Storytelling and Low-Resolution Prototypes for Innovative Simulated Experiences in User-Centered Research

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This article discusses the use of low-resolution prototypes and storytelling as tools for planning and building simulated interactive experiences as a part of an exploratory method of user-centered research. We contextualize the concept of low-resolution prototyping and storytelling, present its insertion in the method and discuss its relevance to design user-centered experiences. The results suggest that using low-resolution prototypes and storytelling to create immersive experiences to validate products/services enable a deep understanding about users, which is an important perspective to design driven-innovation, considering that people do not buy products and services, but meanings. The combination of both tools gives the researchers a qualified amount of data that covers what the user consciously speaks, automatically does and unconsciously expresses. Using the proposed method companies will be able to identify the value perceived by customers, in order to create a better experience.

Keywords: design research, user experience, low-resolution prototypes, storytelling

Introduction

In the context of experience, Design has the purpose to enable the conditions for creating experiences in a planned way. The understanding of how experiences occur and how objects become emotional triggers opens space for new product design opportunities that are meaningful and relevant in people's lives (Forlizzi, Disalvo, & Hanington, 2003). Considering the relationship between people and the products and services they consume, the experience will draw in the emotions, beliefs, and expectations that occur before, during and after consumption (Chammas, Quaresma, & Mont'alvão, 2015).

In order to design experiences, it is necessary to involve the users in the design process, not only by questioning them about their needs and motivations but also by providing an environment in which they can imagine themselves in future scenarios related to the project's context. By actively involving customers in the innovation process, it is possible to get specific information about needs and desires, in order to translate this into products insights (Kaplan & Haenlein, 2006). But the more innovative these products are, the more they will challenge the organization's ability to take them further (Carlgren, Elmquist, & Rauth, 2016).

To do so, low-resolution prototypes - physical representations of early conceptual models (Kaya, Alacam, Findik, & Balcisoy, 2018) - enable the creation of a complete simulation environment where users can interact with the product or service that is being designed, validated or tested, and freely express their perceptions. In

this way, the researcher can dialogue, question and observe conscious and unconscious behaviors that could generate insights for the project. In order to be immersive, this simulation must be planned and applied based on narratives that describe the universe of the project and integrate the hypotheses to be confirmed. When consumers are living the experience, more-original ideas can be discovered (Liedtka, 2018).

Therefore, this article discusses the use of storytelling and low-resolution prototypes (also called low-fidelity prototyping) as tools for planning and building simulated interactive experiences as a part of an exploratory method of user-centered research. This method was conceived and applied during joint investigations executed by HP Inc. Brazil R&D Center and Tecnopuc Crialab, the creativity laboratory of the Pontifical Catholic University of Rio Grande do Sul - Brazil. This method is oriented to the initial stages of the product development process, and allows users to imagine themselves in a future context through fictitious environments and scenarios in the scope of ideation. In this article, we intend to contextualize the concept of storytelling and low-resolution prototyping, to present the method, to discuss how storytelling and low-resolution prototyping can help create a better experience, and finally to discuss its relevance to design user-centered experiences.

Low-resolution prototypes for simulated experiences

Prototyping is an activity that has received considerable attention in the product development process since the adoption of Design Thinking in several business areas (Elveruma, Weloa, & Tronvoll, 2016). The understanding of the design process in the business and development domains has been extended, so using low-resolution prototypes in the early stages of design has become an important practice. In contrast to the traditional role of the prototype in engineering processes, the prototype in the design process, especially of products, has a more exploratory role (Elveruma *et al.,* 2016).

Using prototypes, designers and project teams create concrete representations of design concepts, taking them out of the conceptual space of their minds and materializing them beyond graphical representations. These prototypes, even when done in a rudimentary way, facilitate the communication of concepts and ideas, both among the design team and with users and stakeholders (Orr, 2015). These traditional prototypes can serve many useful purposes in product development processes, but since they often require a high commitment of financial, human, and time resources, they are often seen as an obstacle to final production (Savoia, 2011; Orr, 2015). Its use can help to test and validate the potential market of new ideas in a concrete and objective way; however, it is common to invest weeks, months or years and large amounts of financial resources, which makes this process difficult, expensive and time-consuming.

