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Design for the Next: Integration of Path to Sustained Usage Model into Design Process

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Abstract

The aim of this chapter is to evaluate and further discuss the integration of the “Path to Sustained Usage” model into design process. To achieve this, this chapter explains the details and the outcomes of Engage! Workshop in which the model was tested with “backwards-designing” approach. The paper ends with further suggestions for application of the model into design process.

Keywords: path to sustained usage, long term user experience, user experience, technological products, workshop

1. Introduction

There are several models and perspectives in user experience literature that explore people’s long-term experience of a particular system, product or technology [1–4]. In one of these models, Karapanos et al. [3] explored the temporality of experience by defining three phases of experience in which user (i) gets familiar with the product; (ii) explore the product more, and (iii) makes the product part of everyday life. In another framework, the “pre-interaction” phase also comes into prominence as users’ perceptions and expectations also affect the way the product is experienced [5].

On the other hand, designing for experience is a challenge for designers. During this complicated, iterative and creative process [6–8], designers confront several user and product-related problems [9]. In the early stages of this process, several methods, such as personas and user journey maps, can be applied to comprehend the users’ experience [10, 11]. However, other inspirational tools and methods are still required in this process [12]. While there are several tools and techniques suggested for designing for user experience [13],

tools and techniques especially designing for long-term experience of users are limited [14]. Therefore, after exploring long-term experience of technological products, through user research we first developed a four-stage model [15]. This model (**Figure 1**) brings together affected human-related qualities and affecting product qualities at every use phase (i.e., before acquiring, learning, mastery and post-mastery). The purpose of the model is to develop technological design solutions which will end up in sustained usage that people will keep using for a long period.

In this model, *path dependency* refers to feeling dependent to previously used products. This dependency affects the experience of new products as users expect the new product to have several qualities of previously used products. *Learning phase* of the product is about exploring and understanding the qualities and capabilities of the new product. At this phase, users get *familiar* with the new product and *adapt* to the qualities of it. In *mastery phase*, users make a decision on whether they want to continue using the product or quit using it. For technological products, this decision is made through the abilities of the product (1) to *change* existing *habits*, (2) to be used in *different contexts*, and (3) to become a routine part of everyday practices (i.e., *habitualization*). Finally, at the *post-mastery* phase, product becomes indispensable to the user (i.e., *sustained usage*) until the user finds a new product that satisfies emerging needs and preferences. The end of this phase intrinsically becomes the *path dependency* of the next product. For more information, see [15].

With the definition of these phases and by considering the current debate in design community, we conducted a design workshop study in which we investigated the usage of “backwards designing” approach to integrate “Path to Sustained Usage” model into design process. Thus, the aim of this chapter is to first discuss the outcomes of the ENGAGE! Workshop, and further discuss the possibilities of integrating our model into design process.

