

Using storytelling to investigate interactions

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Abstract—This paper describes a storytelling model used for collecting data from users. The model is described in terms of four dimensions: context, aesthetic, functional and emotional, which are based on the user experience model. Two case studies that used the model are considered. The results show that the model might help students to structure and analyze the stories collected from users.

Keywords—*storytelling; user experience; design; interactions*

I. INTRODUCTION

After so many years being guided by tangible and quantitative methods, such as, usability and ergonomics, interaction design is rediscovering the not so formal methods that value the intercommunication process. Looking for such methods, Jeroen Van Erp speaks about the necessity of the designers to be more entrepreneurs, to develop their capacity of vision, of creating dreams [1]. These methods also involve the user experience (UX) in which the design problem is approached holistically. From the UX perspective, interaction design can be constructed in three different but interconnected dimensions: aesthetic, emotion and function. These two examples of approaching design - creating vision and UX - depend mainly on understanding the users, their needs, their ways of interacting with the products, what they want and why. Therefore, approaching users has being studied by many researches. Many of these studies point out that storytelling can be used to involve users in the design process [2][3][4][5]. This paper works in consonance with these studies and proposes an instrument based on storytelling theory to motivate the users to tell their stories and to assist the designer to collect quality data.

II. STORYTELLING FOR DESIGN

For the National Storytelling Association storytelling is the art of using language, vocalization, and/or physical movement and gesture to reveal the elements and images of a story to a specific, live audience. Denning [6] defines storytelling for management as ‘giving an example’, and good examples are easy to understand and remember. Thus, stories help to understand complexity. In addition, storytelling is interactive, co-creative process and uniquely human which make stories are very powerful tools for designers [6].

Storytelling for design is not new and assumes different forms and shapes like ethnography, personas and scenarios. Scenarios, for example, were explored by Moggridge [3] in his four-step process to facilitate design for a particular market

Recently, Hekkert and Dijk used personas and scenarios as crucial instruments for implementing the method Vision in Design-VIP [7].

Storytelling is being used as an essential asset in the design process because it can be applied as an instrument of communication between different agents of this process (designer/user, designer/client, designer/organization). This use of the storytelling is highlighted by Quesenbery and Brooks [4] in the design process as follows:

- Telling a story facilitates information sharing;
- Stories can translate de analytical data to something more soft;
- They can instigate creativity while promoting collaboration and innovation;
- Storytelling can be used to share ideas and therefore compose a sense of shared history and purpose;
- They assist the designer in making sense about the user and assist others to understand about the design contribution.

To assist the designer understanding the user, Erickson [8] argues that stories could be used to establish a dialog with the users. For Erickson [2] this dialog is crucial to the design process because designers knows too much about design (process, materials, technology, color, forms, composition and so on) but they do not know enough about users (what they like, believe, what they want). In this case, stories are natural way of beginning dialog with users because they are memorable (the designer will remember) and stories lack formality which enables users to express freely. In addition, storytelling is an interactive process that will demand designers to reconstruct the story in their minds and act upon it developing a connection with the user [4]. Therefore, developing a connection fills the gaps between designer/user/product which might spark new ideas.

To support the dialog with users the next section develops an instrument to enable the users to tell their story.

III. TELLING THE INTERACTION

This paper focuses on a very specific genre of stories: the users' stories about their interaction with a product. Thus, the instrument that we developed in this section was created to

facilitate the analysis of the story by the designer while supporting storytelling. Therefore, the instrument is used by the designer as a guide to motivate the user to tell their stories freely (we want to know why something happened) while keeping a structure that helps to analyze the content.

In order to create a model to help the users to narrate their experiences this paper argues that an experience might be structured based on its components [9]. These components are:

Who speaks? – an experience can be described by different users. Each user will have different perception about it and this polyphony is very important to have a better understanding about the experience. It can be first person (the narrator is the protagonist), omniscient third person or limited third person. We expect a first person narrators;

Who speaks to whom? – an interaction with an object can be described to someone in particular. In this case, describing an experience considers the investigator as the narratee. But it is important that the user sees the narratee as an user (someone who shares the same references and believes);

Who speaks when? – an interaction can be described over time. In this case, narration may occur after the interaction;

Who speaks what language? - the tune of the discourse might be used to identify the emotion aspects of the interaction. It is important to identify different voices, as the interaction is reported by different individuals;

Who speaks with what authority? – the authority might reveal how much the user is involved with the artifact. Narrators can be unreliable and they can be self-conscious and so, they give clues that make the designer to doubt their interpretations of the interaction;

Who sees (point of view)? – each point of view demonstrates that an experience can be understood differently by each user. Temporality (the interactions may be reported from the time at which they occurred, from shortly afterwards, or from long afterwards), distance, speed and limitations of knowledge are some variables that can be used to state the point of view.