Low-resolution prototypes, on the other hand, involve fewer costs and reduced time to obtain the necessary information that will allow the project to move to the next phase (Figure 1). In order to achieve a good physical representation of an idea, the tools and materials used to prototype must be simple to use and easy to manipulate (Kaya *et al.,* 2018). Constructed with basic materials (from cardboard to bottle caps), these materialized concepts have many benefits: for Pernice (2016), with low-resolution prototyping, more time can be spent exploring interactions with the product/service, without technical restrictions. In addition, necessary changes are made faster so it's possible to quickly perform several test sessions and apply adjustments needed to re-test the product/service in iterative cycles. Low-resolution prototypes also exert less pressure on users. As the product/service is not yet concluded, users do not feel the obligation to be successful in the tests and are more likely to express any negative reactions. This effect also applies to the design team; necessary changes in the product/service are made more naturally since it is understood that the project is still under construction and can be modified (Pernice, 2016).

Referring to low-resolution prototypes, Savoia (2011) brings the concept of "pretotyping". For this author, between abstract ideas and suitable prototypes there are the pretotypes, low-resolution prototypes that are still in the initial phase, and that help to collect valuable market data and product/service usage information for decision-making regarding the continuity of the project, for a fraction of the cost of prototypes, since they can be developed in a few hours, using few resources. The pretotypes allow design teams to fail quickly so a quick recovery can be achieved with enough time, money, energy and enthusiasm to explore new adjustments in the project until achieving a model that really has value for people (Savoia, 2011).

Figure 1: Example of product low-resolution pretotype. source: the authors.

According to Orr (2015), the prototype can be categorized into three different groups: prototypes of adjustment, prototypes of shape or prototypes of function. Adjustment prototypes are designed to test fittings, assemblies, and manufacturing peculiarities. The shape prototypes are intended to test the aesthetics of final products. Finally, function prototypes are developed to test specific product and/or system functionalities. These three categories are not exclusive, because in many projects it is necessary to test more than one dimension of the product simultaneously. However, from an experience perspective, it is understood that the interaction between the user and a product/service transcends its form and function, and also involves environmental aspects, senses, motor and mental abilities, intentions, expectations, desires, values and previous experiences (Freire, 2009). Experience is the result of the interaction between people, products, and the context in which this interaction takes place - and must be functional, determined, engaging, attractive, and memorable. Thus, in the context of this research, a fourth category of prototypes is also visualized: the prototypes for the conception of experiments (Figure 2).

Figure 2: Example of low-resolution prototypes. source: the authors.

In this process, using a low-resolution prototype creates a easily simulated environment in which the user has the experience of using the product/service being designed, validated, or tested. Through narratives that report the different situations of use that are previewed in the project, during the experience simulation the user can freely make decisions, perform actions and manifest their perceptions. To discuss the construction of these narratives, it is interesting to start with an overview of concepts and applications of storytelling.

Storytelling as the driver of experiences simulations

Stories are a natural and flexible way of communicating. Its effectiveness ranges from its use in teaching, as a means to help people to remember information, to a good form of entertainment (Quesenbery & Brooks, 2010). Stories are told through the generations to educate, inspire and motivate. They reflect how people usually tell things about themselves, about other people, places, cultures, and experiences. Telling (and listening) stories naturally makes people more receptive to new ideas and perspectives (Beverland, 2009).

The use of stories as communication means is not limited to the personal level. At the professional level, whether for teachers, organizational leaders or scientists, there are many ways and opportunities to use storytelling. In a classroom, stories can be used to explain the content in a playful and didactic way. In a judgment, a story can be told by a lawyer as a means of promoting jury empathy and exposing the defense view (Meyer, 2014). In Design, storytelling is used as a method to elaborate usage scenarios, for the creation of personas and as part of other tools used in projects that involve the user experience (Quesenbery & Brooks, 2010; Frandoloso, Gonçalves, & Fialho, 2017).

