Infusing digital creativity in design, the low fidelity way.

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ABSTRACT

In (industrial) design projects, digital and non-digital aspects are often seen as two separate design 'tracks'. Due to advances in our social and technological context, the hard boundary between the digital and the non-digital is fading. This is a challenge for the designer since he needs to be creative with digital technology without necessarily having a technical background. Using the lillidot method introduced in this paper an exploration was done concerning the feasibility of creating a low fidelity design "kit" in order to facilitate the infusion of digital aspects in design.

Keywords

Design, Low fidelity, digital creation, technology abstraction, human computer confluence

INTRODUCTION

It is becoming hard to not to notice the confluence of digital technology and our everyday lives. People use various social media to track their activities in the real world like sharing GPS data to remember where they took photo's, virtually 'check in' at places to let friends know where they are, etc. One of the reasons we see this happening is that digital realms are in the process of being opened up and made accessible to a broader public. Over the past years, the field of interaction design clearly became aware of this by introducing new tools such as the Arduino [1] and Makerbot [8] platforms that allow designers to intertwine digital technology in design. However, at this moment there is still a need for competence in programming and electronics required in order to master these tools. In the research presented in this paper, digital creation is explored using a low fidelity abstraction method called 'lillidots' in order to find a way for a broader range of people to create with digital technology.

DIGITAL CREATION

About five years ago, one had to be able to understand HTML code to upload a picture album to the web. Today, at the mere click of some buttons our photos are shared via an online platform such as Facebook, Flickr or Picasa. This phenomenon is an illustration of 'deskilling' [12] as it shows how technology, in this case the Internet, is rapidly becoming more accessible to a broader range of people. The impact of this phenomenon is at least twofold.

Firstly, people need fewer technical skills to use tools or participate in communities they did not have access to before. An example of this is the online community called Etsy [1], which brings together people with a passion for craft. People who are part of this community are able to share their crafted objects, sell them via their own shop, discuss in online forums, etc. Emerging communities such as Etsy show how a digital platform is being used as a communication channel enabling people to learn new techniques and participate in making their own objects without questioning if the medium they choose to communicate through is digital or not [5][6].

Secondly, the deskilling of technology manifests itself in the way design practitioners think about and create future products and services. This is illustrated by the growth of products with a digital presence thus expanding the products' functionalities into the digital world, beyond its physical boundaries. An example is the smartphone, which is a product that changes functionality based on what application runs on it. It can be used as a GPS tracker sharing a person's running tracks online, but at the same time it can be used as device to measure a person's heartbeat using other integrated sensors. Looking at this from a designer's point of view, it is remarkable how creative application designers are with the limited set of functions available on a smartphone, which is only possible because the product was conceived as a platform product. This requires the product designer, software designer and interaction designer to work closely together (or preferably be the same person). In order to create an application for a smartphone it is not enough to create a concept design or draw a storyboard. Designers need to be able to prototype the application using the physical device in order to fully experience what they have in mind [1][3][7]. For instance, if the product being developed is a map browsing interface using a multitouch screen and the design team wants to use a pinch gesture to zoom in and out of the map, they need to be able to prototype the system in order to know how responsive the mutltitouch screen should be and how fast or slow the software should react. This can only be done when the design team is able to create several prototypes alongside the concept development. At the present time, several tools are available which a designer can use to 'sketch in hardware' and design by prototyping (semi)

functional things. However, in comprehending these tools in order for them to become a manageable design tools, involves almost always a rather steep learning curve involved. For most designers the technical understanding of electronics and software programming is a big leap that is often underestimated by the creators of the tools [10]. If designers do manage make this leap, it becomes clear that they are able to create with technology in a more creative way compared to people with a solid technical background [5].