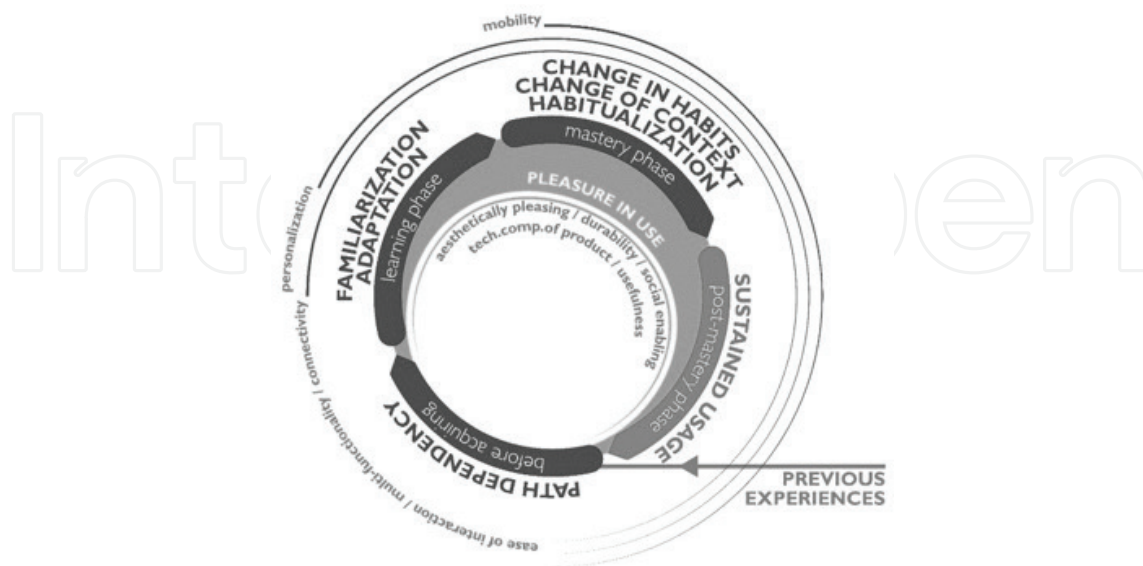


Figure 1. Path to Sustained Usage Model (retrieved from Bogazpinar et al. [15]).

2. Engage workshop

We undertook an investigation into how the Path to Sustained Usage model can be employed as an idea generation method in design process. To achieve this, we defined a set of criteria to go through the phases of the model. Naming the workshop “ENGAGE!”, we structured the idea generation workshop with 19 industrial design bachelor students. One month prior to the workshop, we published an online invitation for the 3rd and 4th year industrial design students to participate in the workshop. In total, we have selected 20 participants out of 27 applications, one of which had dropped out before the workshop. One week prior to the workshop, we sent an email to the participants to inform them about the workshop process with detailed instructions of the user study that we expected them to conduct before coming to the workshop.

On the day of the workshop, after 30-minutes briefing about the workshop process, the students were introduced the details of the Path to Sustained Usage model. Following that, the students were formed into the groups of 4 in relation to the technological products to be designed. With these groups, the Engage workshop took about 6 hours in total with a final presentation and discussion of the workshop outcomes.

During the workshop, we applied the “backwards-designing” process in which we asked students to start designing the final product without thinking of the applicability of technology. Within this process, participants started the design process from the “post-mastery” phase and then, continued their design process backwards by considering the product features that we listed in our model, from post-mastery to before acquiring. The aim of applying “backwards-designing” process was to help the participants break free from the current technology and develop possible future design solutions (i.e., the next product/experience). By following the backwards design process, the participants made associations with the currently available products and designed the path towards the new experience and its sustained usage.

We spared 1 hour for each phase (i.e., post-mastery, mastery, learning and before acquiring) during the workshop. At the beginning of each hour, the groups were informed about the aim and focus of designing for the phase. Through discussions, group members first decided how to implement the human-related and product-related qualities defined for each phase to the product they are designing. For instance, when designing for path-dependency phase, participants considered the qualities that could be adopted from similar products that could break the users’ dependency to previous products. Following this discussion, participants made visualizations and mock-ups for further developing the product. The discussions and brainstorming followed on until the end of final visualization of the product.

3. Results

Five groups of participants developed five different design solutions during the workshop. The solutions were smart (i) sports watch, (ii) cam, (iii) screen, (iv) children’s watch and

(v) earphones (**Figure 2**). All these initial design ideas were extremely detailed as the participants dwelled upon all the aspects of our model and developed usage paths to adopt and to use for a long period of time. Hence, in this chapter, we will follow upon the backwards designing process of one of the outcomes (i.e., SmartScreen) to present the kind of outcomes to be expected from ENGAGE-Path to Sustained Usage Workshop. Here, it should be stated that the participants were free to define what the next product would be. Also they were allowed to make iterations of visual and interactive qualities of the products throughout the design process in relation to the human-related and product-related qualities listed for each phase.