The model also considers that an experience can be described scene by scene, by establishing the scene mood and polyphonies. Describing scene by scene is more likely to lead to a straight forward description of the experience. This means that the experience can be told with minimum disruption about its surroundings. In addition, is important to place the user in the context and to support the storytelling with imagery.

By establishing the scene mood the user's body is put into the scene, or the experience can be described by more than one sense. This also means that the experience is understood by the user's point of view. This is essential to configure the interaction's aesthetic. Finally, the polyphonies might guarantee that the experience can be described by different users and so, with different perceptions. The polyphony also contributes to picture the interaction with many faces and might create means of innovation.

Following this brief review, the storytelling model is created and it is composed by a structure for an interview with a user and a guide to analyze this interviews (see Table 1).

The structure for an interview need to allow the users to tell their story which means that need space and time to narrate the events that happened when interacting with an object. As proposed by Quesenbery and Brooks [4] this structure should have a mix of open and closed questions. In addition, demographic questions might come last to let the user more relax possible, and the designer could add personal comments about his/her own experience to promote empathy between the user and the designer.

Finally, the storytelling model is based on the dimensions of the user experience model developed by Fadel [10] added to a context dimension . This dimensions are: *aesthetic, emotions and functional* (see Fig. 1). The idea behind this choice is that the same components that are designed for a product can be identified by the users describing their interactions.

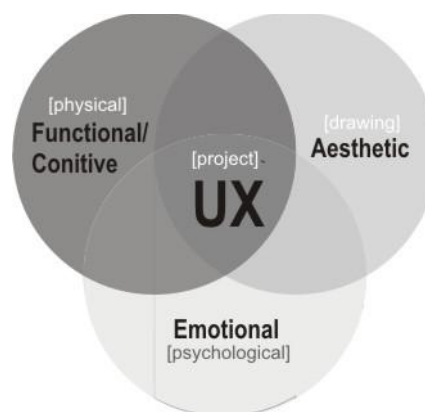


Fig. 1. User experience in interface design

The aesthetic dimension is related to the physical dimension and assumes all visual attributes of the product like colour, texture, images and graphic composition. The visual is considered as the basic element for the success of the game. This is to say that visual is the degree the designer can construct meaning through form and colour.

The emotional dimension assumes the psychological dimension from the original work of Fadel [10] which involved the determination of the game personality. This paper suggests that the game personality should be complex and follows the complexity definition described by Csikszentmihalyi [11]. Thus, this paper understands that a complex system is differentiated, i.e., the system has many distinct parts but they are integrated. Furthermore, the parts work together in an integrated form because without integration the system can become complicated. So, in designing a game complexity must be created based on the balance between two extremes: integration and differentiation. Therefore, complexity in game design can be structured by describing its style, its humour and reactions to the user.

The functional dimension assembles the physical characteristics of the game and deals with the game

functionality and interactivity. Interactivity is defined here as all the elements of user-interface interaction, as well as the game capacity of reacting to users' interventions.

TABLE I. STORYTELLING MODEL

Categories	What to look for	Variables
Context	Try to find out if the users are familiar with the product, where the product is used and when	Who speaks when?
Functional	Let the users to narrate about their experience with the object	Who speaks? Who speaks with what authority? Who sees (point of view)?
Emotions	There are two moments that could be perceived by users: what they felt during the interaction and how they feel after that. The user should feel free to express their feelings toward the product or anything else that was important during the interaction	Who speaks to whom? Who speaks what language?
Aesthetic	The quality of the experience is also influenced by the perceived aesthetics. Let the user talk about the visual, texture, form, etc Use imagery to support users' aesthetic choices	

The Table 2 that follows gives examples of how to use the model.