EXPLORATION

Looking at what tools are available for a designer to create products involving a digital component such as a sensor, a connection with the internet or a gesture based interaction, it is clear that there is an abundance of options at hand. Yet, it seems that just having tools available is not enough to intertwine the digital with the non-digital. Based on what is observed in practice it seems that only a certain type of designer, often an interaction designer, is pulled towards the more technical creation tools. On a more general level, existing literature [12] argues that in order to create something a person needs certain competences, tools and materials. Another source needed in order for a person to be engaged in a creative process is a motivation in harmony with this person's level of creativity within a specific domain [11]. It could then be argued that what today is referred to as an 'interaction designer' is someone who has acquired competence in understanding technology, who is able to work with the materials and tools at hand to be creative in the digital realm and because of that, this person is motivated to do the design work he does.

On the contrary, a person who has no real passion for some form of technology will be less likely to be engaged in intertwining the digital and the non-digital world when creating a new product. A reason for this is that in order to gain competence in digital creation, this person needs to be motivated on his level of creativity with digital tools. It is at that point most of the tools available seem to lack a point of entry since they very rarely offer a 'layman' introduction. In order to bridge the gap between the functional concept creation and being able to express ideas about how the digital world could be involved in a person's design project a low fidelity toolkit was created and tested.

METHOD

In the context of this exploration, a low fidelity kit was composed that stimulates people to think about digital creation in relation to products or product ideas they have. The intention was not to have people create fully functional prototypes at this point, the method used should be regarded as a search to engage people without a strong interest for technology in thinking about how the digital world could be of value in their creations.

Lillidots

In order for people to take abstraction of technology, the lillidot concept was created. The lillidot is the central concept the low fidelity kit uses and is described as "something of variable size that can attach itself to any object, person or space. You can talk to a lillidot and it can talk to you. A lillidot can tell you everything about the object, the person or the space it is attached to or that it observes. The lillidot can work together and talk with other lillidots independent of their location." From a technical point of view, the lillidot is a high level abstraction of sensor or an actuator, but since no technical terminology was communicated the people using the low fidelity kit were not biased by any kind of technology.

Kit contents

The kit itself (Figure 1) consisted of a box filled with creative material. All materials included were obtained from an arts supply shop and can be categorized in two categories; creation material and attachment material. The creation material was focused more towards giving the lillidot created a certain shape or representation, the attachment material was provided in order for people to attach their lillidot creations to the objects, persons or spaces related to their idea.

Figure 1 : lillidot design probe kit

Besides the material, the box contained several lillidot-cards that people had to use to write down their concept or idea making use of one or more lillidots. For every concept created, a title card had to be filled out followed by one card per lillidot (Figure 2). So in the end, a lillidot-based creation becomes a bundle of cards, consisting of a title sheet and several lillidot sheets held together with a paper fastener. Included in the box was one filled out example sheet, the example provided was a 'coziness meter' which gives a person away from home an indication how cozy it is in his/her living room. This application involves three lillidots, one on the fireplace in the living room to measure the height of the flames, one on the person himself to track his location and one on the person's mobile phone to display an indication of how cozy the living room is.

On the title sheet, people were asked to give every collection of lillidots a title, an overall description of what they want to happen based on the lillidots they use and provide a short index of the lillidots used. On the individual

lillidot cards, people were asked to name each lillidot, write down the location of the lillidot and why it was located there. Also, for every lillidot they had to fill out what the lillidot does on individual level. This could be described coarsely but if wanted this could be done in more detail.

Test setup

The lillidot box was tried out with a group of five 'social crafters'. These people were all involved in crafting things themselves and communicating about their craft via online platforms and/or social media. The reason why these people were selected was because they have no real affinity with technology, but do make use of technology to share and communicate about the things they make. Every crafter received one box with a small introduction sheet, the example application and plenty of blank title and lillidot cards. They were not explicitly asked to think about lillidot applications in the context of their own craft, but it was mentioned that this could be a starting point for them. It was also mentioned that if they wanted to add additional material to the box they could or if they felt something was missing or needed to be added on the provided sheets they could do so too.