3.1. Stage 4: designing the post-mastery phase

In this stage, the participants were expected to come up with a design idea for the “next” product and the way it is going to be used after a potential user learns and masters its features. This is the stage where designers sketch out the intended use for their technological product, and how it will have been integrated into users’ lives. At this stage, the groups utilized the knowledge they gathered from the initial field work (i.e., interviews with users) to understand users’ needs, expectations and desires.

For the SmartScreen design solution, the participants preferred to develop a Persona to map out potential users of their products and decided upon the necessary features for the next home entertainment system. The persona they developed was someone working in a creative work, who values his/her independence, rather nomadic and enthusiastic about trying new things. Through the utilization of this persona and the knowledge they gained from the field work, the participants interrogated possible features of such a home entertainment system and tried to foresee the context it will be used in. The sketches drawn on large post-it notepapers in **Figure 3** show the initial interaction details between the user and the product which helped to develop the spherical form as well.

It should be noted that, although participants were generating an idea for the final stage of our experience model, it was only the first step of the ENGAGE workshop. At this point, the ideas were initial and the details developed were vague. The final design solution and other elements of the long-term experience are detailed in the coming steps of the workshop.

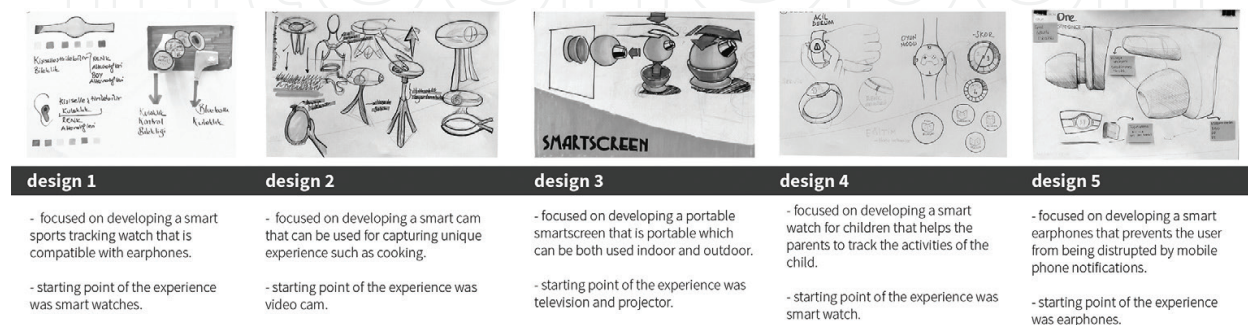


Figure 2. Summary of workshop outcomes.

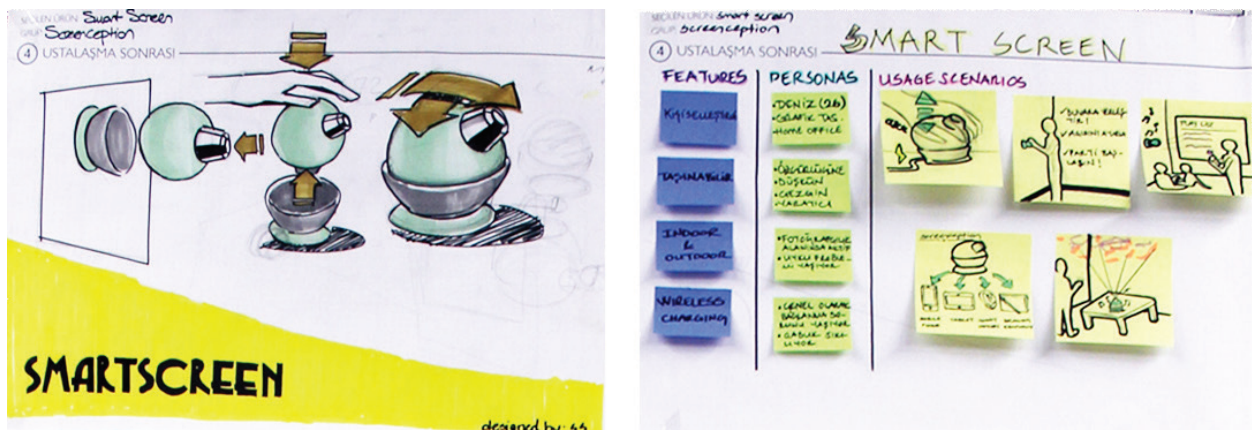


Figure 3. Sketches for the post-mastery stage (developed by Groups 2).

