experience design and find a correlation among evolution rules and UX design in multiple layers.

2.1.4 User Experience Design in Action

Jesse James Garrett in his book *Elements of User Experience Design* (Garrett, 2010) introduces five planes of a user experience design project: ‘surface’, ‘skeleton’, ‘structure’, ‘scope’ and ‘strategy’ (Garret, 2010).

Surface consists of a series of Web pages, made up of images and text. Behind that surface is always a skeleton of the website. In the skeleton the position of buttons, controls, photos, and blocks of text are planned. Skeleton’s most important task is to

organize all elements and give them the best place and behavior in order to act correctly and understandable. Structure in as abstract layer on top of the skeleton in the website and its responsibility is to explain users' flow amongst pages. This also decides how and when several features and flows in a website can get connected to each other. Each website has a strategy behind it, the strategy determines the scope of that specific website and create boundaries for the possible function list of the website (Garret, 2010).

Each plane is related to the planes below it. So, “the surface depends on the skeleton, which depends on the structure, which depends on the scope, which depends on the strategy” (Garrett, 2010, p. 22).

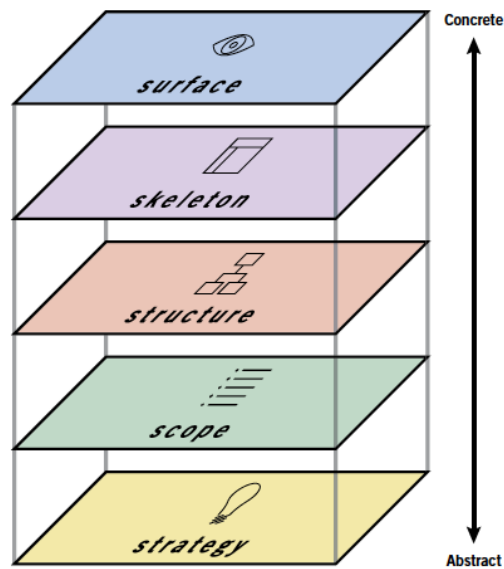


Figure 2.1. Five Planes In User Experience Design (Garrett, 2010, p. 22)

According to the above literature review, skeleton plane has the potential to maximize the efficiency and effect of a website. Since the research focuses on providing ways for empowering the final UX product for all stakeholders, going more into the

depth of skeleton layer can open a lot of door to find a element of the site which needs more attention in that layer.

2.1.5 Skeleton Plane

Garrett (2010) divides each plane into two parts; one is product as functionality and the other one is product as information. On the functionality side, he defines the skeleton through interface design. But information products have a unique set of problems all of their own. Navigation design is the specialized form of interface design tailored to presenting information spaces. Finally, crossing both sides, information design, is the presentation of information for effective communication (Garrett, 2010).

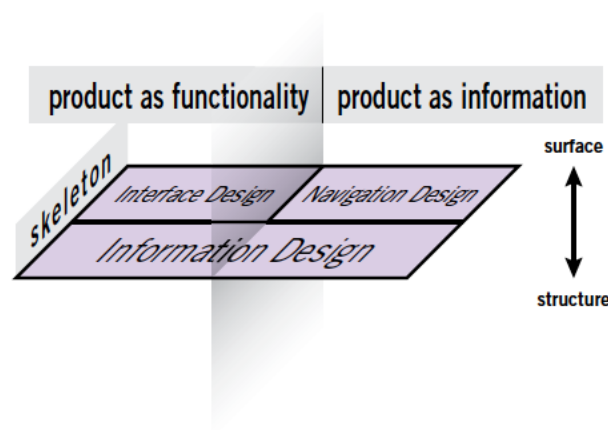


Figure 2.2. Three Elements In Skeleton Plane (Garrett, 2010, p. 108)

2.1.6 Wireframe

When information, interface, and navigation are going to be designed, page concept comes up to create a unified skeleton for a website. Garrett (2010) says: “the page layout must incorporate all the various navigation systems, each designed to convey a different view of the architecture” (Garret, 2010, p. 128); all of these pieces are necessary because they have a role in the page. Therefore, information design is crucial for a good result in this part.

Based on literature review, wireframe can be defined as schematic way to create the skeleton of a website, which shows how all element can be fit together to communicate with users (Garrett, 2010). Wireframes collect all ideas in a single document and in the process of working on a web project it is an important reference for the implementation of visual design (Garrett, 2010).

Based on the literature review, wireframes are the first phase in a formal visual design for a web project (Garrett, 2010), and in the whole process of development, the developers need to come back and compare the product with what has been mentioned in the wireframe. Even for designing in strategy, scope, and structure, people who are responsible about these aspects can refer to the wireframe and certify that the product can meet what they have expected (Garrett, 2010). Also wireframe can be a tool for builders of a website to check if they are progressing correctly and ask their questions based on the wireframe.

Garrett also believes that when they are separate visual designers and user experience designers in a project, wireframe plays a powerful role and enables both sides to share their comments and ideas on a specific topic based on their knowledge and expertise. It also helps them find hidden question, apart from its ability in uncovering problems during the design process (Garrett, 2010).

To summarize, wireframe can integrate different parts of structure, navigational, information design, and positions of visual elements in a website. So it seems wireframe is playing an important role in the process of user experience design for the entire design team. It can be counted as a common reference for everyone involved in a web project. It also has potentials to be a language because of its simplicity in action and its ease of use

for everyone. Now it will be important to see what are the available wireframe tools being used in current user experience projects.

2.1.7 Wireframe Tools

Literature reviews and research about current wireframe tools show that several instances of them are available. Keeping this in mind, some powerful tools will be introduced below in two major categories, wireframe software tools, and wireframe analogue tools. Literature and especially searching in the online content in order to find updated and active wireframe tools showed that wireframes are usually being presented in these two main categories. Software wireframe tools such as Balsamiq (Guilizzoni, 2010), Axure (Axure, 2012), and Pencil (<http://pencil.evolus.vn/en-US/Home.aspx>). Also, analogue wireframe tools such as Paper prototyping (Synder, 2003), Phone Doo (<https://www.cohdoo.com/phonedoo.php>), and Wireframe Magnets (DIY Kit) (<http://konigi.com/tools/wireframe-magnets-diy-kit>).

Based on what has been found in reviewing several articles, Analogue methods are supported by User Experience pioneers such as Bill Buxton (2010), author of Sketching User Experience (Buxton, 2010) and Carolyn Snyder author of Paper Prototyping (Snyder, 2003). According to their comments on analogue wireframes they recommended them based on these reasons (Nedved, 2012):

- Analogue wireframe keeps all team members motivated to participate in prototyping sessions.
- It allows designer to do what they want quickly and collect feedbacks faster.
- And it gives them more freedom, since there is no limitation in these tools.

Based on what has been reviewed about several types of wireframes, in the second group, the last two analogue tools seem interesting because they work based on magnets and are made by magnetic materials. Also, based on articles about these tools, they are useful for group activities where they could be used in large sized whiteboards by using dry erase markers. But they are usually mentioned as tools for user experience designers and visual designers in a web project team. This research tries to see if other stakeholders in a project can use them.

2.1.8 Three Approaches to User Experience

Besides what has been discussed about the measurement of user experience, literature review shows three approaches to user experience (Battarbee & Koskinen, 2005). First one is the *measuring approach*, which is mainly used in development and test processes. Literature review from McNamara and Kirakowski (2006) showed some aspects of the measurement in user experience. This approach tries to evaluate emotional and cognitive reactions. It is almost hard for people to verbalize these types of feelings, so it is an important issue to see how the verbalization process can be possible in the measuring approach.

The second one is *pragmatist approach*. Forlizzi and Ford (2000) proposed a model for user experience in interaction. This is a theory-based model, which shows experiences constructed by long time interactions between the user and the environment (Forlizzi & Ford, 2000). Some other research shows that this approach should focus on sense-making process, which consists of actions such as anticipating, interpreting and recounting (Wright et al., 2005). Therefore, the user interaction in the real context in long shot periods is the issue that this approach targeted.

The third approach is *empathetic approach*. The role of design empathy became popular from in the 90s by several researchers in this area (Leonard & Rayport, 1997, Segal & Suri, 1997, Koskinen et al., 2003). In this approach, in order to design an experience for users, designers must engage with the user's desired experience using sense and emotions to collect all feelings and insights around a topic. Design empathy involves both users and designers and helps users to have a tool to verbalize their dreams and have a discussion with the design teams (Dandavate et al., 1996).

So based on the above literature review, it seems empathic approach is a powerful approach in user experience in order to involve users and create a meaningful experience for end-clients of a specific product. In user experience design for web projects, there is a big gap between designers and user; typically they cannot meet each other in a midpoint. Therefore, there is a lack of understanding that needs to be supported by having an empathetic approach to go behind the user's eyes.

2.2 Empathic Design

In order to bring contextual and meaningful factors into a design task (Kouprie & Visser, 2009) designers should try to be close to the lives, feelings, and experiences of users to design in the way that meets users' needs (Koskinen et al., 2003). Literature review asserts empathy is a quality of design and that both designers and user's minds can have influence on it (Kouprie & Visser, 2009). There are several researches about empathic design and all of them argue that empathy is a significant quality in the process of product development, which helps designers to meet customer needs (Mattelmäki & Battarbee, 2002, Suri, 2003). Empathic design supports a wide range of issues in design from rational issues to private contexts (Mattelmäki & Battarbee, 2002). Some of these

researches proposed valuable techniques for empathic design, and three of them will be discussed here.

2.2.1 Approaches to Design with Empathy

There are several techniques for empathy in design; however, Kouprie and Visser (2009) try to categorize them into three main categories, which will be presented here.

First of all, the most popular and accepted approach is being in direct contact with users (McDonagh & Bruseberg, 2000, Mattelmäki & Battarbee, 2002, Suri, 2003).

Literature review shows some advocates believe preparing generative sessions can provide an opportunity for users to express their thoughts (Sanders & Dandavate, 1999, Visser et al., 2005).

The second technique is communication and it is a good approach, especially for times that designers cannot meet users directly. Several techniques such as storytelling, persona and scenario design, and roleplaying have been mentioned in empathic design researches (Buchenau & Suri, 2000, Go & Carroll, 2004, Lugt & Visser, 2007).

The third category contains techniques for designers to step into the role of the user and use a role-playing approach to feel experiences. Techniques here include 'product handling', 'experience prototyping', 'bodystorming' and 'informance' (Buchenau & Suri, 2000).

Regarding the aforementioned techniques, it is necessary to have a framework to apply these techniques in a certain way. Following a framework helps designers to plan step by step to collect all the empathetic results that they need for a specific design challenge.

2.2.2 Empathic design framework

During the literature review, several frameworks for design with empathy have been found; however, four of those are more popular. Stein suggested a process that has three phases: ‘the emergence of experience’, the ‘fulfilling explication’, and ‘the comprehensive objectification’ (Stein, 1917, Nilsson, 2003 & Kouprie & Visser, 2009). After him, Reik (1949) and Rogers (1975) proposed other processes. Reik (1949) believes that this might consist of identification, incorporation, reverberation and detachment. On the other hand, Rogers asserted that there are three phases: entering, living, and communication (Rogers, 1975, Hakansson, 2003). It seems these three frameworks have something in common and it is possible to summarize and modernize these models into one unified plan.

In order to implement design projects with empathy, Kouprie and Visser (2009) proposed a simple but complete framework for empathy in design. This framework tries to give insight into three key elements: motivation, ‘stepping into and out of users’ life’, and the time that should be planned for the empathetic relationship (Kouprie & Visser, 2009). The proposed framework in their article consists of four steps. Since there is some key factors in this element, in this literature review it has been tried to have a short review on these four steps to find a good place in order to apply empathy in the main research questions.

There are four steps for the proposed empathetic framework: ‘discover’, ‘immersion’, ‘connection’, and ‘detachment’ (Kouprie & Visser, 2009).

In discovery the designer approaches users and starts to get in contact with them. This step is supported by a list of questions, and then the designer must try to find

answers on these questions around the users' life. After the first session, it is the time to get out of the office and be more and more close to users to see what happens around them without any judgment, this is why Kouprie and Visser (2009) named this step, immersion. In this step the designer must be open-minded and just catch users' points of view. After that, the designer must try to recall users' thoughts in an understandable way in order to make an emotional connection. This step helps both sides to understand feelings and meaning about a specific issue. In the final step, detachment, since the level of understanding has been raised enough, it is time to get back into the role of a designer and start ideation (Kouprie & Visser, 2009).

Based on what this article mentions as a framework for empathic design, some important points come up about the importance of these step in having a successful user experience design:

- In all of these steps, the designer must only care about users in all possible aspects, which resonates perfectly with the definition of user experience design.
- These steps can be categorized into two parts, the first part, which consists of the first two steps, are more about users' and their real life. The second part, which consists of connection and detachment, are done more in action and closer to design solutions.
- Connection and detachment phases of empathic design framework have potentials for catching users' design ideas and issue with the final product. They are able to discuss feelings and meaning in a specific context.

- It seems necessary to use powerful tools in each step to collect meaningful information about the user and find a language, which helps users to share their feeling in the connection step.

IDEO in 2008 published a book called HCD, Human Centered Design, and in that book tried to provide all toolkits around the user centric design (IDEO, 2008). This book proposes three main sections in a human centered project: hear, create, and deliver. Then they introduce several steps and methods for each part. When it comes to the ‘create’ section and in it’s first step, ‘develop the approach’, they talk about two methods. The first one is *participatory co-design* and the second one is *empathic design*.

It is really interesting that they have placed empathic design in the first step of the creation process and they also pointed out that empathic design should be done not only to generate ideas in a design team, but also to have the users in mind throughout the whole process. In the book the authors emphasize the importance of this and as their framework for doing human centered design projects, they used empathic design in several domains.

On the other hand, they introduce empathic design next to participatory co-design as two supportive tools for developing the approach in a design project. It can be argued that there is a success key in this combination and it can be more valuable if these two methods could be applied in a user centered design project, in order to get involve with users’ feelings and active thoughts when they are doing a participatory design. However, since participatory co-design in these literature reviews expanded the horizon around design with empathy, literature reviews have been done to find more about this part of the research questions.

2.3 Participatory Design

Elizabeth Sanders (2002) believes there is a shift happening in design that generated an attitude to think about designing with users instead of designing for users (Sanders, 2002). Literature review shows everyone has something to add on top of the main idea in a design process, so why should they be ignored? If they can have appropriate toolkits, they can share their thoughts and ideas in a creative process. However, it should be considered that these participants are not part of the team, but they speak for the research and share their insights.

It is also believed that, it is hard to design experience, because it is a step-by-step creative activity and users will produce it. This process has two sides, communicator and communicate, it is important to see how these two are interacting in a certain moment. The question here is how this communication can be understood and how they can be collected in a sort of valuable conversation, which can create positive effects during the design process in order to design a meaningful experience? To summarize, ‘how do we access experience?’ (Sanders, 2002).

2.3.1 Access to experience

Elizabeth Sanders (2002) in her all encompassing research about user-centered process and co-design has proposed sort of rules in order to collect users’ current experience and their preferred experience. Based on literature review, designers can listen to what people say, and catch what they think. Designers also can watch what people do and see how users use a product and understand what people know about a context. Regarding this understanding, they can realize what users’ feel and value their dreams (Cain, 1998, Sanders, 1992 & Polanayi, 1983). Then, these actions from users can be categorized into

three main actions: say (say, think), do (do, use), make (know, feel, dream). The important point here, in regard to users' feelings, dreams, and knowledge, is that specialty tools are needed (Sanders, 2002).

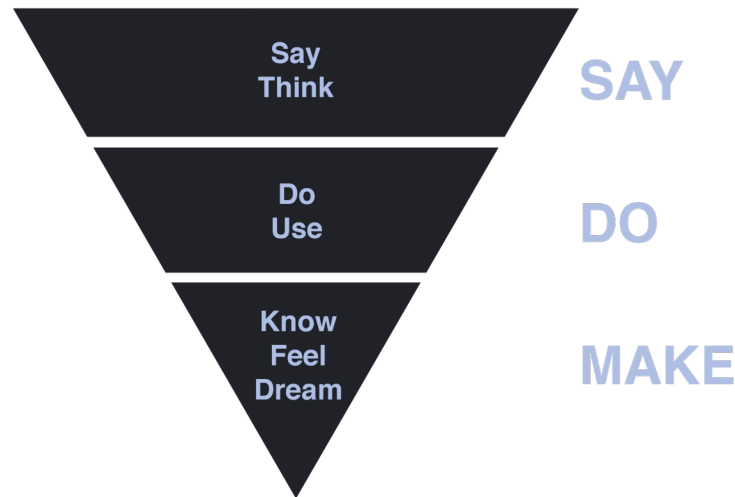


Figure 2.3. What People Say, Do, And Make (Sanders, 2002)

Elizabeth Sanders (2002) believes designers must provide ‘make tools’ for users to make a language in common between users and designers (Sanders, 2002). These ‘make tools’ should be projective. They also need to have potentials to show people’s creativity. So they need to be easy to use and they should not have complicated features for people, how are using the toolkit to show their thought.

This literature review shows the importance of using ‘make tools’ in participatory design process to have participants’ ideas and let them say, do, and make. Based on literature reviews in empathic design it can be argued that, these say, do, and make actions bring empathy in the design process, if they could be done in the ‘connection’ phase of the empathetic framework (Kouprrie & Visser, 2009) in order to make a connection with stakeholders of a design project.

Dorst and Cross (2001) used ‘think-aloud’ (Van Someren et al., 1994) technique in the experimental research for co-evolution in design (Dorst & Cross, 2001). If this method can be used in addition to activities with the aforementioned ‘make tool’, this can directly access what participants know, feel and dream and that is how this process can be empathetic.

2.3.2 Product personalization in co-design

As another part of stakeholders in this research, clients are playing an important role in the design process. The role of product owners is different from users and designers. Recent researches in the past decade show there are several reasons for consumers to personalize their products (Blom & Monk, 2003, Weightman & McDonagh, 2003, Schreier, 2006, Mugge et al., 2009). Personalization helps owners to have ease of use, because they feel more familiar with the product, it also gives them the feel of ownership (Mugge et al., 2009). It is also mentioned that the product personalization process is a fun thing to do, and owners try to put an effort in the process of product design for themselves and it enables them to come up with creative choices (Mugge et al., 2009). In a competitive market, personalization helps owners have a unique identity (Kiesler & Kiesler, 2004) distinguish their brand and characteristics from other competitors in the market. Besides, literature review shows, self-expression is another advantages of bringing product personalization in the design process (Kamptner, 1995, Dyl & Wapner, 1996). And least but not last, it can be a fun thing to do (Mugge et al., 2009).

Therefore, it can be stated that adding personalization in web products has these same advantages. It provides several options for website owners and give them an

opportunity to build their own website based on what exactly happens in their business. They know a lot of features in their own market and want to target a specific market, they can say what they're advantages are in comparison with current competitors, and they know the overall contents that they want to be used in the website. So, if they can have a good toolkit, they can make what they want.

Regarding to literature review, wireframe is in skeleton plane and designing the skeleton plane is crucial in web design. Also, designing a plain wireframe is easy for everyone to do. Regarding to the reason of this study, an easy to use wireframe tool for all stakeholders is required. A good wireframe toolkit can be a potential 'make tool' for both users and clients to express their ideas, feeling, and concerns about the targeted issue.

Besides, Franke and Piller (2004) in their research about value creation by toolkits for user innovation and design argued that user and owner participation in design activities makes the market more mature and it should be done even if it raises the costs. They also asserted that the sample product which is being designed by these groups, can be attractive for others users and owners (Franke & Piller, 2004), since each have some sort of creativity in their features.

Apart from what has been discussed above, creativity is one of the forces that exist in the process of co-design where users and clients are involved, and it will make a synergy around the participatory design topic. It can be useful in the literature review to take a look at creativity in design and its several valuable aspects.

2.4 Creativity in design

Design solutions come from creative mind, it is not necessary to involve a lot of expert creative designers in each design process, it is just important to catch creative insights of participants, even users and owners, in an exact moment which that creative momentum happens (Dorst & Cross 2001). Dorst and Cross in their research also mention that designers must be able to collect all of these insights during the process in order to come up with key features of the design concept. However, it is not guaranteed that the expected creative moment should happen for sure because it is related to the situation that the design process is being done. In participatory design one of the items that affects the creative process is the tool for participatory design (Sanders, 2002).

Literature review of Christiaans (1992) shows that time is an important issue in creative process. If participants spend more time to map ideas from their own perspective to the subject that they have to be creative for, designers can achieve better results as a creative output from that activity (Christiaans, 1992). Besides, applying creativity in design process makes that idea original (Dorst, 2001), so if product owners can put their idea in their own design project, it can be invaluable for them to have an original and unique product amongst other competitors.

Dorst and Cross (2001) research about creativity in design also argues that creativity in design brings the problem-solving aspect involved with co-participation models. It is also mentioned that this combination brings surprises for designers about what they did not think about before (Schon, 1983). This 'surprise' plays an important role in the process of problem solving for a design task (Dorst & Cross, 2001). Therefore, creativity in design can expand a horizon in a design process and if this task can be done

in a participatory design, it could focus all stakeholders' creative minds in a right path and make designers surprised.