Figure 2 : filled out lillidot cardset

The box was left with each participant for a period of about four weeks. After that time, the participants were revisited and a qualitative interview was conducted about their created lillidot applications. The participants explained which applications they made, why that particular application was made and what elements were needed to make it. Also, they got the chance to reflect on the low fidelity kit provided. From the researcher's point of view, the focus of the interview was on how the participants thought about interactive technologies, what vocabulary they used to describe things and how realistic or dreamy their created concepts were.

RESULTS

Overall, it was clear that using the lillidot abstraction the participants had no real troubles thinking up concepts or understanding the goal of the creative exercise. Providing the social crafters with a platform to think in a different way than they are used to, turned out to be inspiring for them to think about since they indicated that it allowed them to look at their craft activities from another point of view. A notable thing that was observed by all participants was the capability of thinking up a rather complex application that in their eyes was not feasible at all. However, from a technical point of view the lillidot application would be possible to create. An example was one participant who wanted to embed an infinite amount of lillidots in a piece of fabric in order to check if a piece of clothing created from that fabric had a good fit. Based on the data coming from the lillidots, the crafter could adjust her sewing patterns to improve the fit of the clothes created. The person trying on the clothes could immediately know if whatever he/she is trying on is the correct size. The social crafter who came up with this idea thought it was not realistic at all. However, looking at the current state of technology a slightly adapted version of this idea should be feasible to create. The lillidots enabled the participants to come up with innovative ideas within their activities, but did not enable them to know how feasible they were.

Besides that, almost all of the social crafters indicated that they did not see themselves investing time in creating the actual working version of the lillidots. This because the association with complex digital technology was often made, which is something they did not want anything to do with. So much like the previous point made, the low fidelity kit managed to surface several valid product ideas but the further development was not seen as something the crafters could do themselves.

A very delicate part of the whole setup turned out to be the material selection. Whereas the intention was to provide the participants with example material, most of the participants found this to be limiting their thinking instead of triggering it to think of other materials. One participant refused to make any physical representations of their lillidot applications because of that. The importance of the material provided has also been highlighted in literature [7] but was clearly confirmed here.

The material discussion does point out that physical representation of a digital presence was an important aspect for the crafters. They made a clear point that if there is digital data being gathered or shared, it should be made visible on the object or the person using the object should be aware of what is happening. In order to do this, some of the crafters tried to shape the lillidots in such a way that they integrated with the object's shape. For example, one crafter made juwelery in the shape of chickens. She made

the lillidot in the shape of a chickenwing to let the chicken share status updates on twitter.

During the initial lillidot introduction, the words 'sensor' or 'computer' were explicitly avoided. However, one participant made the link between a lillidot and commercially available devices that attach to a person's shoes to track their running tracks. It was interesting to see that the link with these existing devices was made since they were obviously the kind of products the lillidot method was implicitly hinting at.

CONCLUSION & DISCUSSION

The current evaluation of the low fidelity abstraction was done with crafters, which are not necessarily people with a background in industrial or interaction design. The lillidot method did however prove to be a valuable 'meta tool' to engage people with no real interest in or affinity with technology to think about what they would like technology to do for them within their design and creation projects. For the social crafters who used and evaluated the lillidot method, the absence of any kind of technology in the design kit provided was perceived as being a positive thing, however this might not always be the case if the person using the method is aware of the state of the art regarding a technology domain.

Since the social crafters were very critical regarding the creative material provided, the content of the kit should be reconsidered in a future version. A change that could be considered is inviting people to use and add their own material in order to make the kit and resulting creations more personal. This would allow people using the kit to express themselves using the material they feel comfortable with.

The research described is still ongoing. In the near future a second trial will be done with people in industrial design practice. The central question will be whether the low fidelity abstraction will suffice from their point of view. Overall, the lillidot method facilitated discussion about rather complex digital applications for the technology layman. In order to achieve a better integration of possibilities digital creativity in (industrial) design projects the lillidot method should be regarded as a first starting point which seems to be pointing in the right direction but needs to be further aligned to become useful in practice.

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