TABLE II. EXAMPLE OF QUESTIONS FOR EACH CATEGORY

Categories	Examples of questioning
Context	Have you ever used the [product]? Where do you usually use it?
Functional	Could you tell me a little bit about how this product fits in your everyday activities?
Emotions	How do you feel using it?
Aesthetic	What do you like most about it?

IV. CASE STUDIES

This section describes examples of the application of the storytelling model. First, the model was used by a design student to collect data for the development of a tourist map. The designed experience in this case, was "exploration". Thus the map should support this experience as well as stimulate the act of explore.

Second, this paper describes the use of the model by another design student to gather data about eating habits. This data was used to develop a web site for a company that sells cheese and water. In this example the interview was video recorded.

A. Tourist map



Fig. 2. Touristic map designed by Felipe Zahtarian

Object: tourist maps (see Fig. 2).

Using the model: questions preparation

Categories	What to look for
Context	Could you tell me how do you find yourself around a new city?
Functional	Do you usually use a tour map? Did the map help you find the places you wanted? Was it easy to use?
Emotions	How do you feel using it? Do you still have the map?
Aesthetic	Was it beautiful? Do you remember the building on it? Were they in 3D?

1) The interview

In order to facilitate data categorization, the lines corresponding to each of the model's dimensions were colored with red (context), blue (functional), green (emotional), and purple (aesthetic). In addition, the variables (who speaks when?, who speaks?, who speaks with what authority?, who

sees?, who speaks to whom?, who speaks what language?) were underlined.

The interview was originally in Portuguese and it was translated to English as follows:

Could you tell me how do you find yourself around a new city?

Look, to tell you the truth, in all trips, we need to learn how to move around the city, where to find the basic things, etc. But I can give you too examples: Paris and Venice.

Paris: the distances are enormous, the trick is to use a lot of underground. Even so, we end up lost. The first time I went there, I used a print map. It helped, but it wasn't easy. The last time, we used a bit of GPS and the maps that were fixed on the underground stations. It was easier. Finding interesting places in Paris is not so difficult, because it is well signaled. Even though, a good map helps, if not a small error may cause a half hour extra walking. We used a lot of metro, because the traffic is chaos.

Venice: this is a very special experience. As there is no streets in Venice but rivers, we had to get around on boats. The difficulty was to find the hotel at night, because everything seems much alike and the city turns into a maze. The last time we went there, Luigi downloaded a digital map and we followed it. At Venice, even to find a market is not easy, so having a GPS is interesting, or a digital map with additional information, like where the pharmacy is, the market, etc.

2) Data categorization and concepts

In this section, the lines were put together so that they could define each category (see Table 3).

TABLE III. DATA CATEGORIZED FOLLOWING THE STORYTELLING MODEL

Categories	What to look for
Context	<p>Could you tell me how do you find yourself around a new city?</p> <p>..the distances are enormous, the trick is to use a lot of underground.</p> <p>..because it is well signaled. We used a lot of metro, because the traffic is chaos.</p> <p>As there is no streets in Venice but rivers, <u>we had to get around on boats.</u></p> <p>...because everything seems much alike and the city turns into a maze.</p> <p>Who speaks when? – <u>The first time ... The last time</u></p>
Concept for context	The tourist use the public transportation if it is well signaled
Functional	<p>Do you usually use a tour map?</p> <p>Did the map help you find the places you wanted?</p>