To put the issue into perspective, doing creative design, as designers, users, and product owners, requires a powerful toolkit. This toolkit might involve everyone and should help participants to say, do, and make what they believe as a preferred and creative output for a specific subject.

2.5 Conclusion

The literature shows that user experience design has a lot of potential in having users involved in the design process. As an important phase of user experience design, especially in web projects, which are the subject of this research, designing the skeleton plane plays an important role in the success of a web design projects because it specifies the hierarchies and allows displaying relevant information. Wireframe is a tool for designing the website skeleton and analogue frameworks have more ease of use for designers and other participants during the wireframe design process. Besides, magnet wireframes are one of the manual wireframe tools that are recently being used in design process. However, they can be used also in the participatory design activity for web design.

As an important issue, empathic design forces this research to find more about abilities used to engage users and see how they feel and think, how they are coming up with ideas, and how they do work with a design product. Empathic design engages users and stakeholders deeply with a design project, so this can help this research in becoming more aware of stakeholders. Consequently, an empathetic framework is needed in order to guide the research in the right path to apply the empathic design in the process of user

experience design. Based on the literature review about this issue, the connection phase is the place that can make use of a wireframe task for participant.

In addition, numerous studies have argued that participatory design is a valuable method to be used in user study. In this research, participatory co-design comes up as a tool for bringing this required empathy in user experience design. Participatory design is becoming more popular and it is a successful way to see what users say, do, and make. Since the empathic design needs to capture feelings, in this research participatory design is being used to see if it can be a good tool for user experience design with empathy.

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter introduces methods and methodology used in the proposed research. Since an empathetic wireframe tool is being introduced as part of the research, the design process and operational mechanism are discussed in detail. The main idea is that of a magnetic wireframe built on top of the current available magnetic tools for designing wireframe models. However, empathetic conversations are added to this model as well as simplifying the current method of using magnet wireframes. This is then followed with a case study using the model with three groups of participants. These design sessions have been done based on proposed methods found in the literature review of empathic design research and user experience research to obtain more valuable results, which are then matched with the discussed frameworks and phases in each area. Next, basic information about participants and their role in a user experience design project is introduced. These participants are recruited based on their level of participation in a sample web project, a group of students as users, a group of faculty members as project owners, and a design team, which is responsible for designing the user experience in the sample project. The process and methods of data collection are then introduced followed lastly by the research questions.

3.1 Methods and Methodology

Due to the fact that the research topic revolves around several creative participatory design processes, a combination of experimental and qualitative research methods are best suited for this study. In this case, the methods are participatory co-

design and semi-structured interviews, being followed by a survey, which is conducted based on the sentence completion method, in order to understand the ease of use the proposed wireframe task has for users and clients, and also to see how that effects the design process for user experience design teams.

Also, as a part of this research in the literature review, several quantitative researches have been done in order to understand boundaries, definitions, steps, and frameworks in all areas of the research questions.

3.1.1 Literature Review

This research is based on a combination of several popular collaborative methods for design, empathic design, participatory design, and also sentence completion method. The literature review on the first two has been done in the second chapter; however, since the incomplete sentence method has a well-established background and a lot of work has been done with this method for user experience design, it seems important to review this method and see where and how it can be applied for this research's questions.

Besides, magnetic wireframe is one of the analogue wireframe tools in user experience design; however, paper prototyping, as another manual wireframe tool, has been used in some other research activities in the pass decade. As a successful case study, a literature review has been done on a research in paper prototyping for web design projects as well.

3.1.1.1 Sentence completion

Understanding user needs and what functions are required vary based on the users' values and different situations (Nurkka et al., 2009). Besides, if the product cannot make connection with the user's values, it cannot create a successful market for product

owners (Cagan & Vogel, 2002). The question here is how users values can be understood and extracted.

Since user experience is a consequence of users' insight, system features, and their both communication in a context (Hassenzahl & Tractinsky, 2006), it is important have a tool to differentiate between several insights about a specific user and how effective and meaningful this is for the design team. This tool needs to be flexible for users to shape it however they want. Answering predefined questions has its own advantages; however, in a topic like user experience design, designers need to catch users' values and this requires dynamic questioning but in a structured way. Moreover, emotions have a direct effect on an individual's experience and memory (Norman, 2004), thus in addition to values, the tools should be able to imply the users' feelings as well.

On the other hand, as discussed in the literature review chapter, it is necessary to have a projective tool for this research; since the research is seeking to understand how possibly users feeling can be collected. Projective techniques are constructed based on different human abilities: 'association', 'completion', 'construction', 'choice ordering', and 'expressiveness' (Sanders, 2002).

There are several projective techniques in the literature review; however, one of them, which is used in a number of user experience research (Greatorex, 2005, Hoyer & MacInnis, 2007, Nurkka, 2009), is sentence completion method. Nurkka et al. (2009) assert that these sentences must be open enough for participants in order to let them be open about sharing their feelings and thoughts (Nurkka et al., 2009). The other important point in developing these sentences is about their validation. Researchers have to make sure that all of their incomplete questions are valid for the participant group.

Literature review also argues that, these types of question must be abstract enough for participants to just put them in a context and let them decide on the importance elements relating to their experience, and focus on what resonated with them (Nurkka et al., 2002). Then all collected answers from participants can be collected and organized in a table to see several answers in the same context, with the same incomplete questions, but with different feelings and values in their response.

Nurkka et al. (2009) in their research for capturing users' perception use this method and also uses some incomplete questions like: 'in my opinion, computer...', 'I use computer because...', and 'the internet...'. As it is obvious, these questions are simple and abstract, but related to the research context (Nurkka et al., 2009). Therefore, in this research a number of sentence completion questions have been developed for participants to answer after doing the participatory design session, in order to understand 1) how was their feeling during the design process with magnetic wireframe and see how they express their feelings, and 2) how does the magnetic wireframe help all categories to come up with ideas and be creative in doing a design task in different levels.

3.1.1.2 Using paper prototypes

Literature review talked about several available toolkits for wireframe design, the one that is going to be use in this research is magnetic wireframe. This research tries to use magnetic wireframe for several stakeholders in a UX project, the research done by Grady (2000) uses paper prototypes in a web project for Mercer University (Grady, 2000). Based on the literature review about this research, paper prototyping has four main benefits for web projects:

1. The whole activity does not take too much cost and time.

2. People participated in the activity tried to critique the process and web design process, which is important for designers to know.
3. Designers tend to do this activity, since they do not spend more time for these sessions.
4. This activity caused improvement in the usability for the aforementioned website.

Boling and Frick (1997) mentioned three benefits of paper prototype (Boling & Frick, 1997). First of all, it is easy to be done by hands, second it is portable and designers can carry that wherever they want and ask their participant to play with those and, third, paper prototypes are unfinished and have low level graphical features, this makes an opportunity for participant to feel and make their ideas with them and criticize objects in a page (Boling & Frick, 1997). This can also noted that doing this activity does not rely on working with computer software.

As it has been mentioned in this literature review, it can be asserted that magnetic wireframes have all of these characteristics and values. The material of magnetic wireframes also works for longer time and it is not necessary to reprint papers. Magnetic wireframe also can be combined with the use of markers and erasers in order to put names, details and sample text in magnetic boxes and be able to change them any time in the process of wireframe design.

3.1.2 Participants

This research aims to use a design tool in order to bring empathy in a user experience design projects. It has been already discussed that all stakeholders of a web project are going to be the subject of this research, users, client, and the design team. In

this research a sample project has been defined as a web project with relevant stakeholders.

The sample project is about designing a new homepage for the Design School at HIDA. Therefore, users are students, the client consists of a group of the schools faculty and the design team is a firm, which is responsible for the design of this subject. Three faculty members have been asked to participate in this research, two of them have director position in the school and the other one has a passion in web design, and who plays a role as a consultant of the client team for this sample project.

For users group, 10 fourth year students of the graphic design program (5 male, 5 female) have been asked to participate in this study in order to role play as users of this website. The reason that they have been selected for this study is because there are familiar with the home page of the design school for about 4 years. Also, they have viewed the website from several perspective, from the beginning of their application for ASU, accessing to forms, login pages, and etc. Thus, they could have more comments about the home page of the design school.

Forty, Inc., (<http://forty.co>), which is located in Phoenix area, has been asked to participate in this project as the design team. The Forty's design team knows about ASU. Based on the empathetic framework that has been chosen in this research, the first two phases are about discovery and immersion. In order to skip these two phases and focus on the third step, which is connection, the design team should know about the Design School at HIDA. Therefore, Forty, Inc., seems like a good choice for this study.

3.1.3 Participatory Design Session

Based on the literature review and the research goal, a participatory design is required to see how a ‘make tool’ can help stakeholders to share their thoughts and feelings. In this research, a magnetic wireframe tool is going to be used as the ‘make tools’ for all participant groups. Also, in order to compare it with current manual activities, it is going to be compared with sketched wireframe (paper and pen) to see how it changes the experience. Moreover, it gives an opportunity to participants to have a base model to compare the magnet tool with. It is also believed that in order to have participants’ thought and feelings, the ‘think aloud’ (Van Someren et al., 1994) technique is required during their activity. For the whole time of the activity they used this technique besides participating in the design task.

It should be considered that the think-aloud technique used only to hear what users and clients wanted to see as elements and features in the page and this helps the research to provide a valuable transcript for designers. The think-aloud activity could disrupt the design process, but it did not interrupt their activity and they could even find remarkable findings about the tool and argue about what they found interesting during the activity with magnetic wireframe tool. However, it was necessary for the research to hear what they ‘say’, based on the literature review from Sanders (2002), and think-aloud could easily support this requirement.

3.1.3.1 Sketching wireframe

Based on the literature review pen and papers are one of the most popular ways to do a wireframe activity. Besides, it is the simplest task that everyone is familiar with and there is not too much knowledge required in order to work with paper and pen. The task

in this participatory is simple, participants will be asked to sketch a wireframe for the homepage of the design school, in order to try this tool for the sample project in the study. An 8.5x11 paper plus a black pen have been given to them in order to sketch their idea.

3.1.3.2 Magnetic wireframe prototype

Magnetic wireframe as the selected ‘make tool’ for this study has some versions in the market. However, in this research, magnetic pieces and sizes are simplified in order to get to the point and not to go into too much details of designing the magnetic wireframe. It has been tried to keep the whole process easy for all stakeholders because the attempt is not only to design a wireframe, but also see how a ‘make tool’ can help all stakeholders in a web project to express their feelings and ideas.

Therefore, a simplified version of the magnet wireframe has been created for this research as a prototype for participants. It has been tried to keep the size based on actual size of users laptop monitors, appropriate at least for 13 inches laptops. On the other hand, they have been sectioned based on 1,2, and 3 column layouts, in order to give users options to implement their idea in several layout forms. Also, dry erase markers let them add every other features and texts or whatever elements they want to be added into their magnetic wireframe. All magnet pieces have a white erasable surface that gives users the opportunity to write with dry erase markers on them and clean them.

10 pieces of 60 mil magnetic sheets (8 by 10 inches) with white erasable surfaces have been cut into different sizes: *2x10*, *4x10*, *3.25x4*, *2x5*, and *1.5x4* inch in order to support 3 different types of the aforementioned layouts and columns. Also a magnetic dry-erase 17 by 23 inch whiteboard has been used as a board for this activity. It allows

participants to put their magnet pieces on it and make their actual magnetic wireframe, write on it and edit that if they want.

3.1.3.3 Co-design session operational mechanism

An invitation to participate in the research and the information letter about the research was first sent to the email address provided by each participant. Design sessions with users and client have been done individually in a one to one participatory design session, while participatory design with the design team has been done as a group activity with all design team members. Then they will be asked to participate in a 30 minutes (60 minutes for design team) design activity regarding the research topic.

In the co-design sessions with users and clients, first they could choose whether they wanted to be video recorded or not. Then the topic of the sample project has been given to each participant and they have been asked to start sketching their ideal homepage for the design school in in their specific role (users or clients). Role playing and thinking aloud are the two main tasks that they could do in the whole design session.

When they stopped sketching, the magnetic wireframe tool was given to them, they were asked to do the same project with magnetic wireframe tool, while they were thinking aloud and focusing on their role as a user or client. Based on the literature review, these techniques have been used to let them *say*, *do*, and *make* in order to gain the empathy. However, in the whole process they could think like a designer and mention their idea as if they were the designer. At the end of the activity with the magnetic wireframe, a picture has been taken from each presented idea with magnetic wireframe.

After finishing the task, each participatory design followed by a short semi-structured interview. This was done in order to see how they felt about the session and

mentioning the advantages they found in the tool and what differences they found between these two tools. Then the video capture was stopped and they were asked to answer some quick questionnaire and sentence completion to write about the experience. These are going to be discussed with more details in this chapter.

On the other side, a summary of past participatory design session has been discussed with the design team, also an image from each finished magnetic wireframe from the users and client teams have been shared with them in order to give them an introduction about what users and client believed about the project. Then, the design team has been asked to sketch a wireframe for the subject of the project with paper and pen as a group. Then they used magnetic wireframe in a group activity to design their wireframe one more time with the magnetic tool. Then an array of individual interviews with each team member has been done and then they have been asked to fill the questionnaire and do the sentence completion task in the survey form.

During the whole process, in order to track their activities in all design sessions and also to keep their name and personal information confidential, each participant gave a combination of a letter and number. Letters are *U*, for users, *C*, for clients, and *D*, which is for design team members. For example *UI* was the first user who participated in the design activity.

Participatory design session causes a situation for research to see whether the usage of magnetic wireframe is easy and meaningful for users and clients or not. On the other side, in the design team, it helps to collect data from the design team to understand if it helps them to know more about the users feelings and thoughts.

3.1.4 Follow up Interviews

In the next step, after finishing each participatory design session, a semi-structure interview has been conducted to see how they can describe their contact with the magnetic wireframe. These interviews were done exactly after the design session with magnetic wireframe tool because participants were totally in the same context and situation. They could again use magnet pieces to say what are the cons and pros of that tool and talk about their feeling and experience easier.

The interview questions were designed to be simple. They were related to the experience that participants have had in the design session. It was also a planned activity because after that they were supposed to do a survey and complete some sentences with their own words. This redundancy helps the research to makes sure about answers that they share. Also, an interview could help them to summarize their experience and find appropriate names, verbs, and phrases in their mind. It was not only useful for the research question, but also valuable for users in order to be prepared to answer questions in the next part in the highest possible quality.

Interview questions for users and clients are:

1. Describe your feelings about this design session.
2. What advantages do you think magnetic wireframe creates for you?
3. Does magnet tool help you to express your comments, needs, and ideas easier?
4. Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

Also design team members were individually asked to answer these questions:

1. Describe your feelings about this session.

2. What advantages do you think this tool brings in your projects?
3. Does that help you to understand more about client and users?
4. Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

The first and last questions in both interview questions' sets are the same, because they are asking about the personal understandings and experience in these sessions; however, second and third questions are pointing to the same, but from different aspects, the first one is from the user's and client's point of view and the second one is showing designers beliefs about magnetic wireframe advantages and idea generation ability with magnetic tool.

In the process of interviews, it has been tried to use probing techniques to let users talk about their experience easier. The attempt was to let them remember their feelings and motivate them to talk about all of the important moments in the design session. However, semi-structured interviews cannot directly give the research comparable answers in order to see how exactly the tool was successful. Consequently, the need of a short survey, in order to summarize these answers, seems necessary.

3.1.5 Questionnaire and Sentence Completion

This research activity was followed by a short survey that contains two sections. In the first section the attempt was to find out how exactly participants can value the experience with the magnetic tool and how was the grade of this tool for them in different areas. Based on the research questions and literature review, in order to understand the value of the tool by itself and the reflection of the tool on participants, these statements have been developed to see how much they agree or disagree with them:

1. This activity was fun for me
2. Magnet tool helped me to be faster
3. I could talk more clearly about my idea
4. Magnet tool helped me to imagine better
5. This tool helped me to be more creative

These statements were used for all three groups of stakeholders to just focus on personal feelings and relation with the tool. They were supposed to select a grade among 1,2,3,4, and 5, 1 means totally disagree and 5 means totally agree. In this part of the research, numbers are preferred over using phrases such as agree, disagree, somehow agree, and etc. because this seems faster for participants to select a number and grade their feelings and experience. Then this experience can be measured with a certain number, which is comparable with others' results and experience evaluations. It also helps the research to come up with meaningful graphs in order to compare the different aspects of the experience with magnetic tool in the Data Analysis chapter.

In the second section of the survey, based on the literature review, which has been discussed in this session, a sentence completion task has been defined for all three groups. This let them to once again think about their experience with the magnetic tool and share their experience about that in a context with boundaries. These boundaries are incomplete phrases that are given in this stage to them, and they must complete them with their own words.

Using the magnetic wireframe in the different groups of stakeholders is the main activity in this research, so it is important to see how they can define this new experience and what words can be chosen by them about their experience with this tool. These words

can help the research to understand whether the magnetic tool is useful or not and in what aspect it can be helpful for each stakeholder. It also can potentially expand an area for using this tool in other areas of user experience design, since participants are free to use their own words and show their creativity to apply the use of this technique, based on their situation and experience, in several part of the UX issues in a web project.

User and clients must complete these sentences about their experience with magnetic wireframe:

1. The magnet tool is.....because.....
2. The magnet tool helped mebecause.....
3. Talking and playing with magnet pieces wasbecause.....
4. In this session, I wish I could

First three questions in the beginning tries to focus in a context, find an appropriate word for the blank and then in the second part see why it was like that. In the last sentence participants could mention what else they hope to have in that session. This can be useful to notice lacks in the current idea and also understand some point for future works.

On the other side of this activity, design team members must complete these sentences individually:

1. My favorite wireframe tool is because
2. The magnet wireframe is
3. The magnet tool helped usbecause.....
4. I would magnet wireframe as..... in my projects.
5. Having used magnet wireframe in team, I heard

In this part, the first sentence let the research to know why a specific tool can be their favorite wireframe tool. Sentence number two can reflect how the magnetic wireframe resonated with them and it is being followed by the next sentence to show how it helped them in their group activity. The fourth sentence can imply how they would apply this tool in future projects. And the last sentence helps them to once again remember what they heard from teammates in the activity session and see whether these conversations could be valuable for them or not.

All of these answers from the sentences answered by both teams (used in the Data Analysis chapter) can be shown in a table and then categorized to see how much their experience were close to each other and what elements can improve it, or what are the other potentials in this tool. Therefore, this part of the survey can answer an important question in this research and show how the experience with the magnetic wireframe tool was and whether it can be useful in web design projects or not in order to discover more about stakeholders' thoughts and bring empathy for all stakeholders.

In order to summaries the whole process of the used methodology in this research, figure 5 shows the whole activities and the timing for each of them.

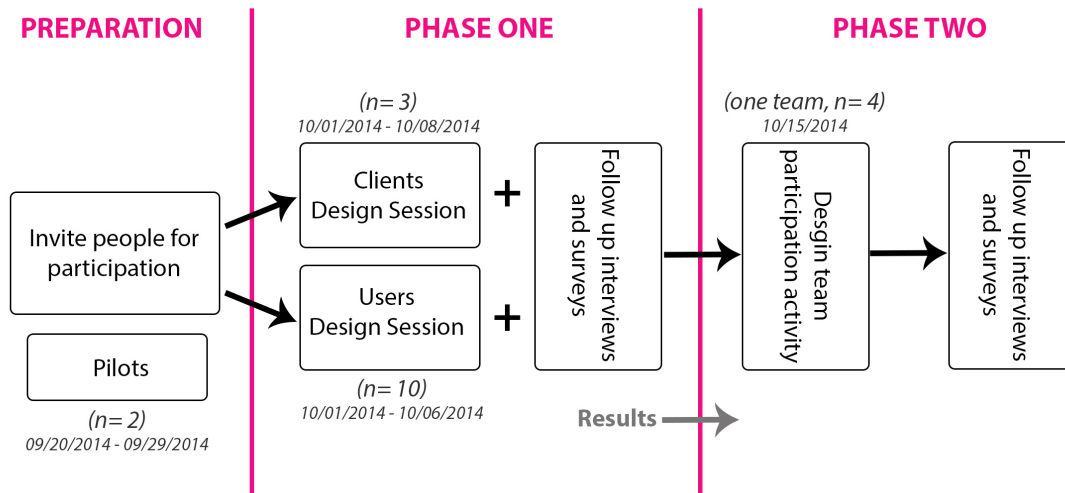


Figure 3.0 - Study Setting

3.2 Pilot Study

Before we start applying the methodology for participant, a pilot study was done with 2 participants in order to evaluate questions and the whole participatory design activity. The result of this study has shown that all of the steps are making sense for pilot participants. It also helped the research to estimate the approximate required time for the final study, which is around 30 minutes. Moreover, when the sample project and situation has been defined for these participants, there were some points that they mentioned needed to be clarified. So, it helped the study to make clearer phrases and stories for the design session activity and interview questions.