3.2. Stage 3: designing the mastery phase

In the second stage of the workshop, groups were expected to extend the product idea by considering the product and human-related qualities of “mastery phase.” At this stage, students both did sketches (Figure 4) and early mock-ups (Figure 5) to improve the *interaction* between the user and the product. With the mock-ups, participants elaborated on how the product will be interacted. At this stage, they also searched for the product qualities that would help the user to understand the interaction of the product better and achieve the integration of product into users’ lives (i.e., *habitualization*) through *ease of interaction*.

At this stage, participants were informed that mastery phase is the one that users make a decision to accept or reject the product to be a part of their life. The product features such as *personalization* and *mobility* are listed as the important factors of product acceptance. Therefore, the groups pursued for additional product features facilitate the user to personalize and mobilize the product. They also put extra effort to understand how the product will *change users’ habits* with new product features (left end side of Figure 6). Developing upon the assessment of possible *changes in habits* and figuring out how it is related to *changing*



Figure 4. Sketches for the mastery phase for SmartScreen (developed by Group 2).

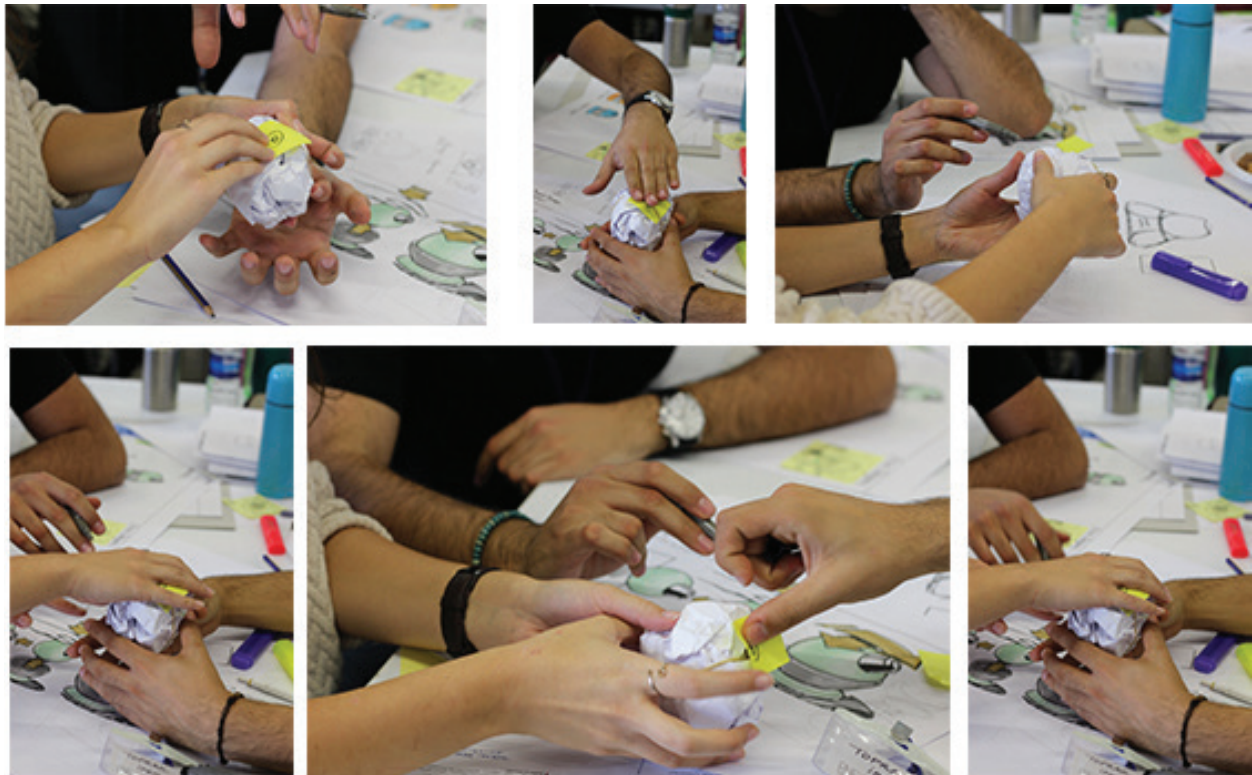


Figure 5. Mock-ups for the mastery phase for SmartScreen (developed by Group 2).