For Quesenbery and Brooks (2010), stories have many applications in the design of experiences: they can describe a context, such as stories that tell a person's journey; they can illustrate problems and pain points, explaining why a new experience is needed; or they can launch points for a discussion, explore design concepts and describe the impact of new projects (Quesenbery & Brooks, 2010). When used in experience simulations with low-resolution prototypes, they are written to describe a context or situation of use of a product and/or a service. In this case, the narratives help in understanding the circumstances and variables related to the project, since they not only describe a sequence of events but also help to explain the reasons and motivations of these events.

Because they have a particular structure that describes cause-and-effect relationships between events that occur in a particular period, impacting specific people (Dahlstrom, 2014), narratives are important tools to interact with users. Good storytelling is interactive; it is like a conversation in which the storyteller and audience participate together, and are engaged to the point to feel part of the narrative. In addition, storytelling does not bring too much detail - on the contrary, it purposely leaves gaps that will be filled by the viewer's imagination, so that it builds up parts of the story (Quesenbery & Brooks, 2010). This active and dynamic aspects of storytelling make it essential for the design of experiences.

Considering these concepts, in the following pages we discuss how low-resolution prototyping and storytelling can be applied in a user-centered research method, as important tools used to create the stories that will be told to users and experienced by them in interactive experiences simulations, in the context of products and/or services development projects.

Low-resolution prototyping and storytelling for user-centered research

As user experience becomes central to the design process, it is necessary to establish means by which designers and users can act as equal partners, which impacts not only the results of the design process but also the design goals. In order to design new products and services, users' participation is essential, so they can contribute with their vision about what is being developed and act as collaborators in the design process. So, under these premises, Tecnopuc Crialab's design team developed a user-centered design research method[1] focused - but not restricted - on the initial stages of a technological product/service development process. This method was created in collaboration with HP Brazil R&D, in order to involve users in some stages of the development process and to encourage them to become co-creators in the design process (Figure 3).

[1] *The complete method was published in the Brazilian journal Human Factor Design (HFD, v.8, n.15, p. 98-113, March 2019).*

Considering our goal with this article, we will briefly explain the method and then focus on the role of low-resolution prototype and storytelling.

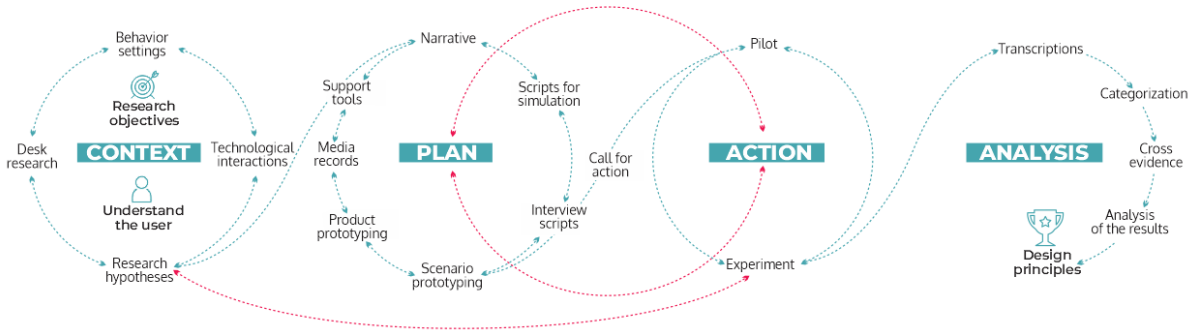

Figure 3: Complete diagram of user-centered research method. source: the authors.

About the Method

The method comprises four phases: Context, Plan, Action, and Analysis. The first phase, CONTEXT, is about understanding the project environment. It defines the research main goal and the directions to be followed in order to make the experience happen. Every process should start with a contextualization because it allows us to understand the project universe and the user profile, who will be the main actor in this process. As in our experience design, management and development teams will work together, decisions regarding this phase must be made in a joint effort. This initial phase is also important to clarify the research context, which can be driven by the idea of a product to be developed, by a product to be validated or a launched product to be evaluated.