In the pilot study all of the steps have been followed, conversations in this pilot study could show how much the whole context could make sense for participants. Also, responses to interview questions and surveys could help see how some questions could be mentioned well. Here is part of the response to semi-structured interview questions:

Q1: How was your feeling in this session about the activity?

Answer: *'I have never done exercise like this before and it was new to me and I really like it. Playing with those magnets was active exercise.'*

Q2: What advantages do you think this magnetic tool has for you?

Answer: *'In magnetic tools, those boxes are just there and all those modules are handy and I just need to pick them and find a position. If I want to put in the word, this is very flexible.'*

Q3: Do you think this magnet tool could help you to express your comments, ideas and feelings easier?

Answer: *'Yes, I think this helped. In paper I was worried about having a clean sketch, but in magnet I could be free of that and meanwhile talk easier. Also I could move things around and explain why this is good or why this is bad.'*

Q4: What is your idea about the difference between magnetic wireframe and sketching?

Answer: *'Paper is more rigid, magnetic tool is more flexible. The great part of magnetic wireframe is that it can be collaborative and we can talk about a web project together with a same language.'*

After this pilot it has been noticed that more pieces of magnets are required, so more pieces were added in order to give participants more options.

Here is one of pilots responses to both parts of the survey after doing the participatory design session and interview questions, starting with agree and disagree questions and the in the second example, sentence completion questions.

Table 3.1

Pilot Number 2 Answers For First Part Of The Questionnaire

	Q1	Q2	Q3	Q4	Q5
Disagree \leftrightarrow Agree (1,2,3,4, or 5)	5	4	5	5	4

Table 3.2

Pilot Number 2 Answers For Sentence Completion Questions

#		Part 1		Part 2
1	<i>The magnet tool is</i>	Collaborative	<i>Because</i>	It is flexible; it uses shared space and not personal space.
2	<i>The magnet tool helped me</i>	To be more active and engaged	<i>Because</i>	I could make quick changes.
3	<i>Talking and playing with magnet pieces was</i>	Creative	<i>Because</i>	I can move them anywhere on canvas and also on top of each other.
4	<i>In this session I wish I could</i>	Have magnets with different shapes		in order to show details.

3.3 Data Analysis

Based on the method chosen in the previous section, three main categories of data have been discovered in participatory design session, users and clients talked about the feature of the website that they like to see, so in order to share them with the design team, a summary of their required features must be collected to be presented to the design team as the raw data for the new homepage of the design school. On the other hand, in all participatory design sessions several remarkable actions and narrations were captured, since participants were asked to use ‘think aloud’ technique. In data analysis a selected

version of these conversations and actions will be mentioned and they will also be categorized.

As another output of participatory design sessions from user and clients, some picture of their final works with the magnetic wireframe have been collected to be shown to the design team as the second empathetic data about customers' needs. From participatory design with the design team, a report about what happened will be mentioned; also a picture of the final wireframe, which was finished using the magnetic wireframe tool from that group activity, has been captured as an output of the activity. The design team also talked about how their wireframes relate to what they learned from the user and how it affected them.

In the following up interview for each question, keywords have been collected and in data analysis all of them are going to be shown as buckets of collected data about their overall feelings in these form of design sessions with 'make tools' such as magnetic wireframe. Finally they will be sorted based on their frequency to see what feeling is more popular about these sessions in their conversations.

Next in prepared surveys, first for agree-disagree questions, all of the grades will be collected in a table and graphical figures will show what the common answers are, this can specify what the advantages or weakness of the tool for users, clients, and designers were. This helps to create meaningful results about the activity with this tool and using it as an empathetic 'make tool' for user experience design projects.

In the sentence completion section, a table of answers will be shown and then it will be tried to make buckets of answers to see why special words and feelings have been discussed in their answers and what aspect of work with this tool can be shown with

those answers for each group. Finally, the overall grouped data in this part shows all actual summarized cons and pros of the tool. Then, the research can conclude whether this tool could contain the whole processes and relations as an empathetic activity or not.

3.4 Research Questions and Rationale

Q1: Can the magnetic wireframe be used with all stakeholders in a UX project?

Since literature review shows that a ‘make tool’ is necessary to extract feelings and thoughts about participants, doing participatory design session with magnetic wireframe as a ‘make tool’ can help the research to see if it is easy and meaningful for all stakeholders to share their ideas and concerns with a magnetic tool. A high level of people’s acceptance of the tool indicates the higher feasibility of using that as an empathetic tool for UX projects.

Q2: Can design teams learn more about users and clients when they are using magnetic wireframe as a ‘make tool’?

It is very important to see how the experimental results of design sessions with clients and users could help the design team to generate an idea as a design solution for the project, so designers’ comments and ideas about the effectiveness of this tools plays a significant role in showcasing the results of this application.

Q3: In what aspects the magnetic wireframe can improve stakeholders’ experience?

Based on literature review, it has been discussed that bringing fun in UX projects is important. Besides, it is important to see how this tool can help all of stakeholders of a web design project to talk about their ideas. Also, it is important to see whether this tool can increase the creativity in a UX design task for all stakeholders or not. Therefore, the

evaluation of collected data about these aspects of the 'make tool' in this research can show how much it can improve experience of participants.

CHAPTER 4

DATA ANALYSIS

4.0 Introduction

As discussed in chapter 3, three (3) types of co-design sessions have been done in order to evaluate the proposed tool for empathic user experience design. The first and second types encompass users and clients and the last one is for the design team. The result of first and second co-design sessions, including sample wireframes and summarized insight, have been shared with the design team and then they finalized the study with their proposed wireframe with the magnet tool.

Each session has been followed with an interview and a questionnaire and all of them will be presented in this chapter. Combinations of qualitative and quantitative data have been collected from these activities.

In this chapter a variety of results will be discussed. First, from the first two co-design sessions, it has been tried to observe how participants work with magnetic tool and what insights are being mentioned in their think aloud process; therefore, a report of their activity and insight will be presented in this chapter. Second, the result of all questionnaires and sentence completion tasks will be presented. After that, in the third part, the result of the design team's use of users' and clients' insight and the result of modeling with the magnetic wireframe tool will be analyzed, and also the result of each interview and questionnaire of all design team member will be reviewed.

At the same time, in each group, details of activities in each session and interactions with the magnetic tool have been captured; so the results of these activities

will be presented as another achievement and observations will be done on the research activities and participatory co-design sessions.

4.1 Users and Client Design sessions

10 students of the design school, as the users of the sample web design project, have participated in individual design sessions. Each session started with a simple task of sketching the preferred homepage on paper. The sketching task was designed to give users and clients a popular basic tool to do the wireframe task. The result of these sketching can be found in the appendix next to the final deliverables and reports of each participant.

Then, this activity was followed by design using the magnetic tool. During this activity, since the participants had been thinking aloud throughout the session, several words and phrases describing their thinking processes have been presented. These insights are important because after all the activities with users and clients are done, they should be presented for the design team in an appropriate way to see how the insights and designed magnetic wireframes done by each participant could help the design team in order to design the final wireframe. Therefore the result of the think aloud activity with the magnetic wireframe has been collected alongside of a picture of each presented wireframe by these two categories of participants. This data can also be found in appendix 1 for each participant.

Moreover, during the activities, some interesting findings from each participant have been discovered. Table 4.1 shows a special finding for each participant in the form of a quote from them or an observation in the study.

Table 4.1

Users' And Clients' Gender And Special Findings

Name	Gender	Special finding
U1	M	<i>'I can have a smaller size of the tool to carry that in my pocket'</i>
U2	M	<i>'It is good for collaboration'</i>
U3	F	Used a piece of magnet to show submenu of Degrees
U4	M	<i>'It is interesting that you can see <div> boxes and do coding for the page'</i>
U5	F	<i>'These are like a toy'</i>
U6	F	None
U7	M	Found free spaces during the activity with magnet wireframe
U8	F	<i>'We can rotate pieces'</i>
U9	M	Moved pieces to show main items can be one module, or separated modules. Tried different layouts.
U10	F	In the meantime tried to fill blank spaces with moving pieces
C1	M	Used bigger sizes on top of smaller sizes to show the zoom action
C2	F	<i>'This tool shows us empty spaces that we did not think about before.'</i>
C3	M	Mixed some layers to show the image is behind the transparent menu and made the menu narrower

It is interesting to see that all participants, except *U6*, found something new during their activity with the given tool. It shows the learning that has happened during the study, and for the researcher, in each session something interesting was found which was not known before. On the other hand, each finding can be an optional feature for the magnetic tool when clients and users are using it.

Each participatory design activity was followed by short interview questions related to participants experience about the design session. Also, after that they were asked to fill a questionnaire, which had 5 grading questions and 4 sentence completion phrases. As a useful result of these activities, this collected data could be used to help the research in order to understand how participants feel and how they can work with the magnetic wireframe tool and in what aspect it can improve the quality of participation. Therefore, in the next section a summary of these interviews and questionnaires have been shown in several tables.

4.1.1 Results of Interviews

As the first part of the follow up activity, participants answered a semi-structured interview as a warm up conversation to make them ready to answer the questionnaire in the next step. It was believed that this interview could help participants once again remember what exactly they did and felt during the activity. So when they were going to answer questionnaire, they were warmed up in the interview and they could think with more words. On the other hand, the answers of these 4 questions have a direct impact on this research. Here is a table that shows the result of the first 3 questions. The result of the 4th question can be found in the appendix along with the complete answers for the first 3 questions. Since all of the participants believed that the magnetic wireframe helped them talk about their ideas, in the third column the reason of that helpfulness is shown.

Table 4.2

Users And Clients, Result Of The Interview

Name	Feelings about the session	Advantages of magnet tool	Why it helps
U1	It's great, very cool	It is perfectly ready to show to everyone	It lets you think out of the box
U2	I like it	It is in the dimension of the monitor	None
U3	It was kind of fun	You can move stuff around	I could pick it up and say why I need this
U4	It was cool	A tool which can be used to visualize	If I did that this way (rotate 90 degrees) I could say another idea
U5	I like it	Its tangible	I talked to myself anyway
U6	I like it	It is easy to change	I could see what exactly happens while I was thinking about my idea
U7	I think it was good	I can change them easier	I can see ok I need that for this space and then I can do it
U8	I like doing things by my hand	Magnet helps you to do more exploration and see changes	I can specifically talk about what's going on
U9	It is very interesting	It is quick	I can make it just here and talk about it, write some more stuff, change my stuff
U10	It's kind of cool	It is kind of interchangeable	With this you are hands on and move stuff around and talk about it
C1	I like it	I think the idea of having lots of different shape is good	I could talk on it and think about objects
C2	Everything was easy to show and change	You are constrained by size and you can move it anywhere	Now I have the buckets, were would they go
C3	To me it was a lot more playful	You can do this as magic for clients	If you do it with clients, they can move it and say why and say what is that look like

4.1.2 Results of Questionnaires – First Part

After finishing the interview, all of participants answered 5 scoring questions along with 4 sentence completion tasks, all about their experience with the magnetic tool. This follow up activity is a measurement tool for the experience of the user. The research is concerned about an issue in user experience design. However, it is believed that the whole experience, which participants have undergone in the design sessions, is a user experience issue by itself. It is necessary to measure that experience to see whether the tool, which is the medium of this participatory design activity, can bring a good and meaningful experience for participants or not.

In the first part of the questionnaire, they were asked to grade these statements:

1. This activity was fun for me
2. Magnet tool helped me to be faster
3. I could talk more clearly about my idea
4. Magnet tool helped me to imagine better
5. This tool helped me to be more creative

Here is the table that shows the entire given grades by students, who enrolled as users of the sample project:

Table 4.3

Results Of The Users ' Questionnaire – First Part

Name	Gender	Statement1	Statement2	Statement3	Statement4	Statement5
U1	M	5	5	5	5	5
U2	M	4	4	5	2	4
U3	F	5	5	5	5	5
U4	M	5	4	4	5	4
U5	F	5	5	5	5	5
U6	F	4	3	4	3	4
U7	M	5	5	4	5	4
U8	F	5	5	5	5	5
U9	M	5	4	4	4	4
U10	F	5	3	4	4	5

Also, faculty members as clients of the project answered the same questions about their activity with the magnetic wireframe tool:

Table 4.4

Results Of The Clients ' Questionnaire – First Part

Name	Gender	Statement1	Statement2	Statement3	Statement4	Statement5
C1	M	5	5	5	4	4
C2	F	5	5	5	5	5
C3	M	5	5	5	5	5

As discussed in the methodology section, it is important to have comparable results to see how much the tool could be useful for participants in different aspects. These tables and numbers show how much participants agreed with the statements; therefore, a comparison graph for the result of each of the statements can show a

measurement for each considered potential in the magnetic tool. The first graph shows the comparison for 10 users, who participated in the activity:

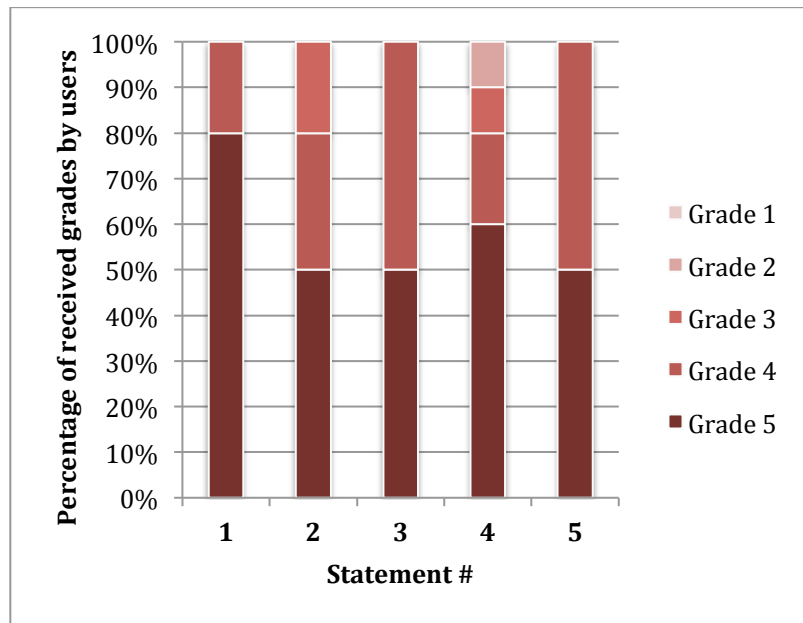


Figure 4.0 Comparison Graph For Users Comments About The Magnetic Tool

Here is the same graph but for clients of the sample project:

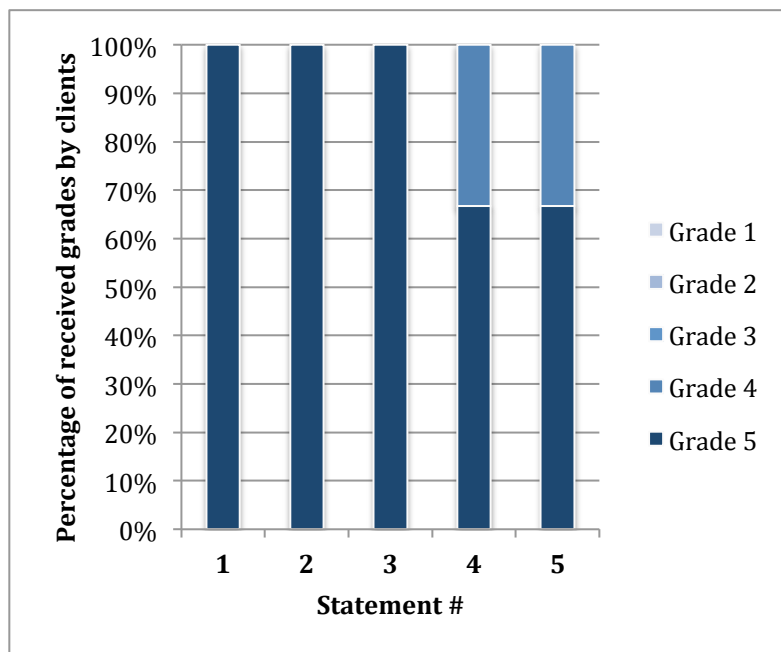


Figure 4.1 Comparison Graph For Clients Comments About The Magnetic Tool

As is shown in these two graphs, it can be observed that most of the statements received high grades of 4 and 5 from participants. On the other hand, as shown in the graph, the activity was fun for all of participants. Therefore, based on the literature review it can be concluded that participants have had a good user experience. In order to see which quality worked better during the activity, Table 4.5 shows the average of the grade for each statement for all thirteen (13) participants (users and clients).

Table 4.5

Users And Clients Average Grades For Measurement Statements

Grade	S1	S2	S3	S4	S5
5	11	8	8	8	7
4	2	3	5	3	6
3	0	2	0	1	0
2	0	0	0	1	0
1	0	0	0	0	0
Average	4.85	4.46	4.62	4.38	4.54

It can be observed that these statements can be sorted based on the average grades that they earned from participants. Therefore, the aforementioned statements can be sorted and it can be show that in which aspect participant felt that they made more connections with the magnetic tool:

First: This activity was fun.

Second: They could talk more clearly about their idea.

Third: The tool helped them to be more creative.

Forth: Magnet tool helped them to be faster.

Fifth: Magnet tool helped them to imagine better.

It can also be argued that, since the average of all aspects are in the high range, all of these aspects could be found in the activities and participants made the defined connection with the tool. The ranking only shows the most useful aspects of the design session and working with magnetic wireframe.

4.1.3 Results of Questionnaires – Second Part

In the second part of the questionnaire, participants filled blank areas of given phrases. Since users and clients filled the same statements in this part as well, it is believed that having all of those answers in the same table can show the overall responses and feelings about the participatory design activities with the magnetic wireframe tool. Here all of the responses will be shown separately based on each sentence number, beginning with the first sentence:

Table 4.6

Results Of The Sentence Completion – Statement 1 (Users And Clients)

<i>Statement 1</i>	The magnet tool is.(1)..... because.(2).....	
Name	(1)	(2)
U1	Awesome	You think outside of the box.
U2	Systematic	A natural grid system is formed.
U3	Efficient	It allows for fast flexibility of changes.
U4	Good for team/client interaction	They could better visualize and quickly make changes to ideas in real-time.
U5	Functional	It lets you see the idea in a tangible way.
U6	Interesting	It helps think in a different way.
U7	Helpful	I can see layouts visually.
U8	Creative	I can be more flexible.
U9	Interesting	So much of the web is online. Actually doing something physical is very different.
U10	Different	It is not digital but still effective and more hands on.
C1	Great	It allowed me to write larger.
C2	Flexible yet limiting	The sizes are defined but they can be easily repositioned.
C3	Great	It allows you to make changes easily and quickly.

If the first blank area is considered the initial finding about the magnetic wireframe, these characteristics can be categorized in several themes. Then it can be valuable to see feelings and thoughts in common among user groups. Then, in their own specific words, it can be asserted in which aspects the tool can be useful for users and

clients. Table 4.7 shows buckets of answers about the magnetic wireframe from users' and clients' perspectives:

Table 4.7

Statement #1 Buckets For Users And Clients

Name	Category	<i>The magnet tool is:</i>
U1		Awesome
U6		Interesting
U9	Feeling/ Experience	Interesting
U10		Different
C1		Great
C3		Great
U3		Efficient
U4	Technical	Good for team/client interaction
U7		Helpful
U8		Creative
U2		Systematic
U5	Functional	Functional
C2		Flexible yet limiting

This shows there are three main approaches about the magnetic wireframe, the first and the most popular one is the one that comes from people feeling and experiencing with the tool. Based on their answers, this has several reasons; it helped them to think out of the box and the magnetic tool allowed them to write their thoughts in a larger format. The second group members have a technical view about the tool, since it let them see

something like HTML code and see layouts visually. The third category had functional features viewpoint on the magnetic wireframe tool. Magnetic pieces make natural grids and this allows people to have the repositioning feature. They have also continued to answer to blank areas in the second, third, and fourth sentences:

Table 4.8

Results Of The Sentence Completion – Statement 2 (Users And Clients)

<i>Statement 2</i>		
The magnet tool helped me.(1)..... because.....(2).....		
Name	(1)	(2)
U1	Be more flexible	I did not have to show scribbles.
U2	Structure my thoughts	Boxes have formed what I had not previously envisioned to be.
U3	Better visualize interactivity	I could move magnets freely.
U4	Move and shift my conceptual thinking	I could literally shift what I was thinking without having to worry about redrawing/sketching it.
U5	Think out my ideas more quickly	I was not looking at it solely in 2D.
U6	Refining ideas	I could easily adopt what I use through quickly.
U7	To visually understand layouts	I can prototype different layouts.
U8	Express	Sometimes it is hard to explain something.
U9	Talk out my ideas	I was not wrapped up in the computer focused only on that.
U10	Progress	I saw the potential to add new elements.
C1	Change options easy	Of the magnets.
C2	Organize the components	The structure was more defined than in the sketch.
C3	Think clearly	I did not get caught up in trying to do tight sketching. I could sketch very loosely.