contexts, also considering that the persona they have created is enthusiastic about creating new things, participants added “customized kit” idea to the product to facilitate the user with the ability of buying extra kits in relation to their changing personal interests. They have selected three key functionalities to develop specialized parts, namely a projector, a high-power speaker and a motion sensor. These specialized parts are offered in various combinations to respond to people’s needs and expectations, as illustrated on the right end side of **Figure 6**. Furthermore, the spherical parts were designed to be taken out of their stands and placed in different rooms or outdoor settings to provide their functionality in various contexts.

At this stage, the participants also inquired into advanced interactions by considering the change in the context and habits of the user. These included products giving haptic and audio feedback to inform the user about the interactions (e.g., buzzing, clicking sounds and even playing recorded information). The interaction ideas that the participants came up with at this stage were also additionally explored in designing the learning phase.

3.3. Stage 2: designing the learning phase

The interactions that the participants explored in this stage aimed to help users understand how the product works through *familiarization* and *adaptation*. As affecting product qualities, *connectivity*, *multi-functionality* and *ease of interaction* comes to fore. For the SmartScreen, participants focused on four interactions as turning on and off the device,

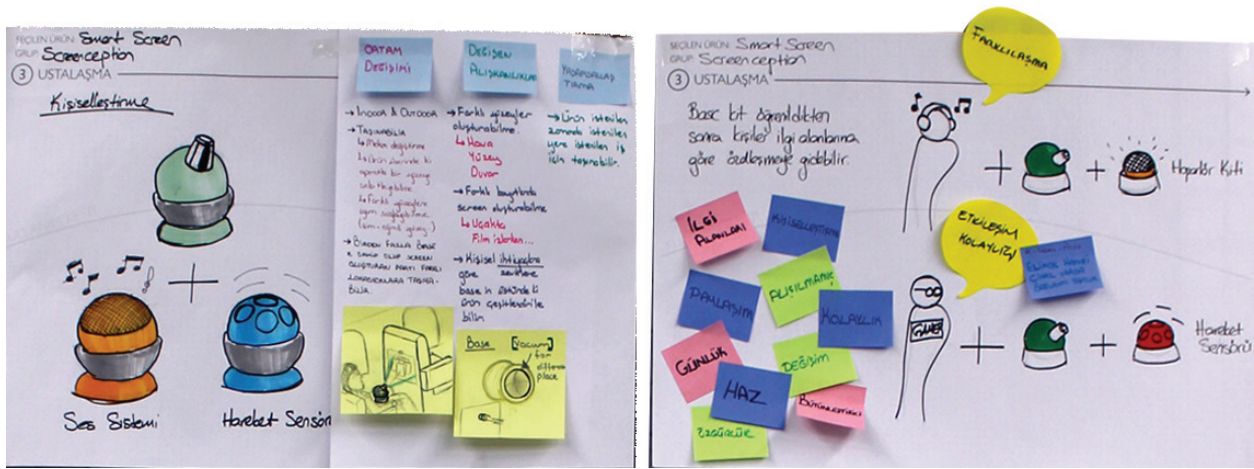


Figure 6. Visualization of mastery phase for SmartScreen (developed by Group 2).

initiating the functions, making the adjustments and charging (Figure 7). These interactions were actually considered by the participants as the “initial interactions” with the product after the purchase.