Concept for functional	<p>Was it easy to use?</p> <p><u>...The first time I went there, I used a print map. It helped,</u></p> <p>...we used a bit of GPS and the maps that were fixed on the underground stations.</p> <p><u>...downloaded a digital map and we followed it. At Venice, even to find a market is not easy,</u></p> <p>...with additional information</p> <p>Who speaks? – <u>we need to</u> first person</p> <p>Who speaks with what authority? – <u>I can give you too examples</u></p> <p>Who sees (point of view)? –</p> <p>Temporality - <u>The first time ..The last time,</u> distance,</p> <p>speed - <u>downloaded a digital map and we followed it</u> a lot of action performed in this period of time</p> <p>limitations of knowledge - <u>Even though, a good map helps</u></p> <p>The tourist use maps in different media.</p>
Emotions	<p>How do you feel using it?</p> <p>Do you still have the map?</p> <p>..but it wasn't easy.</p> <p>...It was easier.</p> <p>...Finding interesting places in Paris is not so difficult,</p> <p>...Even though, a good map helps, if not a small error may cause a half hour extra walking.</p> <p><u>...The difficulty was to find the hotel at night,</u></p> <p>...GPS is interesting,</p> <p>Who speaks to whom? - <u>to tell you the truth</u> - the investigator as the narratee</p> <p>Who speaks what language? - <u>very special experience</u> <u>The difficulty was</u></p> <p>Concept for emotional</p> <p>A map might help the tourist to feel secure</p>
Aesthetic	<p>Was it beautiful?</p> <p>Do you remember the building on it? Were they in 3D?</p>

3) Considerations

Using the model suggests that the data collected from the interview could be explored in terms of quality. This is to say

that the model dimensions guided the student to look for answers of the questions he first thought about. It is interesting to notice that many of the designed questions were not asked. Nevertheless, the story was rich enough to fill almost all the dimensions. When questioned about why he did not ask about aesthetic of the maps, the student told that he forgot all about it.

In addition, the aesthetic dimension was not considered by the interviewed. This could be because the interviewed told a story as she remembered experiencing. Thus, she had a lot to tell in a few lines of text.

B. Web site for Cheese and water company - Eating habits

Object: web site (see Fig. 3).

Using the model: questions preparation

Categories	What to look for
Context	Do you usually buy drinkable water? Do you usually buy cheese? Do you eat cheese of buffalo? Where do you shop?
Functional	What do you consider when choosing a cheese?
Emotions	Do you prefer local brands? Do you prefer craft products? Do you prefer products from free range animals?
Aesthetic	Is the appearance of the label important?



Fig. 3. Web site home page developed by Cristiane A. Wartha, Matheus G. Coelho and Ramon G. Wilhelm

1) Interview transcript

Do you buy drinkable water? Where do you shop?

Yes, I buy it at the supermarket. I rather buy Oourofino than any other because it has less salt. And that is a huge difference especially for a woman.

And is that information in the label?

You can find this information on the label, but my first contact with this information came to me through another consumer, because I didn't know how important the quantity of salt is for a woman, especially during the menstrual period, so, ahhh..., because of the period.

And do you buy bottled water too? Always from Oourofino?

Yes, preferably. Yes, but I buy other brands to, but I always read the label.. and the difference for me is a small quantity of salt.

Do you prefer local brands?

No, following this information, no, without knowing that the salt quantity is small, ... because I know that less salt is better for me.

And you always go at the supermarket to buy it?

Yes, I usually go there, almost always.

And what about cheese? Do you buy cheese?

Yes, I am a large consumer because I am a egg/lacto/vegetarian, so how can't I?... I eat very few animal protein, I don't eat meat, cheese is part of my diet so...

And do you eat cheese of buffalo? Or any other special cheese?

Yes, a mozzarella cheese from buffalo for example is much more light and I prefer this food, I always look for cheese that are lighter, but I also eat yellow cheese... but I rather choose the white ones.

And how do you choose these cheeses? Is that because you already know the flavor?

Usually I choose the cheese after reading the label about the quantity of salt and fat. Recently, a lady that was working at a degustation in a supermarket told me about how low the salt was for that specific brand. I started noticing and observing that it was true and then i started buying that cheese.

And do you rather choose products from free range animals?

Oh yes absolutely, and because I don't eat meat I need to consume other products from other living beings. So I don't want that they suffer or be sacrificed.

And what about craft products? Do you like to buy them?

Yes I usually buy them, I give priority to craft products. But it is difficult because I also look for better prices and composition.

Do you consider the appearance of the product? Graphic elements?

Not much because for me it the nutritional information is more important but without doubt a good appearance is important. It sells the product.

2) Data categorization

As it was done with the first example, the lines corresponding to each of the model's dimensions were colored with red (context), blue (functional), green (emotional), and purple (aesthetic). In addition, the variables were underlined.