In order to see how the magnetic wireframe helped them do something for the design activity, the first blank sentence will be counted as an answer for this issue. It is important to evaluate in what aspects the tool could be useful for participants and how their feeling were when they used that for problem solving. It is also valuable to see why they found it helpful. Therefore, having these reasons next to the area of usefulness can help the research to understand users' and clients' mindset during their empathetic relationship in a UX task. The data that has been shown in Table 4.8 can be categorized based on several themes to see the overall areas that the tool can help participants. Here again several categories will be extracted.

Table 4.9

Statement #2 Buckets For Users And Clients

Name	Category	<i>The magnet tool helped me:</i>
U1		Be more flexible
U4	Changing options	Move and shift my conceptual thinking
U6		Refining ideas
U10		Progress
C1		Change options easy
U5		Think out my ideas more quickly
U8	Thinking out ideas	Express
U9		Talk out my ideas
C3		Think clearly
U2	Organization	Structure my thoughts
C2		Organize the components
U3	Visualization	Better visualize interactivity
U7		To visually understand layouts

These buckets show there are four (4) main areas that magnetic tool can help participants in improving their thinking process in a participatory design activity for UX projects. The first bucket is about the ability to change possible options. The first group of participants believed that because they did not have scribbles in their presented idea, they could shift their thoughts. The second group argued that this tool helped them to think out their ideas. They asserted this is because they are not wrapped up with the computer, and it was not like a 2D activity on paper. The third group mentioned organization features of the magnetic tool as the reason for them being helpful. This group argued that those magnetic boxes formed what they had not previously envisioned before. And in the last group, magnetic tool helped them to visualize better, since they could move magnets freely and prototype different layouts of the web design task.

The results for the third sentence can be reviewed:

Table 4.10

Results Of The Sentence Completion – Statement 3 (Users And Clients)

<i>Statement 3</i> Talking and playing with magnet pieces was.... (1).... Because.... (2)...		
Name	(1)	(2)
U1	Flexible	You get to be fast.
U2	Interactive	Physical objects were the tools for brainstorming/ formalizing thoughts/ideas.
U3	Different	I have never done it before.
U4	Web savvy	You could visualize the code and end result, and move pieces around as <div>, or just as ideas.
U5	Informativ e	It let me work out some base ideas for web.
U6	Fun	Magnets are fun easy to move around.
U7	Easy	I could restructure endlessly
U8	Nice	I could be hands on
U9	Fun	It is good for more collaborative discussion.
U10	Fun	You do not normally get to move elements around a wireframe physically.
C1	Interesting	It was a new way of designing
C2	Fun and engaging	It reminded me of playing with Legos.
C3	Fun	It is tactile. It gets me out/off of the computer.

Interaction with the magnetic wireframe along with thinking-aloud was the main task in all activity sessions for users and clients. Therefore, it is valuable to see their different approaches about the main activity that they have done. In order to categorize

results of these sentences, Table 4.11 shows the different categories observed among participants and it can be viewed that where they come from:

Table 4.11

Statement #3 Buckets For Users And Clients

Name	Category	<i>Talking and playing with magnet pieces was:</i>
U6		Fun
U9		Fun
U10	Fun (Experience)	Fun
C2		Fun and engaging
C3		Fun
U1		Flexible
U2	Technical (Pragmatic)	Interactive
U4		Web savvy
U5		Informative
U3		Different
U7	Feeling (Hedonic)	Easy
U8		Nice
C1		Interesting

As it has been mentioned before in the first part of the questionnaire, being fun is the most popular feature of using magnetic wireframe for participants in the first two groups. It is interesting that in the sentence completion task again we can see the most popular answer about the feeling of interaction with magnetic wireframe is the fun experience, which they had during the process. However, in this task, it can be understood that why participants believed that this is fun. Multiple times, during all of the

activities, the word 'fun' has been mentioned. This shows how important this feature is for the study group and the good potential that is embedded in this tool for participants. They mentioned this is like playing with Legos, and moving those magnetic elements is fun for them. The second group looked at technical features of interacting with magnet pieces. That may come from their deeper experience with the tool. They said those elements work like <div> tags in HTML codes, and it also lets them to be fast in the process of doing the wireframe. In the last group, they had feelings about talking and playing with magnet pieces. Feelings like easy, nice, and interesting. Based on what they said, they felt like that because the tool let them be hands on and it was a new way of design thinking for them.

On the other hand, this table shows that the experience that participants had with the magnetic wireframe tools, has both hedonic and pragmatic attributes of a user experience. It has been argued that participants' interaction with magnetic wireframe should be considered as a user experience design issue by itself. Therefore, the extraction of these hedonic and pragmatic attributes in this statement shows the experience of playing with magnetic wireframe has both types of attributes. This means that this tool can be supportive for both categories of interaction attributes, which sounds like a good feature for magnetic wireframe tool among users and clients.

In the last sentence, they talked about their wishes; several brilliant ideas have been discussed as the result of this statement. This was the only question in this category that has only one blank area to be filled. These answers can be a good guideline for this research to see what other potentials are in this tool that can be added as a part of the idea

of using it for users and clients. They also can be done as a further research in future activities. Table 4.12 shows their comments about this activity:

Table 4.12

Results Of The Sentence Completion – Statement 4 (Users And Clients)

<i>Statement 4</i>	In this session I wish I could.....(1).....
Name	(1)
U1	Have a smaller board or smaller sizes.
U2	Take this magnet tool with me.
U3	Maybe have different colored markers to help show hierarchy.
U4	Shrink the magnets to be the exact size I want.
U5	Play with more colors.
U6	Different color pens, group user informative, group ideas.
U7	Have played with more layout ideas.
U8	Design more than one.
U9	Have had an opportunity to design for different devices.
U10	Lay out a few more pages of the website to move fully experience the tool, and see how it helps with creating the hierarchy of the site.
C1	Have multiple boards, colored pens, non-lined magnets
C2	See other subject's designs.
C3	Have some colored markers; bring the whole sketching set home.

To summarize, these features can be categorized in 4 categories:

- Some of them believed that colorful markers could be a great option for them to have in order to draw their thoughts with colors.

- Another group hoped to be able for implementing more layouts and separate pages in multiple boards.
- The third group thought it would be better if they could have more different sizes and shapes of magnet pieces.
- The last group wanted to take the tool with them. This group was interesting because they seriously asserted that this was helpful for them and they want to use it even in other areas like doing collaborative activities.

4.1.4 Results of the observation

During participants' activities with the magnetic wireframe, a lot of notes have been written as a summary of their behavior with the tool and also their approach in using the tool. A complete report of these activities can be reviewed in the appendix; however, there were things in common among them that brought interesting points for the research.

The first one was about their usage of the magnetic tool even during the interview questions. Some of the participants used magnetic pieces in order to talk about their experience and show how the tool helped solve a specific problem in the design session. The second one was a great finding that they had without being aware of it, they noticed they can use multiple layers of magnets on top of each other, sometimes to show a submenu and sometimes in order to show the progress or zooming option. The third interesting issue was about the ability of changing their idea during the design activity process. As it has been discussed, one of the valuable things for users of this tool was the flexibility of the tool and that they could easily change their ideas. When video of activities has been reviewed, it has been noticed that most of them changed their idea during the activity.

The last finding is about the vertical or horizontal usage of the board. Some of them liked to look at the activity space as their monitor size, and the other preferred to use the board vertically and show what happens when they scroll down. In this research it has been tried to not ask them to use it vertically or horizontally to see what the preferred form for each participant is and let them think with more freedom.

Table 4.13 shows the style of each participant in the four aforementioned situations. In the last row of the table, it can also be observed that many of the participants had that experience during the design session.

Table 4.13

Participants' Interaction With The Magnetic Tool

Name	Using magnets in the interview	Used mixed layers on top of each other	Changed the idea during the activity	Vertical or Horizontal
U1	Yes	Yes	No	Vertical
U2	Yes	No	Yes	Horizontal
U3	No	Yes	Yes	Horizontal
U4	Yes	Yes	Yes	Vertical
U5	Yes	Yes	Yes	Horizontal
U6	No	No	No	Horizontal
U7	Yes	No	Yes	Horizontal
U8	Yes	No	Yes	Vertical
U9	No	Yes	Yes	Vertical
U10	No	Yes	Yes	Horizontal
C1	Yes	No	Yes	Horizontal
C2	Yes	Yes	Yes	Vertical
C3	Yes	Yes	Yes	Vertical
Total # of 'yes'	9	8	11	

As the Table 4.13 shows, 6 participants used vertical and 7 of them used horizontal layout of the board in order to do the activity, which is interesting because it shows how fairly it is varied among participants when they were able to choose between

vertical and horizontal options. Moreover, this result of observation shows most of the participants did some of the same activities during their usage that had not been planned for them and they chose what to do based on their experience with the magnetic tool.

Nine of the participants used magnetic pieces during the interview session. If the result of their answer about talking and playing with magnetic wireframe can be reviewed again, it can be argued that most of them used word attached to feeling or counted the session as a fun experience. Therefore, here is the connection between being fun and have feelings about the tool and using that to express the comment about the activity session. Once again it can be understood how this participation has a user experience design by itself that engages participants, even when they are being interview and they have been asked to just talk about their feelings.

On the other hand, in the second sentence participants who valued the tool in a technical aspect, alongside the people who had a fun theme in their answers, used multiple layers of the magnet to show their idea in the design activity. This can show the value of technical aspects behind the fun experience that participant had in the design session. For technical people some of them looked at it like an HTML code or layered design, so they could see layers on it. For fun experience people, they did a lot of moving and during those moving they found out that they can use the multiple layers, which is creative.

4.2 Design Team Participation

After all of the activities with clients and users, it was the time for the design team to finalize the wireframe design process. As the result of first two groups activities a summary of each participant's think-aloud phrases along with an image of the final

proposed wireframe of each person has been shared with the design team on a large table. Then they have started to read those phrases and look at the images. During the process they were free to ask questions from the researcher.

In the beginning of the process all 5 members of the design team had a question, they were curious whether they should split the results among themselves or all of them should read all participants' responses. Since the research wanted to see the impact of the whole set up in the design team's activity, the answer to that question was "*you are free to apply whatever approach works better for you*". So they selected one person as the reader and she started to read. Another person was responsible to highlight important issues on papers of participants' comments. They have reviewed all participants' responses and talked about all of the images and ideas that had been designed by users and clients.

They tried to find out web elements in common among participants and wrote them down on post-it notes. They also used the white board as the main area to stick the post-it notes. When they have finished the activity on reading these materials, they have been asked to start doing the wireframe with the magnetic wireframe tool. They decided to choose a person as the writer (the same person who was had the reader role), and then everyone tried to give each page element an appropriate hierarchy and position. In that moment, a collaborative discussion occurred among team members. The writer person was using markers to write elements on magnet pieces, and then they were talking about the best position for each element in the homepage.

During the activity, they noticed that they have more than one good idea for the page. So they have delivered 3 ideas with the magnetic tool. Images from these ideas can

be reviewed in the appendix section. It is interesting that they developed their next idea based on the lack that they observed in the first version with the magnetic tool and designed a second version. Then the magnetic pieces' forms gave them an idea to create a collage of rectangle pieces in the page and generate the third wireframe design. It was also interesting that all of these presented ideas had design features in common with what had been done by users and clients.

This design session was followed by a warm up interview and a questionnaire. The sample questionnaire can be found in the appendix. Results of these interviews and questionnaires will be presented in next sections.

4.2.1 Results of interviews

The design team members answered 4 questions when they finished the activity.

These questions are:

1. Describe your feelings about this session.
2. What advantages do you think this tool brings in your projects?
3. Does that help you to understand more about client and users?
4. Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

The first three questions ask them about their experience and the application of the tool for their work. The last question was designed to see in what areas they prefer to use either the magnetic wireframe or sketching on paper. Table 4.14 shows important parts of their answers for the first three questions. The complete answers can be found in the appendix.

Table 4.14

Results Of The Interview With The Design Team, First Three Questions

Name	Feelings about the session	Advantages of magnet tool in the company's projects	Why it helps to know about users and clients
D1	I love this tool because allows us to be modular with concept	Ability to collaborate different ideas and you can see different options	Being able to see what they came up with and what they think they need
D2	It was like a puzzle and I like the problem solving	It would be good if we can have more different shapes to make a dialogue with clients easier.	This shows us users' thought besides of the client.
D3	It was very simple, because we had comments and wireframes	This is kind of nice that you can erase and move and you can take a picture and make another.	It is important to look at users besides of the client and decide about the idea.
D4	I like how we could look at all together and work on a same problem	I like that we can move things around and you are able to write on each piece, we often use post-it notes and with this we don't require the paper	It was interesting to see what all the users wanted too see as the website
D5	I thought it was interesting to see other people's interpretation and how they would solve the same problem and I love the fact that it was in kind of a uniform format	This forces us to see in kind of a more structured format because it is a little rough	During the process we were trying to read between the lines and we were trying to make assumption about why they put certain things there

A discussion also happened after the last question about the difference between paper sketching wireframe and magnetic wireframe. Since paper sketching was the main tool in Forty, answers to this question can show in what areas they found the magnetic

tool interesting, and in what parts of company's projects they prefer to use sketching on paper.

They believed that the magnetic tool gives them standard sizes that are visually eligible on a website. Also, having such a solid tool makes them reorganize instead of using paper that is not moveable. Several times they noticed that this tool is a collaborative tool, and they counted this feature as another options that paper sketching does not have. The magnetic tool also let them change ideas more rapidly, so they believed that they could present several ideas faster. Least but not last, having a magnetic wireframe tool can be a good starting point in their projects instead of sketching. They asserted after that they would sketch the finalized version on the paper to save it and share it with others as the refined version of their collaborative activity with magnetic wireframe tool.

4.2.2 Results of Questionnaires – First Part

In the first part of the questionnaire they graded the statements that users and clients had answered in order to evaluate the magnetic wireframe tool's qualities. These statements were:

1. This activity was fun for me
2. Magnet tool helped me to be faster
3. I could talk more clearly about my idea
4. Magnet tool helped me to imagine better
5. This tool helped me to be more creative

Table 4.15

Results Of Designers' Questionnaire – First Part

Name	Gender	Q1	Q2	Q3	Q4	Q5
D1	F	5	5	4	5	4
D2	F	5	4	4	4	4
D3	F	5	5	5	5	4
D4	M	4	4	4	4	3
D5	M	5	5	4	5	5

In order to compare grades given to these statements, graph 4.2 shows the grades and the comparison amongst answers and users' insights about the magnetic tool's evaluation.

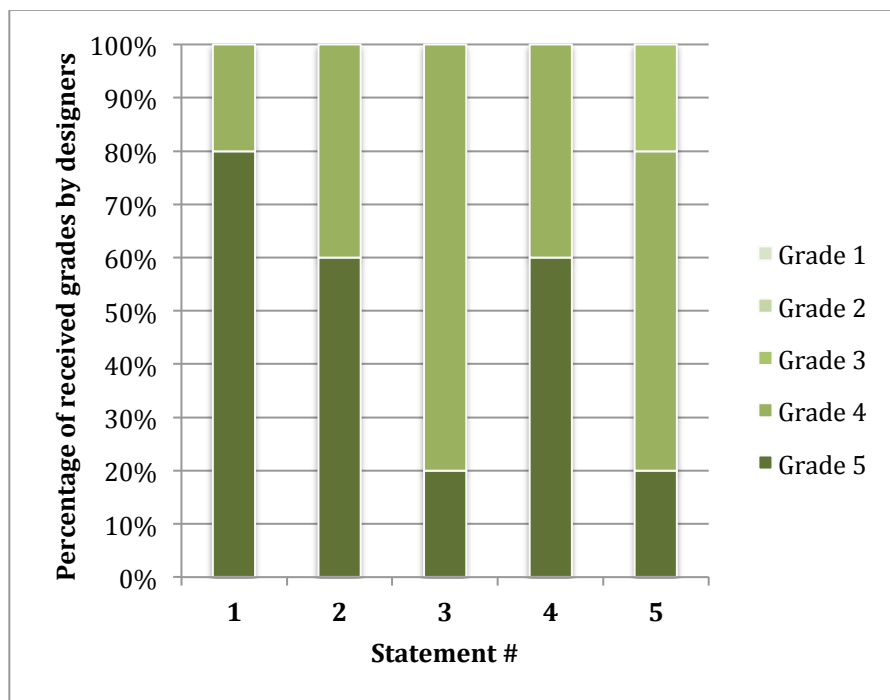


Figure 4.2 Comparison Graph For Designer's Comments About The Magnetic Tool

The figure shows all of the statements earned good grades, especially the first two statements and the fourth one. High grades in these three statements show that doing the

wireframe with the proposed tool was fun for them, and it also helped them be faster and to imagine better.

Results of the third and the fifth statements show that this tool is not that much effective in talking about ideas and being creative for design team members. However, they still have good grades among participants and they seem to accept these shortcomings. This shows that, because of these acceptable grades, in the worst case this tool does not decrease their quality in both creativity and ability in thinking out ideas.

The first part of the questionnaire reflects their personal experience and statements are only based on their personal feelings. However, in this group activity, it is important for the research to understand how the tool and the entire set up of empathetic relationship with users and clients helped the design team to work in a collaborative context. In the next part, results of the second section of the questionnaire can show the collaborative experience of users with the tool.

4.2.3 Results of Questionnaires – Second Part

In the second section of the questionnaire, designers filled blank areas of incomplete phrases. In this part of the research, the answers will be reviewed and details will be discussed.

In the first statement, they have been asked to write what is their favorite wireframe tool, and say why they like it. This helps the results of the research in knowing why designers like a specific wireframe tool for future works, and what characteristics of wireframe tools are important for designers. This also helps the research what are designers main values when they accept a wireframe tool as their favorite.

Table 4.16

Results Of The Sentence Completion – Statement 1 (Design Team Members)

<i>Statement 1</i>		
My favorite wireframe tool is(1)..... because(2).....		
Name	(1)	(2)
D1	The magnet wireframe	It allows you to be modular with your ideas
D2	Pens, paper, post notes	They are the most basic way of organizing thoughts and information before going further.
D3	Collaborative	More ideas are shared together.
D4	Pen and paper	You can do it anywhere, you can do it fast, it is easy to start over but you have proof of where you have been.
D5	Balsamiq	It is fast and versatile, but high fidelity enough to show to clients.

Based on this statement’s answers, pen and paper sketching is the most popular tool in the team. Balsamiq (Guilizzoni, 2010) is the only software among the answers. Balsamiq has hand drawn style outputs and D5 believes that he likes it because it is fast to do. D3 mentioned collaborative as the response to this statement. This can show to the research about the importance of collaborative tools in this area. Finally, D1 believed that magnetic wireframe is her favorite wireframe design tool. This just happened after the design session and it was her first experience with the magnetic wireframe tool. She also mentioned in the first interview question that she loves the tool. It can be understood that this tool has enough interesting experiences for team members.

It is also valuable to see how design team members can define the magnetic wireframe tool. They are UX experts and they are mostly familiar with issues and

bottlenecks in a UX design and especially wireframe design process. Therefore, hearing the definition of the magnetic tool from UX designers in the team can show a more valuable and reliable aspects of a magnetic wireframe for the research. Table 4.17 shows the answers for the second statement from design team members.

Table 4.17

Results Of The Sentence Completion – Statement 2 (Design Team Members)

<i>Statement 2</i>	
The magnet wireframe is.....(1).....	
Name	(1)
D1	A great creative tool for allowing you to create many concept pieces
D2	Fun to see how items can move around, and changes perspective easily
D3	Easy, fast, fun
D4	A great place to begin when you are beginning to organize a site.
D5	A great tool for early concept prototyping

In a summarized statement, it can be asserted that in their point of view, the magnetic wireframe is a fun tool that allows designers to create many concepts in the beginning of a web design project. Once again participants mentioned the fun features of the magnetic wireframe tool, and also moving and changing features of the tool has attracted them.

In the interview questions, participant talked about how this tool can help them to know more about users and clients. The research also needs to know how the tool can help them to work on a wireframe design and UX design task in a team activity. Table

4.18 shows answers of the 3rd statement that talks about where the tool helped the team in the design session.

Table 4.18

Results Of The Sentence Completion – Statement 3 (Design Team Members)

<i>Statement 3</i>		
The magnet tool helped us(1)..... because(2).....		
Name	(1)	(2)
D1	Visualize multiple options	They could move.
D2	Break down different elements	It is structured
D3	Think aloud	We shared ideas
D4	Organize the site	It allows you to visualize blocks of concept easily.
D5	Come up with new concepts	We weren't afraid to move things around.

All of the team members except D3 had the same belief about where the tool could help them. Being able to visualize several concepts is in common among these answers. They like this feature because they could move elements and be structured with defined blocks. Also, D3 mentioned ‘Think aloud’ and she argued that it helped them to share ideas. She considered collaborative features of this tool in other questions as well. Therefore, it can be understood that the collaborative features of this tool was bold in the activity as well as its changeability feature.

Based on research questions, it is significant for the research to see whether the tool can have an application in design teams’ activities or not. This is also important to

see how they value this tool in their projects. Table 4.19 shows results of the fourth statement in the sentence completion task. This can help the research to see how they valued the tool.