The participants also reviewed the product-product interactions that affect the users’ interaction through using the product for different purposes (i.e., multi-functionality). On the right end side of Figure 7, the other products are depicted as laptops, smartphones and tablets, which connect with the SmartScreen to provide content. *Connectivity* and *ease of interaction* are crucial for the learning phase, as the new product is introduced into a context of other products the user owns, and the connectivity is essential to create a “fitting” product experience. And, if such *connectivity* is established, the user can use the product for various purposes. For this purpose, participants thought of an auto-on function, in which case the projector turns on as soon as a smartphone or a tablet is in its vicinity, and an app to control the SmartScreen is launched automatically.

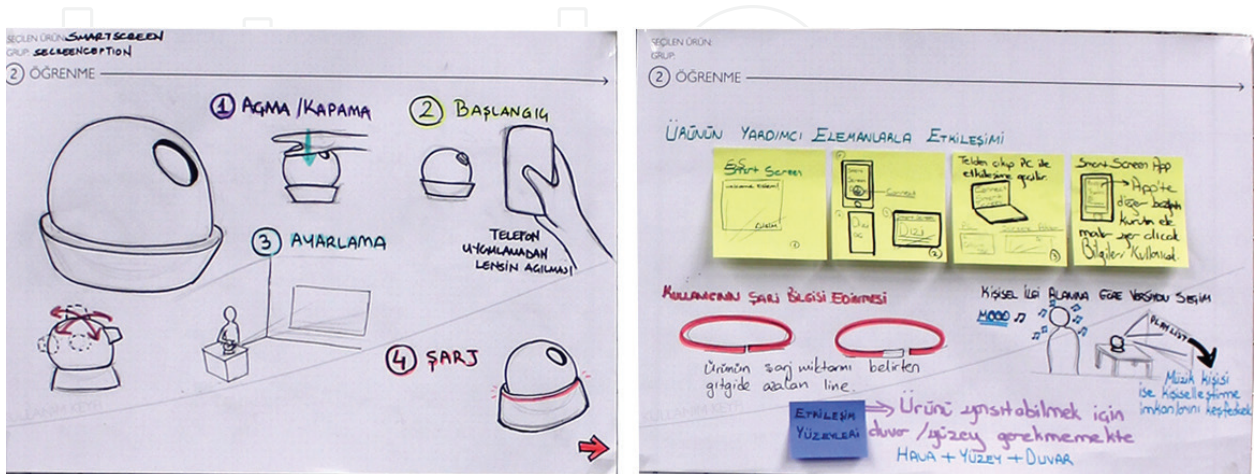


Figure 7. Visualization of learning phase for SmartScreen (developed by Group 2).

3.4. Stage 1: designing the before acquiring phase

Before acquiring is the initial stage of user experience, which is heavily influenced by *path dependency*: a kind of loyalty to their previous experience with similar products. Hence, this stage requires an understanding of the previous products and use experiences, which—if any—of the product qualities should be transferred and how. Only through such an assessment, the “next” product (in this case, SmartScreen) can be adopted by users.

Figure 8 presents an analysis of products by participants that are defined as predecessors of the SmartScreen (i.e., television, Apple TV, Smart TVs and projectors). During this assessment, they highly used the knowledge they gained from the field research. Through this assessment, they have defined *connectivity*, *being stand-alone* and *personalization* as key product qualities, which are also transferred to the SmartScreen. They referred to the results of their field research and their personas, and defined *mobility* as an important product quality. It was because, the users of this new system will like to travel a lot and would like to carry this multifunctional product wherever they go. This was stated as an essential way to break *path dependency* to previous products.