Categories	What to look for
Context	<p>Do you usually buy drinkable water?</p> <p>Do you usually buy cheese?</p> <p>Do you eat cheese of buffalo?</p> <p>Where do you shop?</p> <p>Yes, <u>I buy</u> it at the supermarket. I rather buy Ourofino than any other because it has less salt. And that is a huge difference especially for a woman.</p> <p>Yes, preferably Yes, but i buy other brands to, but i always read the label.. and the difference for me is a small quantity of salt.</p> <p>Yes, I usually go there, almost always.</p> <p>Yes, I am a large consumer because I am a egg/lacto/vegetarian, so how can't I?... I eat very few animal protein, I don't eat meat, cheese is part of my diet so...</p> <p>Yes, a mozzarella cheese from buffalo for example is much more light and I prefer this food, I always look for cheese that are lighter, but I also eat yellow cheese... but I rather choose the white ones.</p> <p>Usually I choose the cheese after reading the label about the quantity of salt and fat. Recently, a lady that was working at a degustation in a supermarket told me about how low the salt was for that specific brand. I started noticing and observing that it was true and then i started buying that cheese.</p> <p>Who speaks when? – <u>but I always...</u> <u>but my first contact...</u> <u>I usually...</u> <u>Recently</u> </p>
Concept for context	Buffalo cheese is chosen by those who live a healthy life
Functional	<p>What do you consider when choosing a cheese?</p> <p><u>You can find this information on the label, but my first contact with this information came to me through another consumer, because I didn't know how important is the quantity of salt for a woman, especially during</u></p>

	<p>the menstrual period, so, ahhh.., because of the period.</p> <p>Who speaks? – <u>I buy</u> first person</p> <p>Who speaks with what authority? – <u>I am a large consumer</u> </p> <p>Who sees (point of view)? –</p> <p>Temporality - <u>my first contact</u> .. <u>Recently</u></p> <p>Speed - <u>I started noticing and observing that it was true and then i started buying that cheese</u> </p> <p>- a lot of action performed in this period of time</p> <p>Limitations of knowledge - <u>I am a egg/lacto/vegetarian</u> </p>
Concept for functional	The nutritional composition of cheese is important for the consumer
Emotions	<p>Do you prefer local brands?</p> <p>Do you prefer craft products?</p> <p>Do you prefer products from free range animals?</p> <p>No, following this information, no, without knowing that the salt quantity is small, ... because I know that less salt is better for me.</p> <p>Oh yes absolutely, and because I don't eat meat I need to consume other products from other living beings. So I don't want that they suffer or be sacrificed.</p> <p>Yes I usually buy them, I give priority to craft products. But it is difficult because I also look for better prices and composition.</p> <p>Who speaks to whom? - <u>You can find this information</u> - the investigator as the narratee</p> <p>Who speaks what language? -</p>
Concept for emotional	Consuming buffalo cheese is pleasurable, gives a sense of nature
Aesthetic	<p>Is the appearance of the label important?</p> <p>Not much because for me it is more important the nutritional information but without doubt that a good appearance is important. It sells the product.</p>
Concept for aesthetic	The design of the packing should value the information

3) Considerations

Considering that aesthetics aspects are very important for the designer, finding out what the user thinks about that becomes a relevant topic. Albeit the user do not remember about these aspects easily, the designer can direct the interview to find out some answers for this topic. But, as happened in the

last example, the user did not say much about the aesthetic of the product. Although she was asked about this topic, the answer was in general terms. This might have happened because she did not remember any relevant aesthetic characteristics.

Otherwise from the first example, the dialogue established between interviewed and interviewee might have supported that all planned questions have been asked.

V. CONCLUSION

Storytelling is a natural way of narrate what happens to someone. Because of that this paper argues that storytelling might be used to let the users describe an interaction with an object. Hence, the story told by the user might be shaped so that the designer can extract the components that can be used to innovate. Therefore, this paper proposes to formulate a storytelling model. This model structures the story using the elements that are present on a narrative. The expected results are a model that is ease of use, and stories structured to reveal the interaction essence. These stories might be the starting point to establish the expected user experience.

Finally, to validate this model two case studies were described. These case studies applied the storytelling model to investigate how the users understand their interactions with an object and a product. The results show that the model can help users. In addition, the results show that aesthetics topics are not easily remembered by the users. In this case, the use of illustrations should be considered.

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