Table 4.19

Results Of The Sentence Completion – Statement 4 (Design Team Members)

<i>Statement 4</i>			
		I would ...(1)... the magnet wireframe as.....(2)..... In my projects.	
Name	(1)	(2)	
D1	Definitely use	A useful tool	
D2	See the potential	A useful tool	
D3	Use the	A tool	
D4	Use	A starting point	
D5	Value	A prototyping tool	

All of answers in the first blank area talks about using the magnetic wireframe tool. This shows how much they value the tool only with one experience that they had. They also want to use this tool as a valuable resource, which can be a good starting point in their projects. It is interesting that they also want to use it as a prototyping tool in their web design projects.

On the other side of this activity, it is important to see what happened during the time that they did collaboration with this tool. This can help the research to see in what aspect this tool could engage them more in collaboration and how this happened in the design session. Table 4.20 presents results of the last statement.

Table 4.20

Results Of The Sentence Completion – Statement 5 (Design Team Members)

Statement 5	Having used magnet wireframe in team, I heard.....(1).....
Name	(1)
D1	That we could create our ideas in a non-committed way, allowing us more freedom.
D2	How easy it was to more things moved to experiment my different ideas.
D3	Much more ideas that were solved together.
D4	Lots of collaboration, people talking about adding, moving, removing sections quickly throughout the process.
D5	We were more comfortable making changes, starting over, etc.

In summary, this tool let them make changes together and have more freedom in applying those changes. This also gives the opportunity to talk about their ideas in a collaborative way and solve problems together.

4.3 Conclusion

In this chapter all of collected results of participatory design session with three different groups of participants have been presented. Results of users’ and clients’ activities showed their level of interaction with the tool. This also provided several comments and themes of responses about magnetic wireframe tool’s abilities. Moreover, the results presented variables for the research in order to evaluate in what aspects the magnetic tool was helpful for participants and what results came from this interaction.

The entire result of the activities of clients and users was presented to the design team members along with using magnetic wireframe in the design session with the design

team. This design session and follow up interviews created several results as well. Results of these activities helped the research to see how the users' and clients' efforts in design sessions could be useful for the design team. This also shows how the magnetic wireframe tool could be applicable in the design team's collaboration.

Now it is time to see how these results could answers research questions? It is also important to see whether the results can be fit with the research's expectation or not. There are several elements in this research that needs to be evaluated between expectations and collected results. In the next chapter the conclusion about the entire research activity will discuss these issues.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

Results of data analysis from the last chapter display several findings related to the research questions. This research has started with a focus on finding an empathetic way of user experience design. In this research, the attempt was to understand what tool can bring this empathy in a UX project for a website design. The ‘make tool’ that was used in the three groups of stakeholders show its results in different ways. Now it is the time to see in what aspects these results could help answer the research.

Three main questions have been discussed in the first chapter. These three questions were about 1) the possibility of using magnetic wireframe for all stakeholders in a UX design project, 2) the way that magnetic wireframe can help design teams to know about client and users, and 3) several aspect of users’ experience that can improve using the magnetic wireframe. All observations, interviews, and questioners’ results should be used together to see how they could have answers for these areas. Besides, since the entire setup of participatory design sessions resulted in designing a wireframe at the last step, and the design team counted the tool as a positive tool for their collaboration, it can be valuable to summarize the entire setup and propose it as a guideline for UX design with empathy.

During the research, in several instances, discussions about ‘make tools’ were mentioned. There were also several comments and responses about this tool that can have specific usages for design teams and clients. Therefore, as another part of the research

conclusion, a review about the significance of ‘make tools’ in web design projects will be done.

5.1 Acceptance of magnetic wireframe tool

First, the research addressed this important question: Can the magnetic wireframe be used with all stakeholders in a UX project? The magnetic wireframe, as the ‘make tool’ in this research, was applied in three groups: clients, users, and design team members. The result of data analysis in each group shows how easy they could use the tool to design their ideas. Since three types of participants participated in this research, the acceptance should be discussed separately.

5.1.1 Clients

Clients or faculties in this research showed their acceptance several times. First of all as the result of the observation they had no problem in working with the tool. Each faculty also had a remarkable finding about the tool, and they presented sample wireframes that have been used in the design session with the design team. The design team also could understand their idea easily, and even in the final presented design by the design team, it can be observed that they considered one of the faculties designed wireframe as a base of their models. They have all changed their idea during the activity with magnetic wireframe tool, and this shows this feature of the tool was useful for all of them.

Second, in interviews, all of the clients mentioned the tool helped them talk about their ideas easier and show what they want to see as the homepage of the sample project. Along with a word to define their experience with the tool, it can be stated that with a fun experience they could talk about their idea.

Third, in the questionnaire results for clients it obviously can be observed that the grades that they allocated to the 5 evaluation statements are high, especially for the first 3 statements. This shows the activity with magnetic wireframe in order to talk about their targeted project was fun for them; therefore, they had a good experience with that. Two of them also used the word *great* in their sentence completion task about the magnetic tool, which is a hedonic attribute. Based on the literature review, talking about the hedonic features shows the more deep experience that user feels in a product. This states they not only did not have any issues in using the tool but also they enjoyed their experience with the tool in order to talk about their thoughts about a project that they own.

To summarize, it can be argued that clients totally accepted the tool as a way to talk about a web design project. They also gave the tool good grades in evaluation statements. Furthermore, the design team felt a connection with the tool, and they believed that they could learn about clients with what they shared as their thoughts and comments.

5.1.2 Users

Users of this sample web design project are senior level students in graphic design. As discussed before, this may help uncover valuable answers in the research about the tool, because they have more experience in design fields, versus a more basic knowledge of web design. Results of all research activities showed that they could use the tool easily; however, the students gave a lower-ranking evaluation statement of the magnetic tool than clients who were to also perform an evaluation.

First of all, based on the observation, all of them used the tool in an appropriate way. Some of students did not use the creative options of the tool such as changeability; however, they still made great efforts in design sessions and had especially great findings in regards to the tool. One of them believed that the tool works like layers of HTML code, and the other one counted the activity as LEGO playing. These all show how they could get connected with the tool in an activity.

Moreover, in results of interviews with them, they felt that they liked the tool and it was a fun activity for them. They also believed that the tool helped them to talk about their ideas and what they need. Most of them had reasons for this issue, which were discussed in results section. They also talked about several advantages of this tool. So this tool had meaning for them and they could see the value in it.

Finally, in questionnaires, the activity with magnetic tool received good grades as a fun activity. Based on the literature review, this means the experience that they had with the tool, was a good experience. They could also be somewhat creative and talk about their ideas better. Perhaps the positive reception was because the magnetic wireframe tool was tangible, therefore making the experience more enjoyable. However, in sentence completion, only 40% of users used hedonic features to answer the statement about the magnetic wireframe and 60% of them used functional and technical (pragmatic) words to fill the blank area.

In summary, among all activities that have been done with users, it can be argued that they did not have major issues with the tool, but the acceptance rate can be considered lower than the acceptance rate among clients. They also connected with the

tool more in the pragmatic aspects, which is not still a bad sign about the acceptance of the tool. They just have less hedonic attachment to the tool.

5.1.3 Design Team

Based on the observation in the activity with the design team, they started the design session once they were asked to read comments and look at wireframes designed by users and clients. Regarding the acceptance and being able to work with the magnetic wireframe tool, it seemed that they did not have problems with the tool and they were familiar with it. They were using posted notes and whiteboards before in their projects. They were also familiar with paper prototyping. Therefore, they had no problem in working with the magnetic tool and they could do the task. They also changed their idea twice during the activity, which shows they could use one of the good features of the tool.

In interview questions, design team members said they liked the tool and it was interesting for them to work with it. They could also see advantages of the tool in their projects and apply tool features in their current tasks. Therefore, they could find the connection with the tool and accept it as a prototyping tool.

In the follow up survey 80% totally agreed that the experience with magnetic wireframe was fun for them. 60% of them also gave the highest grade to statements for better imagination and being faster. Therefore, this shows they could make a good connection with the tool. Besides, in the fourth incomplete statement, they stated that they would like to use the magnetic tool in the future. It shows that all of them found the value of the tool in their UX design project.

5.2 Earn Empathy with Magnetic Wireframe Tool

As the second important question in this research, it was important to see how the entire setup of users and clients' activities with the magnetic tool can be helpful for the design team. This is also important to see if the design team can understand participants' requirements in the sample website project from what they shared in their design process.

Based on design team members' answers to interview questions, having clients' comments along with users' comments and suggested designs from all of them, helped them to design the final wireframe in this sample project. It was valuable for them to understand what users wanted to see in the homepage. They have also been trying to understand why participants used a specific object in their wireframe and addressed that in the shared comments along with the picture of their wireframes. Therefore, they had the reference for comments that they were reading.

It can be stated that the combination of shared comments and implemented wireframe with the magnetic tool was a valuable source for designers to go through and get into users and clients' shoes. Magnetic wireframe facilitated the design for users and clients and enabled them to make a visualized version of their thought in a fun experience. This became an opportunity for the design team to see all comments and possible designs for a page of the project. Consequently, it can be asserted that applying the use of magnetic tools for users and clients was helpful for the design team to know about them.

Designers also stated that an important part of the experience was that all groups of participants used the same tool, allowing uniform outputs. This is a very valuable point that having unified designed wireframes let them compare what they designed and what

other ideas look like. Therefore, the tool brings everyone around the table and gives them the same opportunity in order to enroll in design tasks, but with different points of views and responsibilities.

There is a point in this study that can be improved in future studies. As it has been discussed in chapter 3, it was attempted to use a simplified version of the magnetic wireframe tool in this research. However, the resolution of tool was limited and it seemed that especially among design team members, they needed more shapes and more sizes of magnetic pieces. That is one of the reasons that at the end they counted this tool as a prototyping tool and wanted to make a refined version on papers to make it finalized.

5.3 Empathy in Wireframe Design

Results of final designed wireframes by users and clients along with what designers proposed as their design for the wireframe of the web design project shows that there is something in common in these results. Designers delivered three (3) options for the wireframe of the homepage of the design school. If they can be compared with what users and clients had done in their activities, interesting findings will be captured.

The first design from the design team has close design features to what U9 and U10 designed as the wireframe for the website. They also used top menu items very close to what U3 and U4 have figured for this project. It is valuable to know that both U3 and U4 in the statement 1 of the sentence completion task, talked about the technical features of their experience with magnetic wireframe.

In the second wireframe proposed by the design team it can be observed that the overall idea is looks more like what has been proposed by U1 and U8. There is no top menu, just big boxes to show main topics of the homepage. U1 and U8 believed that they

wanted to see more images than texts in the homepage for a design school. The same conversation happened in the design team when they changed their idea and removed top navigation from their first idea. The same tool gave all the same opportunity to think in the same way about a specific project.

In the third wireframe, designed by the design team, they totally changed their idea. It can be discovered that the idea is very close to what was proposed by U2 and C1. They both believed that the website of the design school should be something different than a formal website. They wanted to make something simple but creative. In the design team, they got the same approach in their last design. So they used a collage of magnetic pieces. Both groups also had the same idea for actions after clicking on each box. They stated that whenever a box will be clicked, all of the elements in the page should move, and contents for that specific element should be moved beautifully with nice effects in the page. This is interesting that how all of them came up with close ideas, especially the design team members that extracted this idea from users' and clients' insights.

5.4 Aspects of Improvement

Results of surveys with all three groups show in what aspects the magnetic tool improved participants' experience during the activity. There are 5 aspects that were mentioned in grading statements. Also in sentence completion statements they talked about how the tool helped them. Here these result can show us in what aspects the magnetic tool improved participants' experience in a user experience design project for a website.

5.4.1 Clients

For clients, based on the results of questionnaires, they completely agreed that the tool created a fun experience for them. They also stated that the tool helped them to be faster and talk more clearly about their ideas and thoughts. Therefore, these three aspects of their experience have improved with the magnetic tool. They also somewhat agreed that the tool also helped them to imagine better. Regarding the creativity aspect, it can be asserted that this research cannot completely rely on participants' perspectives about creativity. However, they almost agreed that the tool helped them to be more creative, of course only in their point of view.

In the second part of the questionnaire, results of surveys show that clients could change options easily, think clearly, and organize the components. Therefore, the tool could improve their activity in these aspects of doing a wireframe and showing their comments. It is interesting that one of them mentioned thinking clearly one more time in the sentence completion part. This certifies that besides of being fun, this tool helped them in order to shape their thoughts in a better form. The participant also mentioned the reason: "I did not get caught up in trying to do tight sketching, I could sketch very loosely."

5.4.2 Users

People who did participation as users of this sample web design project answered part one of the questionnaires with varied grades. However, this can be asserted that first of all the activity was fun for them. They somewhat believed that the tool was helpful for them to be faster, talk more clearly, imagine better, and be creative. Since answers in this

part are only grades to statements, the second part of the questionnaire helps the research to see what was exactly improved by the magnetic wireframe for users and why?

There are some more aspects that they talked about in the sentence completion part. Most of them mentioned the ability to change options in the designed wireframe. They also believed that this helped them to think out their ideas and organize their thoughts. Finally the last group mentioned visualization featured of the magnetic wireframe tool. It has also received good grades in the first part of the questionnaire and 60% of users gave a full grade to statement number 4. In the second part they also mentioned the reason for this. They believed it let them move magnets freely and prototype different layouts. It is interesting to know that both of the users (U3, U7) who talked about visualization aspect in statement 2 of the second part, in the first statement talked about technical features of the magnetic wireframe. Therefore, it can be stated that technical point of view about the tool could help them extract the visualization feature as well.

5.4.3 Design Team

In the design team the improvement in their experience was discussed in different aspects. Besides what they graded in the first part of the questionnaires, they have also talked about some interesting improvements and advantages.

Team members are usually using paper sketching as the tool for wireframe design. But in sentence completion they believed that this tool helped them to visualize several concepts easier. They also liked the feature that they could think aloud and hear each other's comments around an experience with a 'make tool'. Based on their results,

this tool gives them the opportunity to move things around and share their idea without any fear. This can also improve the process of prototyping for them.

On the other hand, based on the results of the first part of the questionnaires, the tool gives them a lot of fun in their collaboration. This also makes their process faster in comparison with what they usually use at the office. However, it does not seem that the tool could perfectly improve their ability to talk clearer and this feature only received an acceptable grade. 80% somewhat agreed with this statement. They also felt improvement in their imagination. But it can be noticed this tool did not improve their creativity too much. Only one of the team members agreed with the statement for creativity.

To summarize, the magnetic tool was successful in improving the fun experience, speed of designing, imagination, thinking aloud, and the ability to visualize multiple concepts for design team members.

5.5 Conclusion

The purpose of this study, as discussed in section 1.1, is to use a tool for stakeholders of a UX project that enables them to have an empathetic relationship in the entire design process. Based on the literature review, the importance of ‘make tools’ in participatory design to gain empathy was understood. Results of observations along with follow up interviews and questionnaires provided the research with valuable conclusions that can be categorized based on the three groups of participants: clients, users, and design team. Since the applied methodology (the entire design activity, interviews and questionnaires) for users and clients are the same, in this part the conclusion about them can be discussed under the same category as well.

5.5.1 Clients and users

User and client groups of the sample project used the magnetic wireframe tool based on the methodology that has been discussed in chapter three (3). They could think out their ideas and share their feelings with in a fun experience with the ‘make tool’ during the participatory design session. Results of their activity also were helpful for the design team. Clients considered more the hedonic attributes of their experience with magnetic wireframe. Besides, users mentioned more pragmatic attributes of the tool and applied it in more technical ways to present their ideas. They both also mentioned interesting findings about the tool and its application in other areas such as collaborative activities. The entire experience of clients and users with the magnetic tool was successful and they graded attributes of their experience with high marks.

With the ability to co-design, clients and users become participants in the design process, which enhances the (user-tool) relationship. They had a common language and they can show a simplified version of their favorite way to design a web page. In comparison to what they have done in the sketching process, magnetic wireframe tool enabled them to feel good about their participation and engage in the process of user experience design. During the activity they have had fun from their interaction with the tool. That is what makes them excited because they enjoyed their fun experience with the tool and they have less fear in designing, since it is a fast and easy way to do a design for all of them. They just need to pick an element and put it in an appropriate place, and then say why they did that change.

Participants in these two categories used meaningful words in the sentence completion task. They talked about their experience along with technical, and functional

definition of the tool. They also mentioned, was the tool's ability to help them change their opinions easily, as well as organize and visualize their thoughts/ideas. These features are important in creating an empathetic relationship between designers and users, in which their thoughts can easily be heard in an organized verbal and visual format.

5.5.2 Design Team

Users and clients shared their thoughts during a co-design session. A transcript of these thoughts have been organized and shared along with what they designed with design team members. All of them started to read these thoughts and looked at all designed wireframes. They extracted important elements and valuable design form from participants' results. Then they designed and delivered three (3) options for the web page of the sample UX design project.

In this group of participants they noticed that this tool is a good starting point for their activities. They also mentioned that the magnetic wireframe tool is a good way to prototype their web design ideas faster with the ability to move objects more rapidly in a page. They still wanted to use sketching on paper to make the finalized version.

They also believed the way that this research applied the tool on users and clients groups helped them to know more about them. Therefore, this tool helped the entire user experience design activity to have empathy. In summary, this tool brings empathetic relationship in these projects, with the use of uniform and simple playful magnetic objects.

Results of the questionnaires also certify that the experience with magnetic wireframe tool was a fun experience for team members. These features can be added to what they argued about the collaborative and prototyping features in this tool.

Consequently this tool makes their wireframe design session more and more collaborative and in the phase of connection they can stand around the magnetic wireframe board and make prototypes in a collaborative way.

Based on results of their sentence completion task, it can be stated that this tool is a valuable tool for them in order to visualize their ideas and think aloud in their collaborative activities. They have also argued that they would use it and apply the tool in their future projects, but mostly as a prototyping tool. This is a great application for such a handy tool like the magnetic wireframe tool.

5.6 Discussions

5.6.1 ‘Make Tool’ for UX Design

The research was aimed at applying a magnetic wireframe tool as the ‘make tool’ in the process of user experience design for all stakeholders of a web design project. Based on the literature review from Sanders (2002) a ‘make tool’ should provide a situation for participants in a design activity to say, do, and make. In summary of what all groups of participants have experienced with the magnetic wireframe tool, it can be argued that:

1. Clients could express their comments easier and more clearly, they used the tool without any major problem and did the activity with it, and also they could make what they wanted to be as their website. Therefore, this tool was a good ‘make tool’ for them in this process.
2. Users could think about what they wanted to see and say their comments, they were able to use the tool and they had many creative ideas about using the tool,

and finally they could make valuable wireframes that was used in the design team activity. Therefore, the magnetic tool is a great ‘make tool’ for users as well.

3. Design team members could collaborate but they still could not say everything that they wanted. They used the tool easily, since they had experience with other prototyping tools, and they could make 3 final designed wireframe by the tool. They could do and make, but the tool was not a perfect way for them to talk. Consequently, as they said, the magnetic wireframe tool can be a good start point in their project to make several prototypes. They need more activities to share all of their comments.

Based on the literature review, it should not be expected that the tool must be a ‘make tool’ for designers. Sanders (2002) asserted that the ‘make tool’ is a projective tool that designers give to users to see how they present their thoughts. However, it can be argued that, after this research, this ‘make tool’ found its place in a design team and it can be a good prototyping tool for them. The unified tool that all stakeholders used let them make unified projective outputs in two groups, as a ‘make tool’ and as a prototyping tool.

5.6.2 Significance of ‘Make Tools’ in UX Design

Based on the experience in this research, it would be valuable to focus on the significance of having ‘make tools’ in the user experience design for software projects in general. It has been observed that such a tool like the magnetic wireframe tool that has handy features, motivated users and clients to share their thoughts and get engaged in the process of user experience design.

When the topic of user experience design is being mentioned, first of all it should be considered that everything is being designed to be used by the user of that particular

project. Nowadays, it became a fad to talk about taking care of users' thoughts and feeling. However, it should be considered that users are not necessarily able to give designers the accurate insights, and designers are not able to capture all of them. Having fun 'make tools' in user experience design projects give all stakeholders a common language to use. Then, they can speak about an issue with the same language. It is important to find a language in common; it is like the significance of learning the English language in order to be able to live in United States for a long time.

It should be noticed 'make tools' like magnetic wireframe tool, should be designed and improved to be used by stakeholders. These tools enable design team members to make collaborative activities about a web design issue. They can write their idea on a piece of magnet, test it in a part of the project, and the other teammates can ask questions about it. They can also easily pick up a piece and talk about that specific piece, change the title on it quickly and apply everyone's comments on it faster. Therefore, it can be argued that the existence of such a tool like magnetic wireframe tool is necessary for any professional firm that likes to create empathy with clients, users, and among its designers.

5.6.3 A Guideline for Empathetic User Experience Design

In the literature review a framework for design with empathy (Kouprie & Visser, 2009) was introduced. Based on this framework, in the connection phase the designer should try to understand users' thoughts and feeling to make an emotional connection. It has also been discussed that this can be a potential phase to use the magnetic tool. Based on results in this research, since the tool helped design teams to know about users and clients' thoughts, this tool can be applied in the connection phase.