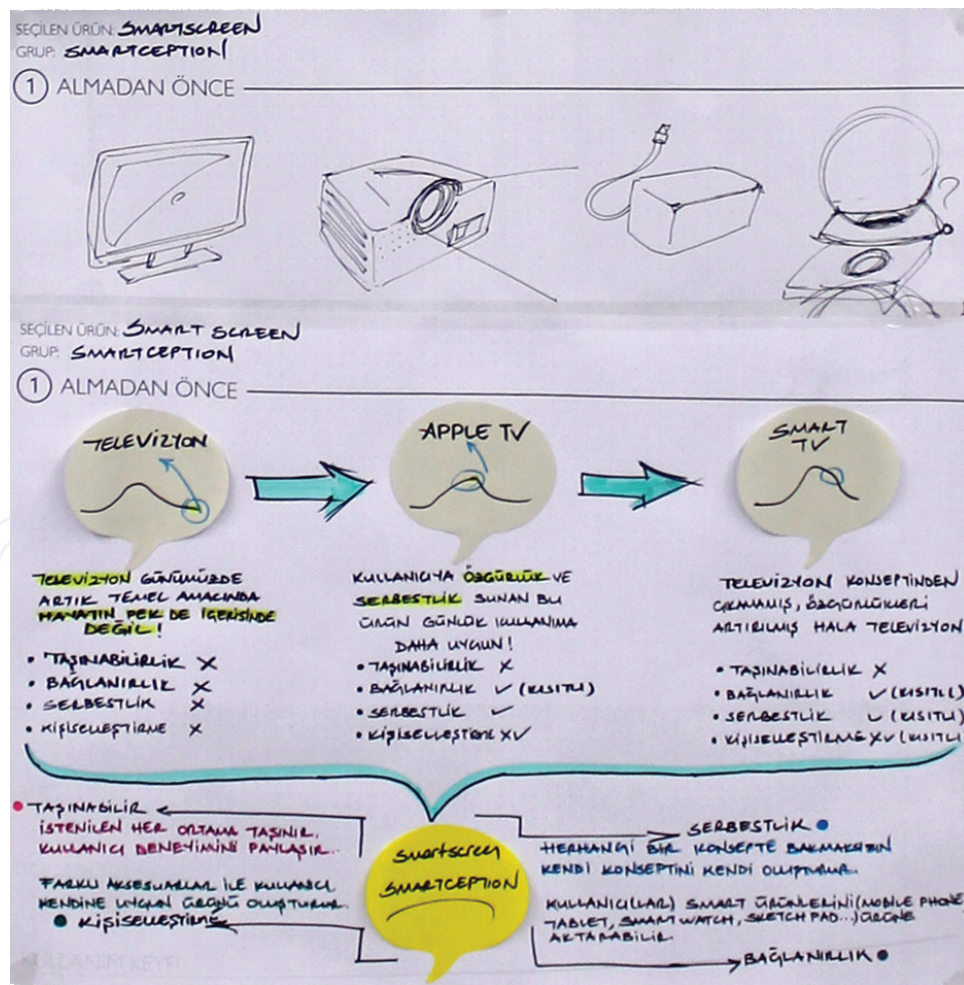


Figure 8. Visualization of before acquiring phase for SmartScreen (developed by Group 2).

4. Discussions

As stated, designing for experience is a complex task and requires tools and techniques to support the designers in this process and [10, 11]. With this vision, we designed the ENGAGE! Workshop with an aim of integrating the Path to Sustained Usage model into the idea generation phase of the design process. The results were two-fold: on one hand, we were able to assess if the model could be integrated into the design process, and on the other hand, we were able to try out a new tool (i.e., backwards designing) to help designers imagine the next product. The outcomes of the workshop showed that both the human-related and product-related qualities we listed in the model and “backwards-designing” method were complementary and guided the participants in this task. We observed that with the guidelines we provided, the participants were able to develop very detailed product ideas in a short time. It was because the workshop we designed for the effective usage of the model associated the participants with a systematic approach at every stage.

There can also be drawbacks of designing a model. For instance, as seen in **Figure 8**, participants used the before acquiring phase as a phase for self-assessment rather than further development of the product. The participants conferred to the products that can be the predecessors of their design just to check whether it can break path dependency through the product qualities they employed. In addition, we were expecting the participants to come up with more advanced interaction suggestions than the participants listed at the learning phase.

