
Brainstorm triggers: game characteristics as input in ideation

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Abstract

In this paper some of our explorations regarding game applications as a model for engaging consumer product interactions will be presented. We systematically looked at what makes games appealing, based on analysis of the literature and on studies we conducted with games ourselves. What we report here is how we used the outcome of these efforts as a starting point for a set of ideation (brainstorm) guidelines regarding 'affectability' when working on novel product concepts.

Keywords

Brainstorming, ideation, user experience, affectability

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Product design and development tools

Introduction

Although "User Experience" and "emotional product design" as a topic is increasingly receiving attention [2, 4, 6, 7, 9, 10], systematic tooling that can help in the early development phases of products that are "affectable", i.e. that will be enjoyable and engaging to

their users, is still scarce. Several publications provide guidelines regarding what characterizes affective products, for example [4, 6, 7], but these descriptions tend to be quite general, and by themselves not sufficiently supportive to guide the development process towards a concrete idea for an affectable product – more specific input will be needed to properly support the development team during the early phases of product concept creation. It is important to address these qualities early on, because it is very likely that affectability is going to require some fundamental design decisions about what it is that the user is going to be offered, and in what way. And such fundamental design decisions are usually difficult if not impossible to readdress at a later stage in the development process, when most features of the product under development have been fixed.

If we want to understand which factors could contribute to an affectable, enjoyable device, a potentially interesting domain to look for inspiration is that of games. Most games have the inherent quality to lure people to touch, and try, and to motivate people to engage in interactions. In an ongoing research activity, we are exploring if characteristics of games can teach us something about designing enjoyable consumer applications such as coffeemakers and vacuum cleaners. Preliminary findings suggest that factors found to be important in games, such as control, but also curiosity, surprise, attractiveness of visual and tactile elements, and sociability, might be interesting candidates for consumer applications as well.

In this paper, some of our explorations of game applications as a model for thinking about engaging products will be presented. No final conclusions can be

presented at this point in time, but we would like to discuss some of our findings so far. We systematically investigated what makes games appealing, based on analysis of the literature and on studies we conducted with games ourselves [3]. What we report here is how we used the outcome of these efforts as a starting point for a set of ideation (brainstorm) guidelines regarding ‘affectability’ in novel product concepts.

Affectability guidelines derived from games

Reviewing the many publications on games and fun resulted in a large list of factors and aspects. We clustered these into three dimensions: *accomplishment*, *discovery*, *bonding*. Only brief definitions will be provided here, given available space, more elaborate discussions with examples are provided in [3].

The first dimension, getting a sense of *accomplishment*, has to do with clear goals that can be met, progress towards those goals and clear influence over that progress. It is determined by the *balance between challenge and control*, by feelings of mastery. The second dimension, getting a sense of *discovery*, has to do with curiosity, the human drive to explore and discover new things. Creativity is thought to be related to this source. The third, getting a sense of *bonding*, has to do with recognition and affirmation, being part of a group, connecting to others. Cooperation or doing something together is about the need to be needed. It creates a sense of belonging, a connection. Related to this aspect is competition, comparing own accomplishments with others.

Next to the just presented dimensions, three *enhancement* factors are distinguished. These influence the effectiveness of the three dimensions, but on its own do not provide fun. We identify three main

enhancement factors: fantasy, aesthetics and physicality. The first, *fantasy*, has to do with a theme the game may have. The second, *aesthetics*, has to do with appearance, e.g. whether the interface is pleasing to look at or made of nice materials, producing appealing sounds, etc. *Physicality* has to do with having an interface that is physically engaging.

In the next section we will describe a case in which we used these dimensions and factors in the ideation and concept generation phase of a product development project. Different approaches to support ideation sessions have been developed over the years [e.g. 1]. However, few tools appear to be available that can specifically support the “ideation for affect” at this stage [2].

Using the affectability guidelines as triggers in ideation

We explored the use of the affectability guidelines in the ideation phase of an innovation project on robotic vacuum cleaners. The goal of the project is to design expressive behavior for robotic vacuum cleaners to make them more affectable and fun to users. Also, careful design of the robot’s behavior is expected to be helpful in increasing users’ understanding and appreciation of what the robot is doing and why it performs certain behavior [8]. A brainstorm session was organized, in which the affectability guidelines were used as triggers to help participants in the brainstorm to come up with ideas how to make a vacuum cleaner, which is normally a very functional appliance, more fun and exciting. Five researchers with a technical background (i.e. computer science, software engineering, and HCI) participated in this brainstorm, which was moderated by the first author. The

moderator first introduced the background of the guidelines and explained the different dimensions and factors (see Table 1).