In session 5.5 it has also been discussed that the magnetic tool is a good ‘make tool’ for users and clients. Therefore, in a web design project, if the magnetic tool as a ‘make tool’ will be applied in the connection phase of an empathic relationship (Kouprie & Visser, 2009); values will be added in the framework. There is also the detachment phase in this framework that designers get detached from users and clients. It can be argued that if designers use the magnetic wireframe tool in the detachment phase as the prototyping tool, they can observe more options and have a collaborative tool in that phase. Therefore, the magnetic wireframe tool can be applied in two phases of the empathetic design framework by Kouprie and Visser (2009).

Consequently, this can be proposed as a guideline for user experience designers in web projects who want to create empathy. If they follow the empathetic framework proposed by Kouprie and Visser (2009), they can use the magnetic tool in the third phase as a ‘make tool’ and in the last phase as a prototyping tool.

On the other hand, results of the research show designers liked the setup of the design session, starting with users and clients comments and designed wireframe, and concluded with an experience with magnetic wireframe tool. Therefore, as another guideline for UX designers, they can use the same thread of activities that has been done in this research, have meetings together around the magnetic tool, and make prototypes with the magnetic wireframe tool. The whole setup makes the user experience design project with more empathy with users, clients, and even their team members. Therefore, this way of doing the wireframe make an internal empathy as well.

5.7 Future Improvement and Strategies

If this research can be done from the beginning one more time, there are several improvement and strategies that can be considered. Based on collected data in questionnaires, when users and client talked about their wishes, several improvements can be done in this research.

- Colorful markers can be added, since a lot of participants liked to have those and this also gives them more options to design.
- More magnetic pieces are required to give participants more freedom with several shapes and numbers of magnets.
- Square magnetic shapes can help participant to create the layer that they really think about. Having magnetic pieces only in rectangle shapes, force them to think limited on those types of layers.
- Multiple whiteboards enable designers and users to think parallel about different ideas that they have about a page and they can also compare those ideas.
- More diverse group of participants should be considered because the result must evaluate all real users of a product. For example in the example that used in this research, parents could be interviewed as well.

There are also so many valuable strategies that could be used. If this study could be done one more time, these strategies can help the research to collect more valuable data:

- Using multiple cameras to record designers' collaboration helps the research to collect more valuable data about their collaborative activity with the magnetic tool. Once the study has finished, it has been noticed that the workshop with

design team members could be captured with at least two cameras; the second one could be on top of the room and could capture all movements around the tool and also all changes in the designed wireframe with a better view.

- Conducting a pre-questionnaire for designers helps the research to compare their feelings before and after of an activity. It was necessary for this research to evaluate the change in their feelings and avoid of having biased results.
- Participants could be asked to think about a mobile version as well as the website. This helps the research to evaluate how they could think about responsive design during their design process.

5.8 Future Research

This section goes one step ahead of what has been done in this research. Several potentials that have been discovered during the research along with what participants have mentioned in their conversation and questionnaires. This can present an interesting array of future studies. These researches can be undertaken in either makes tools for user experience design, or improvements of this tool. It can also be applied in qualitative and quantitative aspects of co-design sessions with users, clients, and even other potentials stakeholders in the market.

The first issue that was in common among users and clients was their need about having colorful markers. They also believed that they would have multiple boards and more sizes of magnetic pieces. Therefore, in one of the future studies colorful markers and multiple boards can be used as additional tools to the toolkit that studied in this research. Also, it can be evaluated that how these added features can bring more creativity and valuable outputs. On the other sides, for design team members, they stated

that they need square and varied pieces of magnets. This can be an interesting study to see whether adding this feature changes their attitudes toward using magnetic wireframe as their preferred wireframe tool or not. Also research can be done on exactly what kinds of new magnets and what exact colors can be added to improve productivity with the tool.

As another avenue for further research, it is important to evaluate and test such a ‘make tool’ in more varied communities. Because the limitations and reasons behind this research, all participants had a background in design. A large group of non-designer participants can be asked to do the same activities with the same tool to see in what aspects this is helpful for them and how does the tool make sense for them as a valuable tool. Besides, how does this tool bring empathy in their relationship with a group of designers?

Since participants, especially in the design team, mentioned their experience with wireframe software applications, in another valuable research this can be a great area to compare both experience of designing wireframe in computer and designing wireframe with tangible ‘make tools’. This can help the field of design to notice what are the values toward using tangible ‘make tools’ and in what aspects design researchers can improve participant interactions with a tool.

Maybe later customized magnetic tools can also be designed that use shapes specifically needed for the application. For example Android mobile apps have specific design patterns used only on that platform (<https://developer.android.com/design/patterns/>) and a specialized magnetic tool for android can be designed that uses shapes proposed in the design patterns. The magnet can

also take into account local factors such as localization based on layouts for different regions (for example right-to-left languages).

One of the other remarkable research can be done on top of this study is about tracking magnetic pieces movements. We can imagine that instead of the whiteboard, a digital whiteboard will be used. That digital board is remotely connected to software, and then we can track all changes that participants make on their ideas during design sessions. With that tool, a larger amount of participants can be examined, since the data analysis for all of them will be easier to handle and results will be valuable. Results of such a research like this can help UX designers to see what are the most items, sizes, names, etc. in common among users of a website project. Also this tool can help designers to have a physical tool to make their collaborative sketches. Actually it is more collaborative when they can work together around a physical tool. Then, if results of these collaborations can be finalized directly from the physical activity to a polished version of wireframe in software, that makes their wireframe design faster and makes more intriguing outcomes for clients. To summarize, it is believed that linking physical ‘make tools’ to computer software will make a remarkable area of research in user experience design.

At last but not least, software projects are not limited to web site projects. There is variety of software types with different characteristic. For example, Enterprise Resource Planning (ERP) applications have expensive licenses for organizations that want to buy them. Several user experience issues are also embedded in these applications that are not necessarily web-based applications. Some of them have mobile and desktop versions. Imagine that such big applications can bring tremendous value for organizations and can be improved by fun and handy tools like a magnetic wireframe tool. This has two

important results: 1) for different sizes of applications, different sizes of magnets and board are required, and 2) these large scale projects have specific concerns, therefore the need for specific study in those group of users seems very important. It can be concluded that having research in these two aspects can open a lot of doors in the market of user experience design for enterprise applications.

5.9 Design Implications

Studies on using ‘making’ in the process of design are being done for a long time in the history of design research. However, what has been discovered in this research opened another door of design implication. There are three main concerns should be discussed in order to evaluate how this research can effect on the area of design in general.

First, What people make along with what they say can be helpful for designers in all areas. It can be imagined that even in an architectural or product design project, researchers ask people to make their dreams and consider what they say in the process. In this research it has been discovered that how amazingly, ‘making’ process, enables people to talk. Therefore, the combination of ‘making’ and ‘saying’ (which can be a transcript of what people say) can help designers in all areas of design. Because design is a user centered task and designers must consider these kinds of conversations all the time.

Second, it is a long time that some products are being designed but they are destructive for human’s life. They do not consider the real human values and emotions. Some product or technologies are coming in the market and instead of make powerful relationship among people; they are breaking face-to-face relationships. The focus on what people need in all aspect of design is the most important thing that should be

considered for a valuable design. Designers must respect people's beliefs and their emotional values, they should hear to their dreams and understand what makes them happy and joyful. These categories of research can help design research to find more about real people's taste and favors.

Third, design studies are being done under control of design teams and experts. These experts can have multiple backgrounds and the communication among them is crucial for the success of a design project. Having projective collaborative tools for design team members enables them to find a language in common. Even it can enable all kind of designers to participate in a specific design major. For example collaborative tools can help graphic designers to participate in architectural projects easier. They may have not knowledge in architecture, yet they can show their point of view as a graphic designer in an architecture project, since they have a language in common.

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APPENDIX A

SHARED TRANSCRIPTS WITH DESIGN TEAM

USER 1

Start with ASU logo

Add video as slider

I hate news, I just want to see.

A big image about the project that someone did, we want to make it active, so a big image will help.

In law school for example, they want to read, but in design school we want to see pictures.

USER 2

Start with ASU menu

Programs (MSD, PhD, undergrad) in medium typeface

The second menu in small typeface

You see a big image behind the whole
Menu goes all across.

USER 3

First, menu items

Then ASU logo, Herberger institute

Degrees are in the main menu, that people are coming to see

Specially to see what type of degrees

Current events for degree, when you scroll down, see that for others degrees.

And search bar in the corner right top.

USER 4

The design school name as a big part.

Then, the video box.

Menu items, (first with icons, then erased it and said, honestly I don't like icons)

When scrolling, menu sticks on top of the page.

A wide gallery of movies and pictures.

Arrows are on left and right.

News and events are on the right.

USER 5

Big image in the top

ASU menu items like MyASU

'I am just going to find paperwork in the design webpage, or if I lost somewhere, I come here to check'

Navigation

And the next should be more about the design school.

I want to see a menu item just for office hours, people are looking for that.

HIDA print lab should be on top, you can get a drop down under that to see its time, getting appointment. Every time I should Google it 'HIDA print lab design school ASU'

Contact info.

USER 6

Start with menu items

Events are on the left side.

About descriptions.

Programs, classes.

Calendar will be up there.

Show cases of students down in a big box.

ASU logo is on top left.

USER 7

Site name, it is standard to see the logo in the corner.

Navigation menu.

A big image

Search bar in the corner.

Its good to have links to outside of the design school.

Footer.

We can probably have some more images, or blog and images.

Under the image, a text about the school and philosophy.

Change the big image only once in a semester.

USER 8

Start with copyright and information about ASU and Herberger (footer)

A search in the middle, if it can be IN the middle of the page, people can search faster and be to the point.

Design events, information, and people.

They are showcasing categorized. It changes every week, combination of all majors.

Three vertical main images to see what's going on.

ASU Design School on top.

USER 9

Header on top

Footer on bottom

Big image and detail

Menu items as big boxes under the slider image. (6 boxes) they can be in different layout, 3 combined in a row, or separated boxes.

Try to keep it simple

USER 10

ASU design Logo

Tabs for: students, faculties, and parents to specialize the view of page

A big wide image slider

Events for Graphic Design, with details

Events for architecture, and two other majors.

I would organize it by who is viewing the site.

Client 1

Started with menu vertically in the middle

Menu items in the middle can change the whole page.

Also some thumbnail photos around it can be like show case of student projects, or specific events in a program.

Boxes can be link, which open the door to some samples or details.

Students want to go to the different programs.

How to apply is an important option, most of students are coming to see that. In the current web page, student must go through a lot of steps to find the process, so it should be in the first page right in the middle.

Try to break the paradigm, use a color in the background, not normal color, something catches tension. Not necessarily unique for the design school, but for the design community.

Alumni page is useful, and gives students a view about what they are going to be afterwards.

Three main questions for freshmen:

(1) what am I going to do after graduation,

(2) the milestone

(3) how much I am going to make (he did not answer them about this question), that is why having the alumni page is important, to get students excited and make a HOPE.

So the page even could be based on testimonials in the starting.

Client 2

Start with the top image, wide.

The Design School logo on it, in the corner right down.

Five main menu elements.

Search box next to menu items on right.

Students are number one, they need a bigger box.

Then faculty, community...

Student box has transparent menu on it.

Featured story combined with texts.

News and events, stories, all with thumbnail photos.

Client 3 (Consultant)

Main picture in the middle

ASU logo on top

Navigation is next to that.

Title of design school

And navigation again

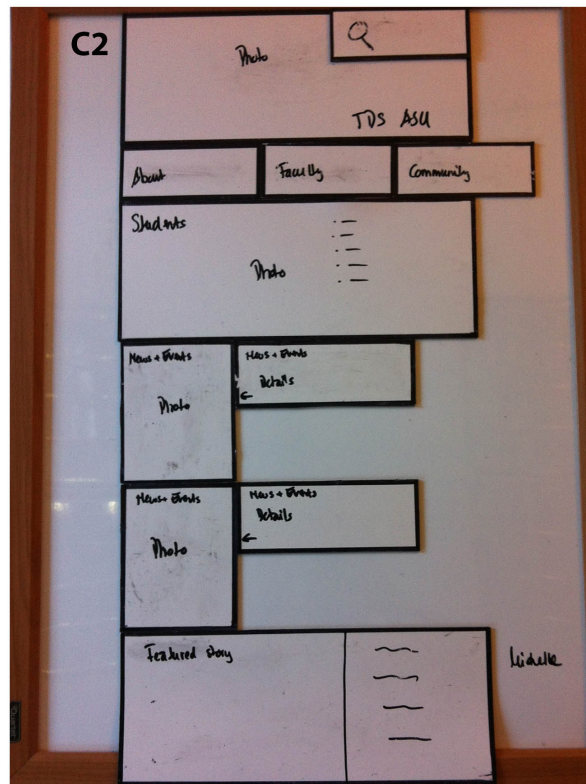
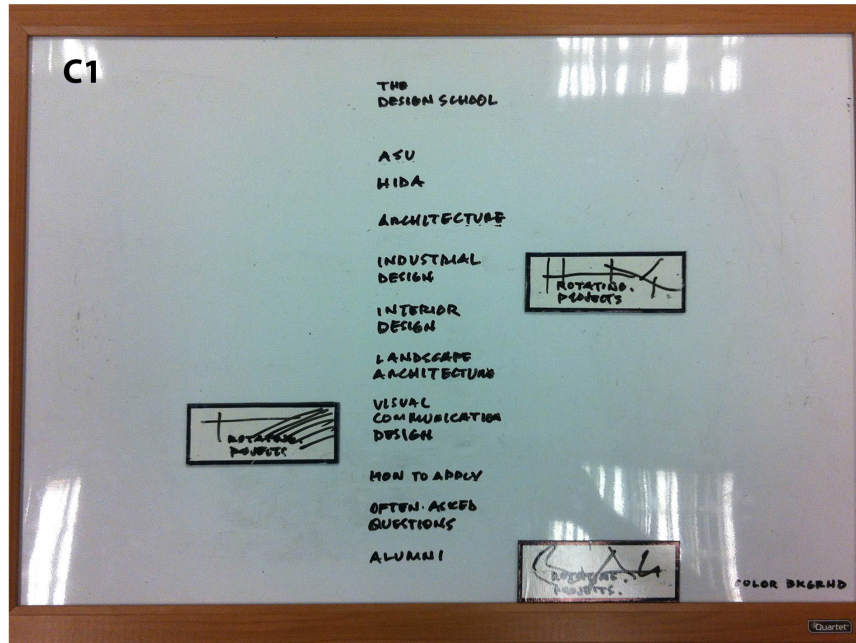
And footer at the end

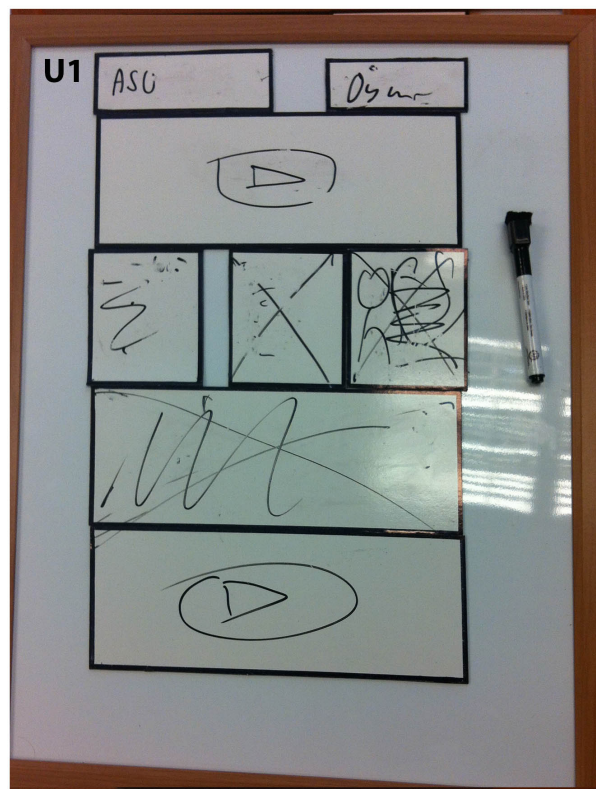
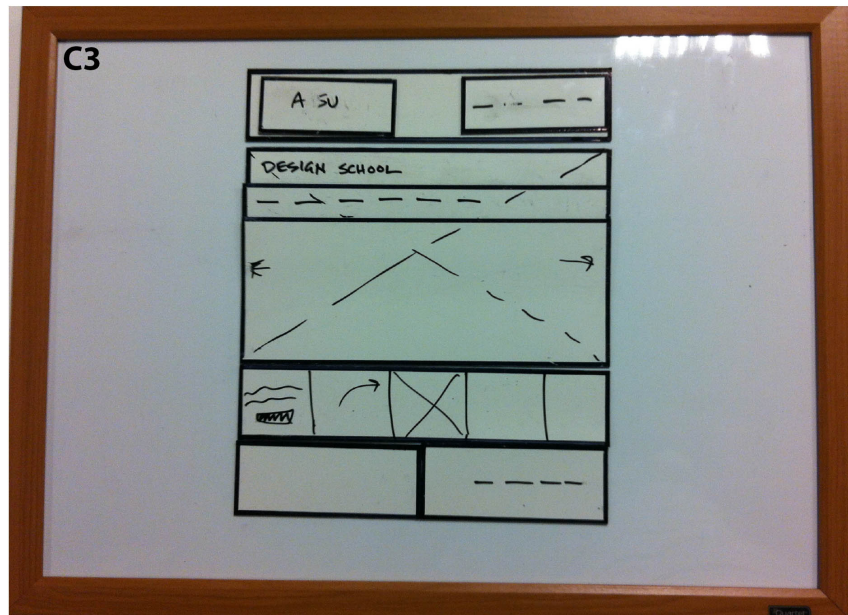
Decrease number of current website navigations.

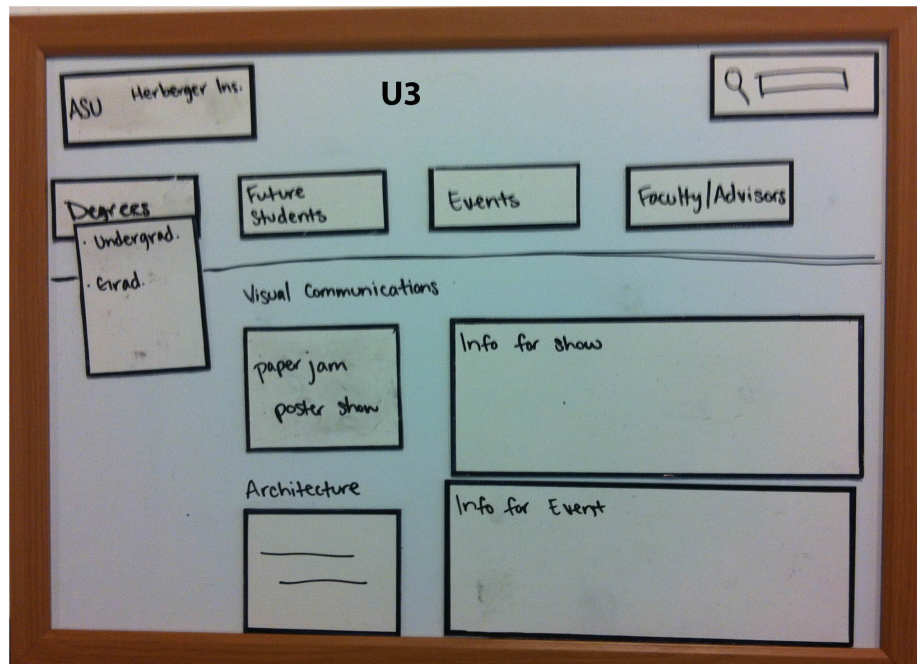
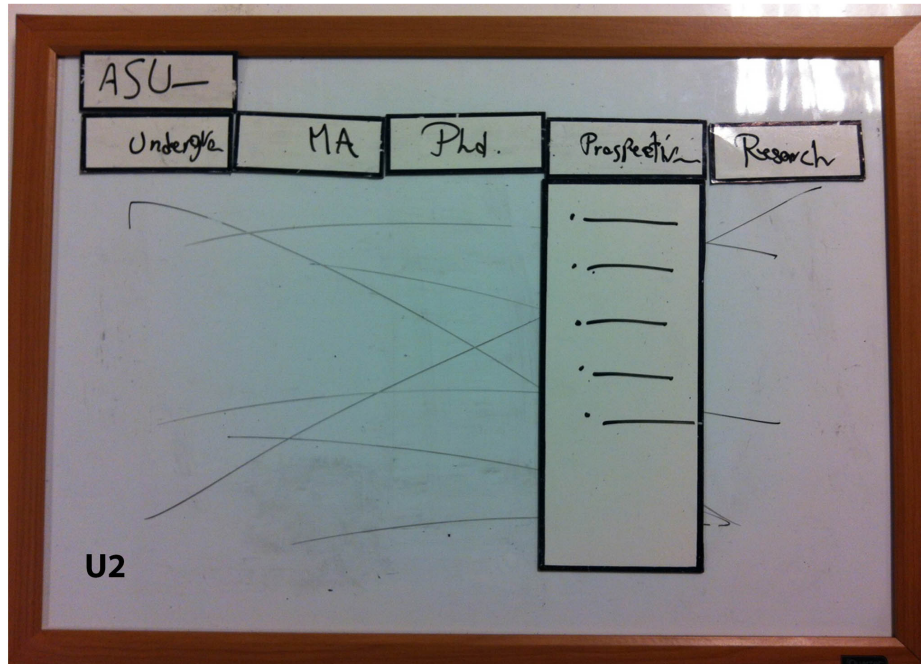
APPENDIX B