However, starting the design process from the “post-mastery” phase and designing “backwards,” prevented the participants from setting personal mental blocks that might restrict them from thinking “out of the box.” On the other hand, the qualities that are listed at every phase of the model helped the participants to focus on the design process better. By trying to cover all the product qualities, in the end, the participants were able to associate the outcomes of the design process with the technological products that users currently use.

5. Conclusions

In this chapter, we have explained and discussed the outcomes of the first design workshop that we conducted to integrate “Path to Sustained Usage” model into the idea generation phase of the design process of technological products. We applied the “backwards-designing” method in which we asked the participants to start designing the “next” technological product without taking the boundaries of current technology into account. The participants were asked to further develop their products—to design the path to the sustained usage of their solutions—by considering the human and product-related qualities we provided for each phase of the long-term experience of technological products.

Our study revealed that the participants of the workshop were confident with design of the model we developed, especially with the backwards-designing method. This process assisted the participants in the sense that they did not have to consider the feasibility of

the product. As the participants were totally free in defining the next product, design criteria were created by the participants themselves. Our model and backwards design process were just a guidance for them throughout this process. We believe that this process can better help the companies to design and develop products to be produced in the following 5 years.

With the learnings from the participants of this workshop, we will further develop the backwards designing process. For further studies, we plan to further investigate this process in detail by researching upon how designers can benefit from it for specific consumer products with futuristic scenarios.

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References

- [1] Hassenzahl M. User experience (UX): Towards an experiential perspective on product quality. In: Proceedings of the 20th International Conference of the Association Francophone d'Interaction Homme-Machine. 2008. ACM
- [2] Desmet P, Hekkert P. Framework of product experience. *International Journal of Design*. 2007;1(1):57-66
- [3] Karapanos E, et al. User experience over time: An initial framework. In: Proceedings of the 27th International Conference on Human Factors in Computing Systems. 2009, ACM: Boston, MA, USA. p. 729-738
- [4] Pucillo F, Cascini G. A framework for user experience, needs and affordances. *Design Studies*. 2014;35(2):160-179

- [5] Roto V. User experience from product creation perspective. In: . Towards a UX Manifesto; 2007. p. 31-34
- [6] Seitamaa-Hakkarainen P, Hakkarainen K. Visualization and sketching in the design process. *The Design Journal*. 2000;**3**(1):3-14
- [7] Green S, Southee D, Boulton J. Towards a design process ontology. *The Design Journal*. 2014;**17**(4):515-537
- [8] Wahlström M et al. Radical innovation by theoretical abstraction – A challenge for the user-centred designer. *The Design Journal*. 2016;**19**(6):857-877
- [9] Hitchcock D, Haines V, Elton E. Integrating ergonomics in the design process: A practical case study. *The Design Journal*. 2004;**7**(3):32-40
- [10] Han Q. *User Experience Design: Creating Design Users Really Love*. Taylor & Francis; 2016
- [11] Hanington B, Martin B. *Universal methods of design: 100 Ways to research complex problems, develop innovative ideas, and design effective solutions*. Rockport Publishers. 2012
- [12] Gonçalves M, Cardoso C, Badke-Schaub P. What inspires designers? Preferences on inspirational approaches during idea generation. *Design Studies*. 2014;**35**(1):29-53
- [13] Fokkinga SF, Desmet PM. Run for your life! Using emotion theory in designing for concrete product interactions. In: 9th International Conference on Design and Emotion, Bogota, Colombia. 2014
- [14] Tromp N, Hekkert P. Assessing methods for effect-driven design: Evaluation of a social design method. *Design Studies*. 2016;**43**:24-47
- [15] Bogazpınar H, et al. Path to sustained usage: A model for long term experience in technological products. In: *Colors of Care: The 9th International Conference on Design & Emotion*. Bogotá. 2014

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