Table 1. Affectability guidelines and some examples of ideas for the robotic vacuum cleaner

Affectability dimensions/factors	(# of ideas) and one example idea
Accomplishment <ul style="list-style-type: none"> • Clear goals • Perceived progress • Feedback • Influence over progress 	(47) Users throw ‘coins’ around in the room that the robot has to collect
Discovery <ul style="list-style-type: none"> • Curiosity and exploration • Creativity • Unpredictability is good, arbitrary is bad • Balance between ambiguity and consistency 	(17) Once in a while, the robot gives a cleaning tip of the day
Bonding <ul style="list-style-type: none"> • Recognition • Affirmation • Belonging • Balance between cooperation and competition 	(10) Make the robot react on petting by the user
Enhancement factors <ul style="list-style-type: none"> • Fantasy • Aesthetics • Physicality 	(6) Give the robot a clear character / personality

Initially, participants found it difficult to come up with ideas. However, after some examples of how these guidelines could be applied to robot vacuum cleaners were provided by the moderator, many ideas were generated. Table 1 presents an overview of the number of ideas that were generated by the participants and some examples to illustrate the type of ideas that resulted from the guidelines.

All participants had experience with brainstorm sessions. They indicated after the session that this new approach resulted in a different type of ideas (more playful), compared to brainstorms that start from functional or technical triggers (more functional). Based on the number of ideas, it seemed that the participants were better able to work with the accomplishment dimension than with the other dimensions. Participants had in particular difficulties with applying the trigger 'affirmation'. Overall, bonding is perhaps less easy to apply to a vacuum cleaner, even a robotic one, since it is usually seen as such a mundane, non-personal appliance. Same argument might be applicable to 'enhancement' – although such factors are often applied in product design, it was perhaps more difficult to come up with new ideas for what is typically seen as a usually stored-away appliance.

After the brainstorm, the ideas were reviewed and clustered by the project team into 30 distinctive concepts and ranked on a number of criteria set by the product manager. The ranking led to a selection of 12 concepts that were translated into usage scenarios. These scenarios were evaluated with 15 potential end-users. It is outside the scope of this paper to present the details of this evaluation, but some scenarios were clearly more appealing than others. The scenario that described a robot with a dedicated game mode in which it played a mimicking game and copied the cleaning patterns made by the user was least appealing. The scenario in which the robot shows in a fun way that it is putting extra effort in cleaning a very dirty spot was considered one of the most appealing concepts. A general observation is that the scenarios in which the fun element was combined with a functional benefit scored higher than scenarios without a clear link

between the fun aspect and the function of the appliance.

Discussion

Many ideas for the robotic vacuum cleaner were directly referring to gaming elements, which is not very surprising, since the affectability guidelines were derived from gaming studies. However, for a 'serious' and functional consumer product, explicit gaming functionality and features are not always desirable, as pointed out by the mixed feedback on gaming related concepts for the robotic vacuum cleaners by the participants in the follow up study. For example, our idea to have a playful way of cleaning the floor by allowing children to remotely control it like a radio-controlled race car was not appreciated, since people were concerned about making a toy of an expensive household appliance. On the other hand, ideas to create a personality for the robot that reacts in a lifelike way to people or to a very dirty floor were much more appreciated.

The evaluation data collected in the next stage of the project provided a useful check of the desirability of the product concepts by users. It also provided useful first feedback on the triggers that we used in the brainstorm, and on other issues requiring further investigation to obtain a more coherent picture of what elements of games could be adopted for application in consumer products. The most important issues are:

- Which fun aspects of games can be used as triggers in consumer product development and which aspects are more difficult to use? In the robot vacuum cleaner case, accomplishment factors seemed more easy to use as a trigger than bonding

factors such as affirmation. Is this the same for other products or would each type of product require a different subset of affectability guidelines as triggers?

- At present, it is not clear what the relative importance or contribution of each of the dimensions is to an overall feeling of enjoyment. The challenge offered is generally seen as the most important factor in making a game enjoyable (e.g. [5]). However, if this will apply to consumer products as well is not so obvious. For example, it is unlikely that consumers will appreciate a coffee machine that challenges them at 6:00 in the morning when all they want then is a quick cup of coffee. Similarly, a vacuum cleaner that wants to 'socialize and bond' when one is in a hurry to have the living room cleaned before guests arrive, will not be seen as funny. This could mean that one should design for adjustable affectability (*aka* an on/off switch).
- How do fun aspects relate to usability and functional aspects? What if a fun criterion can only be met at the cost of a usability criterion? For example, adding a challenge to a product can potentially create more fun interactions, but what if that reduces e.g. efficiency, a usability factor.

Conclusion

We made first steps in developing an approach to use fun factors - derived from game research - in the ideation phase of consumer products. Clearly, we are still in the midst of exploring the factors that might contribute to an enjoyable interaction with consumer devices. But in our robot vacuum cleaner case, we observed that using affectability guidelines based on games in the ideation phase resulted in a different type

of ideas (more playful), compared to brainstorming that start from functional or technical triggers (more functional). Furthermore, it seemed that some dimensions were more easy to use than others. Another important observation was that a relatively large amount of ideas were directly and explicitly related to gaming. However, for a 'serious' and functional consumer product, explicit gaming functionality and features will not always be desirable. So, the triggers may need to be reformulated in a way that they more easily will inspire to come up with ideas that lead to an engaging, fun product concept without turning it into a game. We also identified a number of issues that still require further investigation. More study is needed of brainstorm sessions with other applications, with probably modifications to the current set of guidelines, and by systematically comparing our guidelines to other instructions to brainstorm participants [e.g. 1]. But despite the limitations of this pilot, the results and feedback of the vacuum cleaner research team has given us confidence that this approach can be helpful.

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