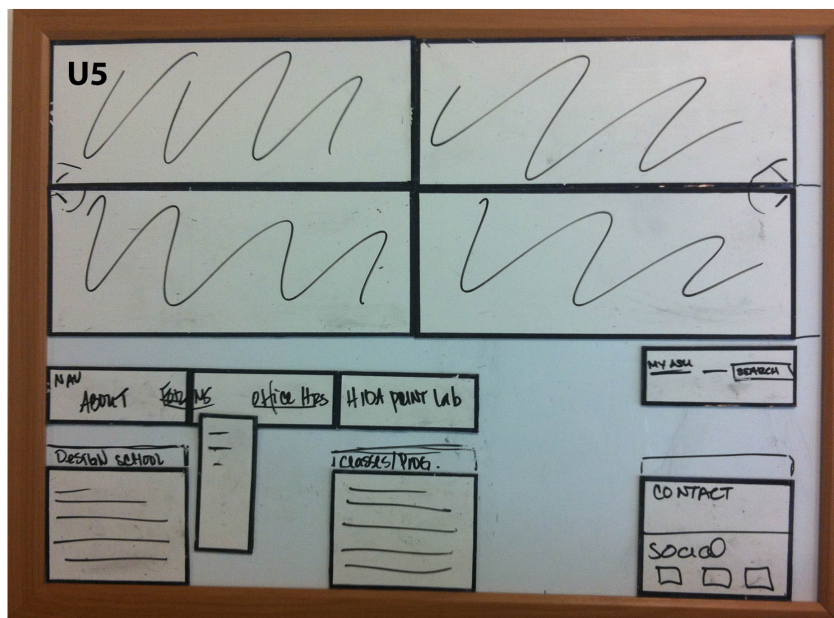
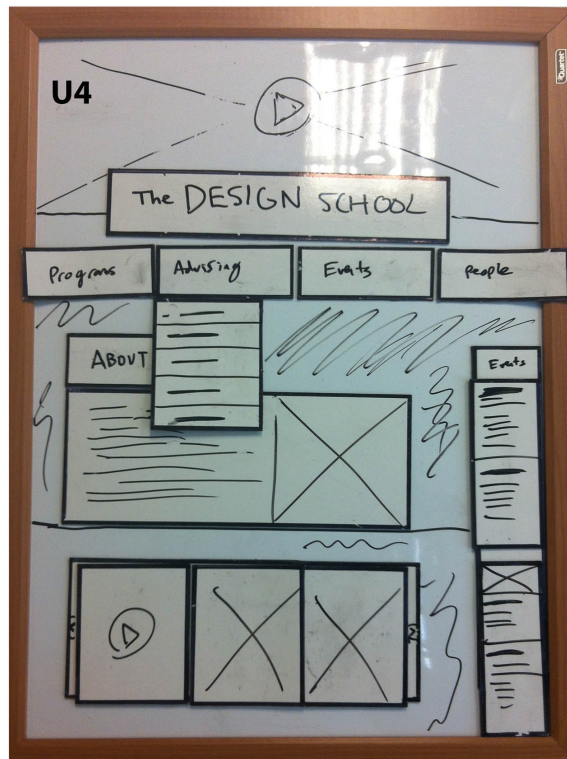
IMAGES OF DESIGNED WIREFRAMES BY PARTICIPANTS

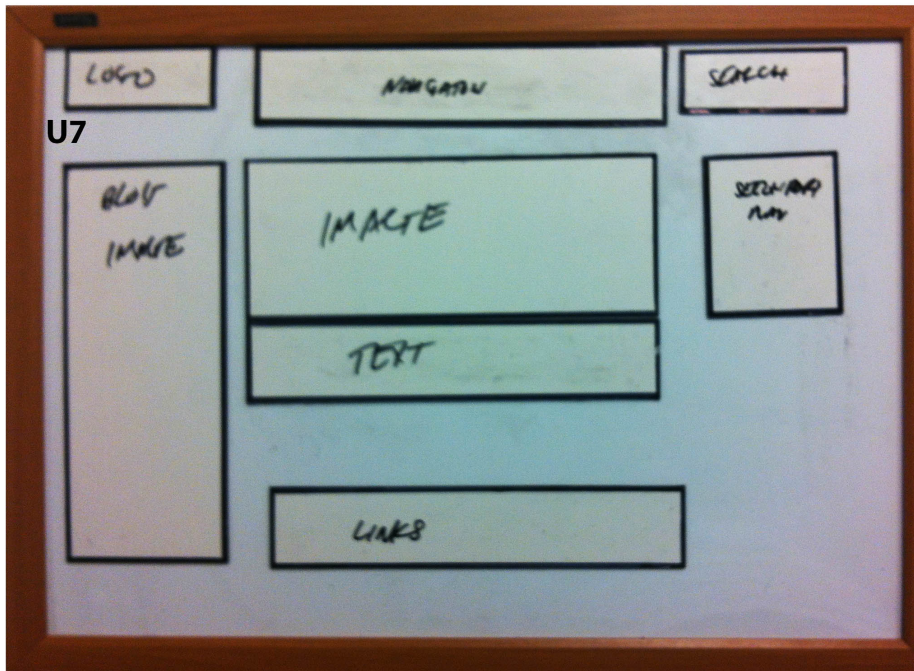
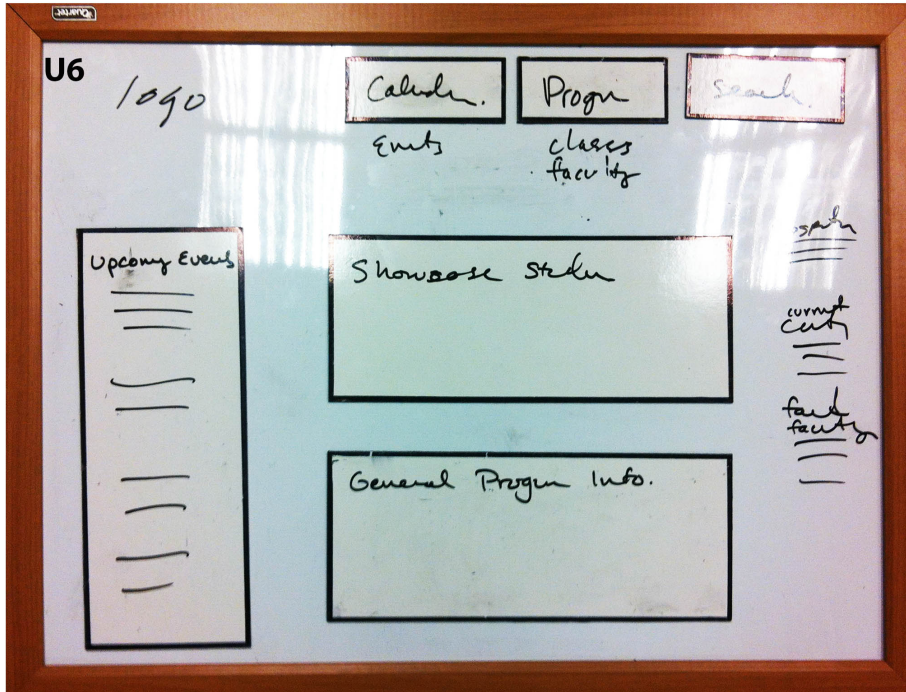
Clients and Users

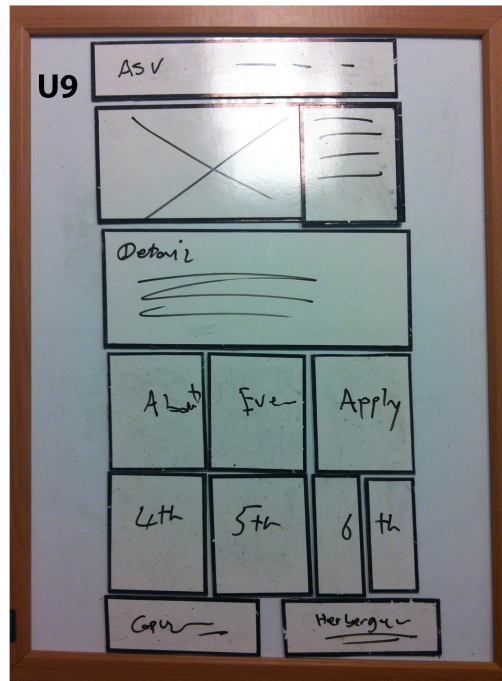
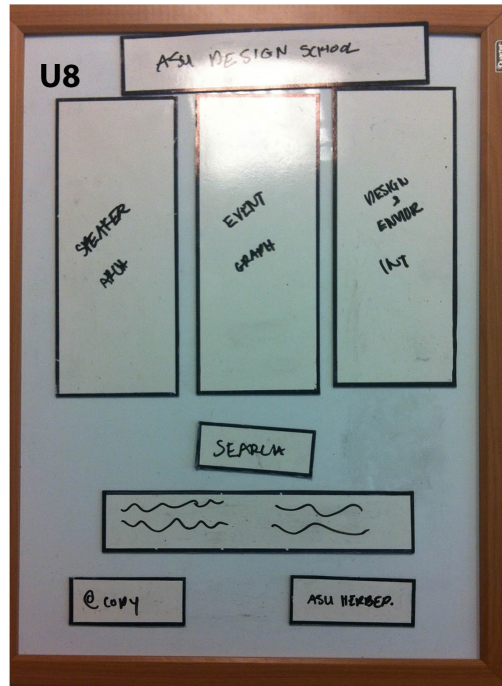


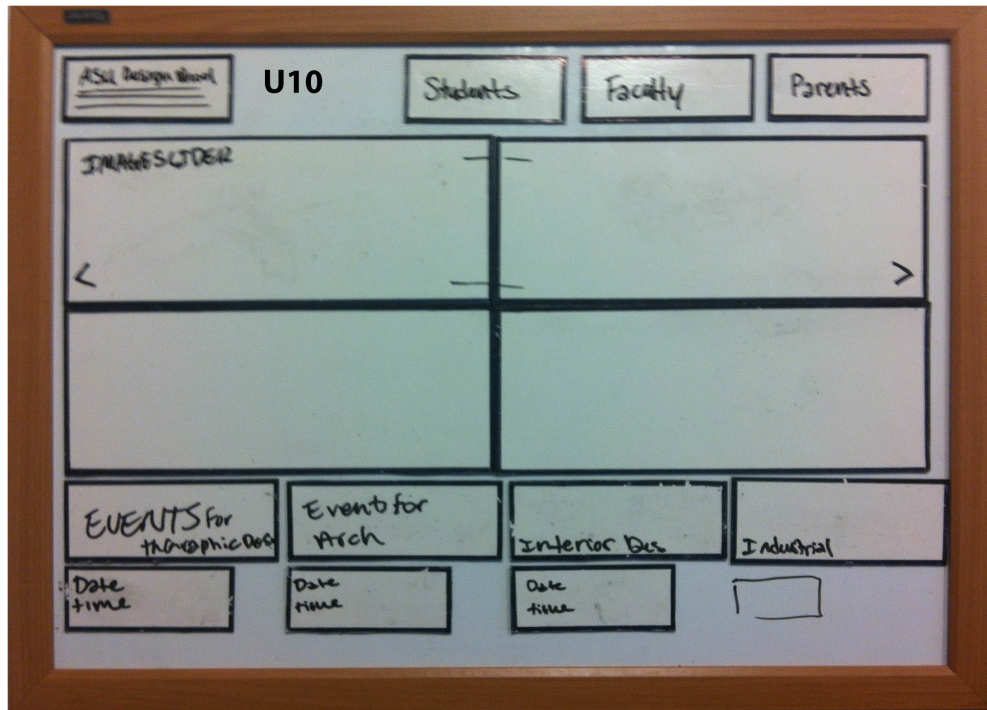




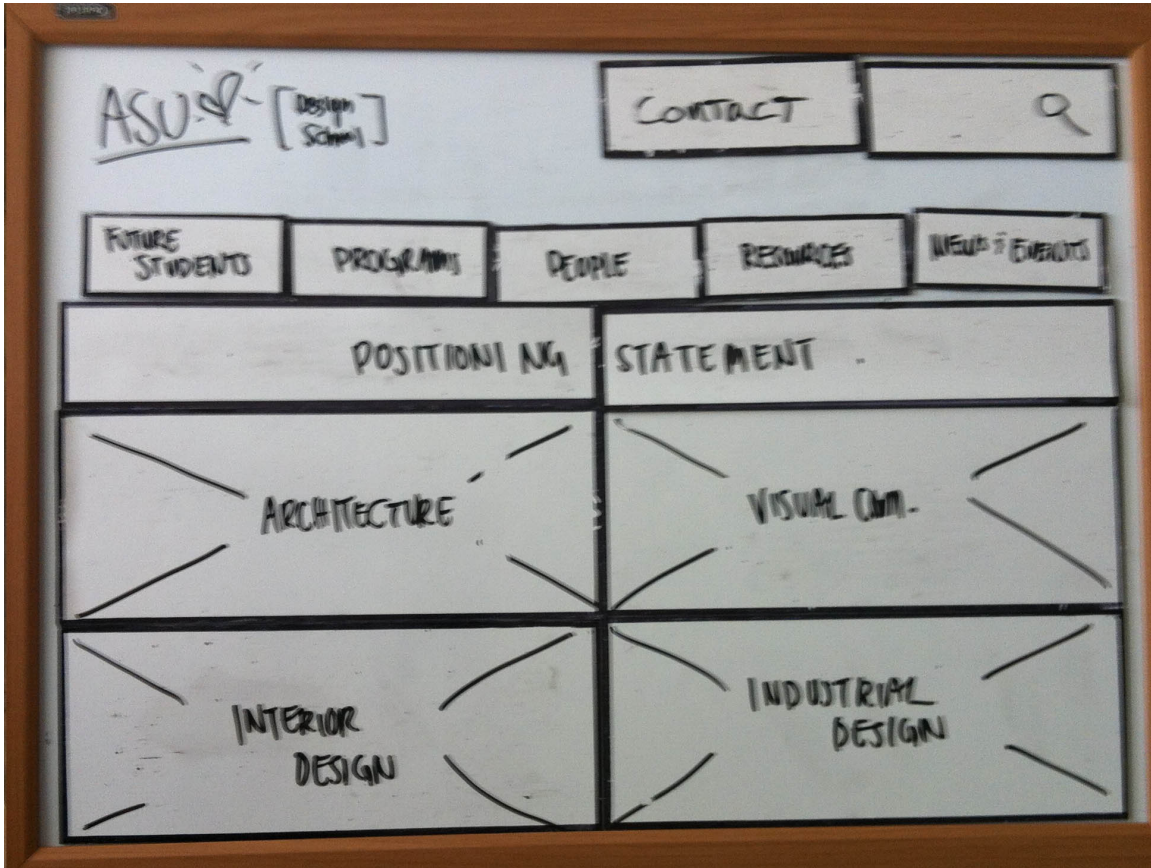




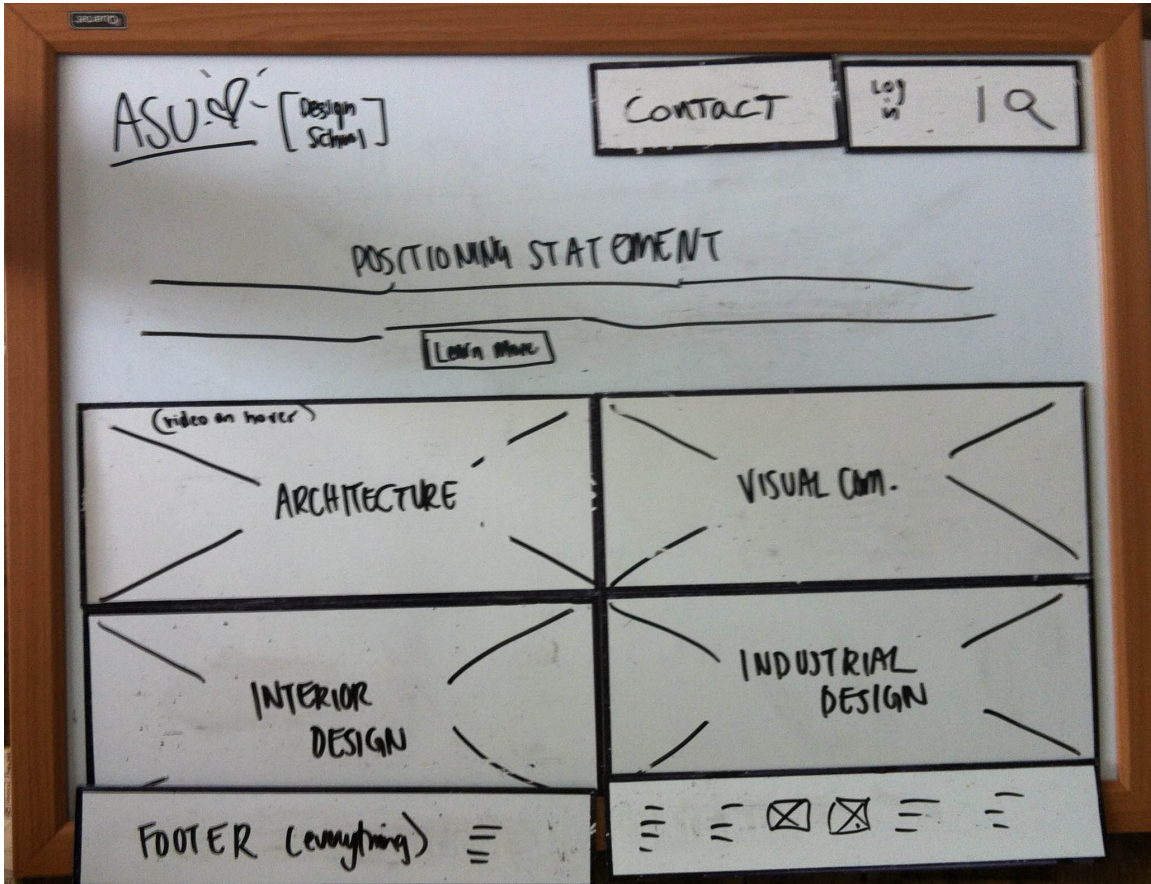




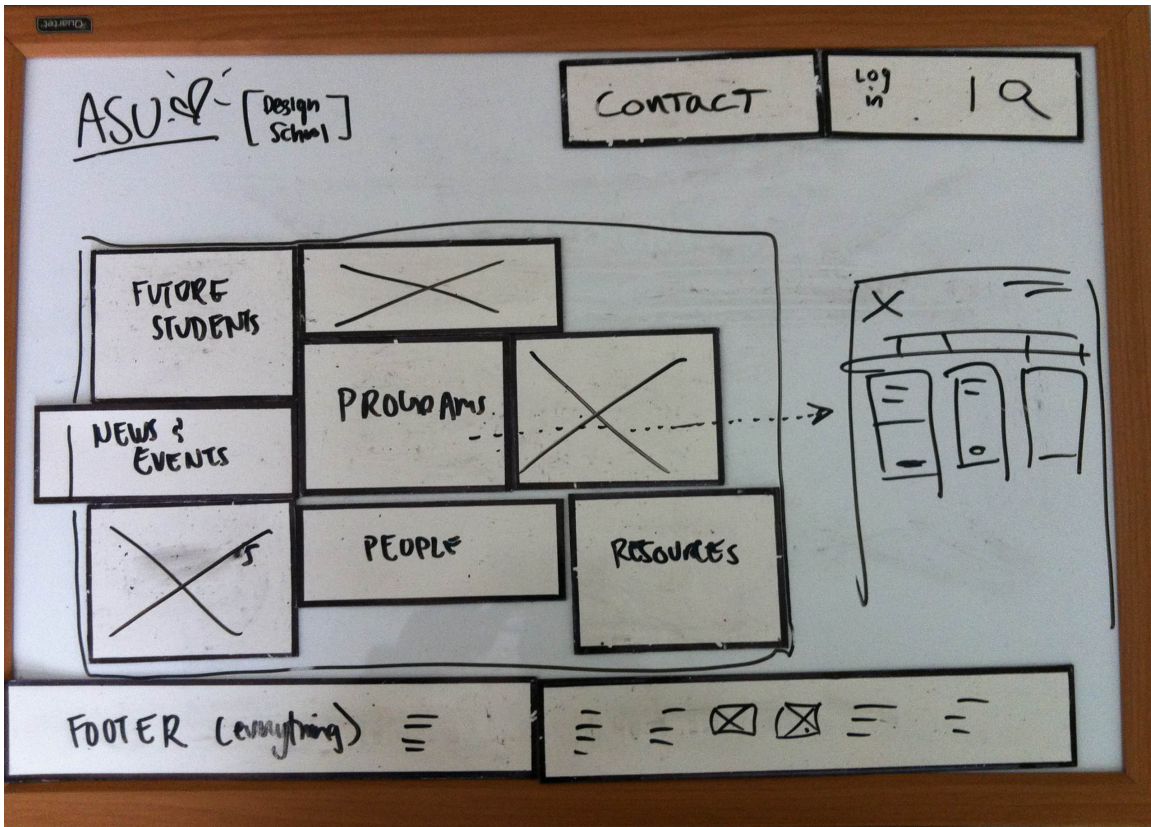
Design Team, Wireframe #1



Design Team, Wireframe #2



Design Team, Wireframe #3



APPENDIX C

PARTICIPANTS ANSWERS TO INTERVIEW QUESTIONS

A: Describe your feelings about this design session.

U1: it's great, so cool. But if you can make pocket size of it, in case if want to move it. On magnet board you don't have to redraw your idea.

A: What advantages do you think magnetic wireframe makes for you?

U1: it is perfectly ready to show to everyone, you can apply your idea just here, move boxes, even make a small space. It is a lot faster, and you save paper. I love it, because people do much better when they are active. In magnet you feeling it, you see it, the paper is not actual size of the page but it is a good size. And also you do not need to scribe, you have a clean idea to show. For my website I have to do that.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U1: not only easier, but it lets you think out of the box. It makes you even move pieces upside down, and you can talk about it with others, flip it around.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U1: If your draw in the piece of paper, you just kept it there and can have it as a part of your portfolio, but if you can have magnet in pocket size, you can have it everywhere and talk with that. When you draw on paper, and you find new idea, you should redraw the whole thing, but in magnet you can change it easy and even pieces to change a position.

A: Describe your feelings about this design session.

U2: Aw I like that, its like posted notes, it is also good for collaborative. And I like it that it is on the board, you can also go on it.

A: What advantages do you think magnetic wireframe makes for you?

U2: it is in the dimension of the monitor. You can start from the beginning easily, I used whiteboards in my projects before, but it is limited in a size, we should have these pieces in classrooms, with these magnets you can make grid systems and actually I want to take them home.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U2: yeah, it helped a lot.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U2: I think it is different, since we started from sketching, I already had an idea, if I went to the whiteboard without sketching, I should say it was easy since we had grid system with that, I like paper though, it's more loose, but what we did with this tool here, we had a structured form.

A: Describe your feelings about this design session.

U3: It was kind of fun, you do what you think is the best to show.

A: What advantages do you think magnetic wireframe makes for you?

U3: you can move stuff around and see how the different views are look like.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U3: yeah, it did, I could pick it up and say why I need this and then move it.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U3: in sketch, you had to still going with that and be stick to it, but there is a flexibility in working with magnet and you are free to move.

A: Describe your feelings about this design session.

U4: It was cool; it's cool to come up with some solutions quickly.

A: What advantages do you think magnetic wireframe makes for you?

U4: we are not limited by sketching but after some time we need some tool to help us to develop ideas, we need some tool to visualize.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U4: I think so, I think it's helpful, even if I did that this way (rotate 90 degrees) I could say another idea, also it can be helpful to see how people are talking with this in a group.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U4: this magnet tool lets you utilize your ideas and concept; you can move it and play with that.

A: Describe your feelings about this design session.

U5: I like it, I think anything tangible is good; you can pick it up, draw on it and make changes.

A: What advantages do you think magnetic wireframe makes for you?

U5: Its tangible, being able to see layers and hover menu, you can move it, arrange it.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U5: I talked to myself anyway, it definitely helps.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U5: Besides of dimensionality, it has volume to look at it, when I drew over that (paper), and then I had all these extra lines, but here just take out this one and put the smaller one. It is a lot easier to work with this magnet tool.

A: Describe your feelings about this design session.

U6: I like it, that was interesting when I could see my idea in an actual size and play with them.

A: What advantages do you think magnetic wireframe makes for you?

U6: it is easy to change; you are more focused to the context. You can also think about the hierarchy of the information that you want to present.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U6: I think so; I could see what exactly happens while I was thinking about my idea.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U6: on paper, I was limited and as you see I repeated my sketches for three times, but with magnets I could easily change them and find the best choice.

A: Describe your feelings about this design session.

U7: I think it was good, I can see it was helpful in order to test.

A: What advantages do you think magnetic wireframe makes for you?

U7: I can change them easier, and it is a prototype. The prototype can show what is good or what is bad.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U7: It definitely to visualize it, now I can see ok this is blah blah. It does help, because I can see ok I need that for this space and then I can do it.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U7: in magnet, it is like live, I can be faster with something like this, it is more organic, and there I feel so solid on papers. It is more like a game, which makes magnets more interesting, it makes people so engaged.

A: Describe your feelings about this design session.

U8: I like doing things by my hand, so anything I can move by hand is perfect, I can move things around, dimensions I am working on, so I prefer anything like this.

A: What advantages do you think magnetic wireframe makes for you?

U8: magnet helps you to do more exploration and see changes, but in paper you cannot easily show those changes.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U8: Yes, I think helps me talk about it since I can specifically talk about what's going on as oppose to when you are sketching.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U8: Sketching is always nice, but what I don't like about sketching is I would have to redraw, but with this I can just change it easy. With paper is not waste of the time, but if I want to do something, I would develop my idea first with magnets and then finalize it on paper.

A: Describe your feelings about this design session.

U9: it is very interesting, lot of the time that you do something like prototype it helps you to have the idea wrapped up, and say I want to this, I want to make this, now you have it in front of you, I think this is helpful.

A: What advantages do you think magnetic wireframe makes for you?

U9: it is quick, you can sit there and you can show the idea quickly and the one who sit there can catch your idea.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U9: I think so, if I am working on computer, I should make it, talk to you, again make it and talk to you, but when I am doing that here, I can make it just here and talk about it, write some more stuff, change my stuff.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U9: pen sketch, I would is more for big spaces, but this magnet tool I think is very good for mobile and if you want to keep it neat.

A: Describe your feelings about this design session.

U10: I think it's kind of cool, it is easy to think about; after you do something you think you can add more of same size elements. It is kind of like a nice process, you can move everything.

A: What advantages do you think magnetic wireframe makes for you?

U10: it is nice, you can put something down, but if you don't like it you can put it away, which is kind of interchangeable.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

U10: yeah, if I was at work and try to show changes to my boss, I should do it for many times in illustrator, so I think with this you are hands on and move stuff around and talk about it, that is cool.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

U10: in magnet you can make a new sketch anytime and change it, instead of being limited with sketching on the paper.

A: Describe your feelings about this design session.

C1: I like it, what would be nice is to have a couple of these, this was okay, it actually works, but it was quite interesting as small <div>s, that was interesting.

A: What advantages do you think magnetic wireframe makes for you?

C1: I think the idea of having lots of different shape is good; I would even have them cut, or have square shapes. And you can also have them based on pixel, you could use shapes. You could have them more proportional to other, but I just found it useful. I could have put them on each other and show the process. I would also have multiple boards. The other way is you can photograph it.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

C1: Yeah, I can sketch in my own mind, I can do this, and this was just a concept of my idea. But on magnet I could talk on it and think about objects. The board also is lightweight and I can move it and turn it easy in the process.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

C1: when I did this on paper, I didn't necessarily think how is the idea, but when I did on magnets, I could think about elements and words on it and talk about its features.

A: Describe your feelings about this design session.

C2: I was trying to fit them all perfectly, it suddenly showed me we have some free spaces, but everything was easy to show and change.

A: What advantages do you think magnetic wireframe makes for you?

C2: you are constrained by size and you can move it anywhere, even after you are committed to an idea.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

C2: yeah, I think it does, because unless focus on space planning, and now I have the buckets, were would they go.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

C2: with sketching I was able to come up with wrong size, I made myself a box, but these boxes are random. But with these magnets, I can think about size and spaces and it creates some negative spaces that you have to think about them.

A: Describe your feelings about this design session.

C3: To me it was a lot more playful, I am doing graphic design for more than 30 years, doing something with hand is lovely to do. I have a bike in my office, I do my work on computer, sometimes I am going back and playing with bike and do handy things with that, playing with physical issues and fix problems on it. It is very joyful to do it, I really like it, and I can even imagine that with more color markers and talk about ideas with clients. This is

really nice to physically touch this, it does not have to be so structured, you just get the idea, and for me it is very tactile.

A: What advantages do you think magnetic wireframe makes for you?

C3: you can do this as magic for clients, it is practical, you can see if they like to have logo somewhere else. It has a simple structure and you can say it is better to be here.

A: Does magnet tool help you to say your comments, needs, and ideas easier?

C3: I think so, if you do it with clients, they can move it and say why and say what is that look like.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

C3: I am not much a sketcher, I am doing sketching in illustrator and move boxes around, but I am still on the computer, this is much better, I really like this, because I am moving physical things around, at this point I don't want to say what is this exactly and use write typeface, which does not matter too much. Back in to years ago, we were sketching something and showing that to customers to see if they like the whole idea, but now what we deliver with computers, is like the final. With this they can say what they like and then select appropriate typeface, colors and whatever.

A: Describe your feelings about this session.

D1: I think it was a great setup; it is interesting to start the point from users, look at users first, and assemble it based on users feedback. I love this tool that allows us to be modular with concept, I think that is a really handy way of being able to map out in a not committed way.

A: What advantages do you think this tool brings in your projects?

D1: I do, I think it allows you to create, with ability to raise and move, and also ability to collaborate different ideas and you can see different options and present then different options.

A: Does that help you to understand more about client and users?

D1: I think having this all the setup and knowing the feedback from the users as oppose to the feedback from clients was really helpful. Being able to see what they came up with and what think they need with all of that information about the project.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

D1: This give you standard sizes visually eligible on a website, so you can have better representation, and the ability to move pieces and replaces pieces, and that is why I love magnetic wireframe.

A: Describe your feelings about this session.

D2: as a user I had fun time talking through everything, it was like a puzzle and I like the problem solving. It was really helpful to see the comments and see that visual versus pictures.

A: What advantages do you think this tool brings in your projects?

D2: that's a good question, it is really nice to have this, and it would be could if we can have more different shapes to make a dialogue with clients easier.

A: Does that help you to understand more about client and users?

D2: Yes, it is important to make sure you know everything, so this show us users' thought besides of the client.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

D2: having this solid makes me organize and also it is moveable, which is great.

A: Describe your feelings about this session.

D3: It was very simple, the way we had comments, and wireframes. And then moving into here was collaborative, that's a very smooth process. I think it is simplified.

A: What advantages do you think this tool brings in your projects?

D3: I think it is definitely applicable to our company; this is kind of nice that you can erase and move and you can take a picture and make another.

A: Does that help you to understand more about client and users?

D3: the way that you had, like with the users and clients papers was interesting. We do have discovery workshop with clients but not with users, which is important to look at users besides of the client and decide about the idea. Looking at both sides of that, I think was good and helpful.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

D3: I think this is definitely more collaborative and I think we actually made more process faster as a group, whereas I am sketching, that might be a good way for one person, but then that person need to show it to other people and talk through everything again and again. Whereas this one done at once all together and I think paper is just slower process with a lot of erasing.

A: Describe your feelings about this session.

D4: I like how we could look at all together and work on a same problem, and kind of look at this is like a collection of ideas and sees what is our idea.

A: What advantages do you think this tool brings in your projects?

D4: I like we can move thing around and you are able to write on each piece, we often using posted note and with this we don't require the paper. I think if it was in different size that could be better to have certain shapes. I did like how we could move things around and it really let you think about the space.

A: Does that help you to understand more about client and users?

D4: It was interesting to see what all the users wanted too see as the website, the hardest thing for me to know what was the user group who wanted to be look like this, but this was helped to see their comments.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

D4: I think it is a fairly similar process, I think the magnet let you edit things and move them quickly and easily. In paper you are not limited to these shapes to start with. This would be a really great to start and then from that through the paper.

A: Describe your feelings about this session.

D5: I thought it was a lot of fun, I thought it was interesting to see other people's interpretation and how they would solve the same problem and I love the fact that it was in kind of a uniform format, the fact that these block are like this helped all wireframe to be in a uniform format, and it was interesting to see how people are approaching that in different ways.

A: What advantages do you think this tool brings in your projects?

D5: One advantage I can see, this forces us to see in kind of a more structured format because it is a little rough, because all boxes are in perfect shape and size to think more abstractly which is appropriate for the wireframe design process. So sketching is easy to get too detail, where with this we just have boxes of information, which I think it is a right way to do it.

A: Does that help you to understand more about client and users?

D5: I think it does, what I found was, during the process we were trying to read between the lines and we were trying to make assumption about why they put certain things there, there was a lot of variety between them, everyone solved a problem in a unique way, so we were trying to learn what was they were trying to look at, what was the most important things and pull those out and make sure they are here.

A: Can you please tell us about the difference between sketching on paper and doing magnet wireframe?

D5: I think this is probably a good way to rough something out, a way to something in place, because of that we were able to come up with concept and see how they act. Probably we would do work it out here and make a refine version on paper and show that to client. Or alternatively we work through this process with client and talk through it so they know what we are talk about it and they can talk about what they wanted.

APPENDIX D
QUESTIONNAIRES

Design Team

Please grade these statements based on your experience:

Agree

Disagree



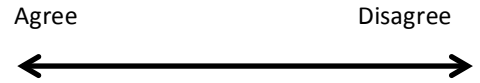
- | | | | | | | |
|----|---|---|---|---|---|---|
| 1- | This activity was fun for me | 1 | 2 | 3 | 4 | 5 |
| 2- | Magnet tool helped me to be faster | 1 | 2 | 3 | 4 | 5 |
| 3- | I could talk more clearly about my idea | 1 | 2 | 3 | 4 | 5 |
| 4- | Magnet tool helped me to imagine better | 1 | 2 | 3 | 4 | 5 |
| 5- | This tool helped me to be more creative | 1 | 2 | 3 | 4 | 5 |

Complete following sentences based on your experience:

- 1- My favorite wireframe tool is because
- 2- The magnet wireframe is
- 3- The magnet tool helped usbecause.....
- 4- I would magnet wireframe asin my projects.
- 5- Having used magnet wireframe in team, I heard

Clients (Faculty Members)

Please grade these statements based on your experience:




1-	This session was fun for me	1	2	3	4	5
2-	Magnet tool helped me to be faster	1	2	3	4	5
3-	I could talk more clearly about my idea	1	2	3	4	5
4-	Magnet tool helped me to imagine better	1	2	3	4	5
5-	This tool helped me to be more creative	1	2	3	4	5

Complete following sentences based on your experience:

1. The magnet tool isbecause.....
.....
2. The magnet tool helped mebecause
.....
3. Talking and playing with magnet pieces was.....because.....
.....
4. In this session, I wish I could
.....

Users (Students)

Please grade these statements based on your experience:

	Agree				Disagree
					
1- This session was fun for me	1	2	3	4	5
2- Magnet tool helped me to be faster	1	2	3	4	5
3- I could talk more clearly about my idea	1	2	3	4	5
4- Magnet tool helped me to imagine better	1	2	3	4	5
5- This tool helped me to be more creative	1	2	3	4	5

Complete following sentences based on your experience:

1. The magnet tool isbecause.....
.....
2. The magnet tool helped mebecause
.....
3. Talking and playing with magnet pieces was.....because.....
.....
4. In this session, I wish I could
.....

APPENDIX E
INFORMATION LETTERS

Individual Study

Information Letter

A Tool for Empathetic User Experience Design

September 12, 2014

Dear Participant:

I am a master student in the Design School at Arizona State University. I am conducting a research study to determine how we can use magnetic wireframe to create user experience projects with empathy.

I am inviting your participation, which will consist of a design session. If you agree, during the session you will be asked to answer an array of questions about your experience during the design session. You have the right not to answer any question, and to stop the interview at any time. You must be 18 or older to participate.

This design session plus the interview will last 30 minutes. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although you can learn more about the user experience design procedure and see how you can experience a wireframe design session, there are no foreseeable risks or discomforts.

We would like to videotape this interview. The interview will not be recorded without your permission. If you prefer, we will position the camera in such a way that your face is not visible. If you do not want to be taped, please do not sign the line below that asks for permission to video record. You can also request that the video be destroyed at any time during the interview. Video tapes will not be published and we are going to see your activity during the design session and write a summary about it on the research document.

This 30 minutes participation also includes an interview and a survey at the end, your responses will be confidential. Any data we collect (including video, writings, or answers to interview questions) will contain a participant number, and will not contain any identifying information. The anonymous results may be used in reports, presentations or publications.

If you have any questions concerning the research study, please contact the research team at: william.heywood@asu.edu or ali.eslamifar@asu.edu. You can also call (415) 321-0573. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study.

By signing below you are agreeing to be videotaped.

Name:

Signature:

Date:

Group Study

Information Letter

A Tool for Empathetic User Experience Design

Dear Participant:

I am a master student in the Design School at Arizona State University. I am conducting a research study to determine how we can use magnetic wireframe to create user experience projects with empathy.

I am inviting your participation, which will consist of a group design session. If you agree, during the session you will be asked to answer an array of questions about your experience during the design session and your collaboration with teammates. You have the right not to answer any question, and to stop the interview at any time. You must be 18 or older to participate.

This design session plus the interview will last 60 minutes. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty.

Although you can learn more about the user experience design procedure and see how you can experience a wireframe design in a collaborative session, there are no foreseeable risks or discomforts.

We would like to videotape this interview. The interview will not be recorded without your permission. If you prefer, we will position the camera in such a way that your face is not visible. If you do not want to be taped, please do not sign the line below that asks for permission to video record. You can also request that the video be destroyed at any time during the interview. Video tapes will not be published and we are going to see your activity during the design session and write a summary about it on the research document.

This 30 minutes participation also includes an interview and a survey at the end. Any data we collect (including video, writings, or answers to interview questions) will contain a participant number, and will not contain any identifying information. The anonymous results may be used in reports, presentations or publications.

If you have any questions concerning the research study, please contact the research team at: william.heywood@asu.edu or ali.eslamifar@asu.edu. You can also call (415) 321-0573. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

By signing below you are agreeing to be part of the group study.

Name:

Signature:

Date:

By signing below you are agreeing to be videotaped.

Name:

Signature:

Date:

APPENDIX F

RESEARCH QUESTIONS AND RATIONALS

	Questions	Method	Rationale
1	What is the User Experience Design and what are the steps to do a good UX design?	Quantitative (Literature Review)	These elements and parameters of the research must be collected from the literature review to see the available methods, frameworks and step for doing the three main area of the research.
2	Who are the stakeholders of a User Experiences design project?		
3	What is Empathic Design?		
4	What are available frameworks for empathic design?		
5	What is co-design and participatory design?		
6	Why designing a wireframe is crucial in the UX design process?		
7	What are the available wireframe tools in the market? And what are their characteristics?		
8	How a magnet wireframe tool can be look like?		
9	How we can engage all stakeholders in the process of user experience design in a web project?	Participatory Design	In order to engage stakeholders in a web design project, some 'make tools' are needed.
10	How a users and clients can work with magnet wireframe?	Observation	It is necessary to see how stakeholders are working with the wireframe and how this brings empathy in design process.
11	What are the advantages of using magnet sheets to do wireframe?	Semi- Structured Interview	Based on the experience that participants have in the design session, this type of interviews let them to share their experience in a friendly talk.
12	What are the differences between magnet wireframe and sketching the wireframe on a paper (as a simple way to do wireframe)?		
13	How a much magnet wireframe can help the design team to improve their design process and quality?	Quantitative data analysis	Based on all applied method in three groups, it is required to measure and evaluate their experience and ease of use in some sort of comparable data analysis.
14	How easy users and client can work with magnet wireframe?		
15	Does magnet wireframe help users to share their comments easier about a web idea?	Survey (a combination of questionnaire and complete sentence questions)	In order to have comparable data about participants' experience, a questionnaire must be conducted to collect comparable answers. Besides, sentence completion as a part of this survey can help share the experience and show to the research that how much it can bring empathy in a project.
16	Does magnet wireframe help the UX team to understand users concern easier, faster, and clearer?		
17	Does magnet wireframe help all categories to have a better imagination about the issue?		
18	Can magnet wireframe bring creativity in a web design project?		

APPENDIX G

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



EXEMPTION GRANTED

William Heywood
The Design School
480/894-6231

WILLIAM.HEYWOOD@asu.edu

Dear William Heywood:

On 9/22/2014 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	A Tool for Empathetic User Experience Design
Investigator:	William Heywood
IRB ID:	STUDY00001527
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	ï Information Letter - Group.docx, Category: Consent Form; ï Information Letter - Individual.docx, Category: Consent Form; ï Research Questions.docx, Category: IRB Protocol; ï HRP-503a.docx, Category: IRB Protocol;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 9/22/2014.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Ali Eslamifar
Ali Eslamifar