According to Pine and Gilmore (1998), the potential commercial success of product/services depends, in addition to other factors, on the experiences it provides - and therefore understanding the consumer needs and their motivations is essential to create meaningful and memorable experiences. In order to do that, we carry out desk research (exploratory research in academic bases and websites in order to investigate cultural, behavioral and market aspects related to the project) and we create personas, user journeys and empathy maps.

As we are using a user-centered approach, we need tools that are focused on explaining and detailing the user's profile and needs related to the product or service. Because of their fictitious, specific, concrete representations of target user's characteristic (Pruitt & Adlin, 2006) personas potentially can help address some of the issues with current user-centered approaches (Miaskiewicz & Kozar, 2011). Also, user journeys and empathy maps can help us immerse on the user's world so we can create a meaningful experience for the user. Based on this, we define the research hypotheses that will be validated with the experiment application. The CONTEXT stage creates the necessary basis for the following method phases since it gathers all the information necessary for the effective design of the experiment.

The PLAN phase consists of planning the simulated experience to be applied. In this phase, the low-resolution prototype and storytelling will have an important role. We start this phase writing the narrative that is going to guide the experience (storytelling), based on the hypotheses, behavior settings (Wicker, 1987), and technologies previously defined, and we consolidate it as text or as a storyboard. How the storytelling will be built-up is also an important aspect to be considered. In our experience working with different teams, with different backgrounds, storyboards tend to help put everyone on the same page and focus on planning the same experience.

With the narratives already defined, the scripts and the protocols must be prepared. They consist in each step the researcher must take to conduct the experiment: this includes welcome the participants and explain how the experiment will be, ask them to sign the image use authorization (or any other document), make initial questions, propose the tasks that the participant should perform, observe it, and make the final questions. Our goal is to compare people's behavior during the experiment and find patterns in their behavior in order to generate products/services insights. To be able to do that, in the scripts, every step must be clear and detailed, including the researcher's lines and the questions that will be done before, during and/or after the experiment

in a semi-structured script. It is also relevant to consider support tools to the interviews that are going to be used in specific points of the interaction. These tools can be used by the participant and the researcher together, helping the user to imagine hypothetical scenarios and to demonstrate their thoughts, opinions, and feelings. Some examples of support tools are paper cards with future scenarios, image sorting (Kumar, 2013), emotional response test (Memoria, 2006; Meurer, 2014), among others.

After the scripts, we initiate the construction of the environment where the experience simulation is going to happen, building the low-resolution prototypes (Figure 4). We need to make the conceptual representation of the product/service tangible to be tested or validated. Also, to be able to create an immersive and playful experience that will stimulate the user's imagination for future scenarios where they perform the requested actions. The low-resolution prototype is done considering the narratives that were previously created.

With the scenarios built, we start the participant's call to action. The users are recruited considering the profile defined in the CONTEXT phase. The recruitment does not necessarily need to be started at this stage but must be finalized before starting the next step.

The third phase of the method, ACTION, aims the experiment application. In this phase, a pilot with a few users is initially applied, to verify the research protocols and all the operations. Once this verification is done, the experiment will be applied according to the participants' schedules. We usually apply it in short iteration rounds, so we can make protocols reviews and, if necessary, apply new pilots. Possible adjustments may occur in these reevaluation steps and we should consider that in the final analyses. Throughout the application rounds, it is also important to make sure that all the media are being recorded, so all the experiences can be analyzed at the end of the research.

Figure 4: Examples of experience simulation using low-resolution scenario and product prototyping. source: the authors.

The last phase of the method, ANALYSIS, refers to the analysis of the data collected with the application of the simulation of the experience. The data collected is analyzed qualitatively because it allows the description of the complexity of the phenomena related to the subject of study (Flick, 2009; Gibbs, 2009). In this phase, all audios are transcribed and snapshots of recorded videos are selected. We strongly suggested the use of two video cameras to record the user in different angles. This preparation of data is important to posteriorly cross texts from the transcriptions and images from videos.

Then, the shreds of evidence collected with different media are crossed and categorized. Then, the results are analyzed. By the end of the analysis, results are compiled and design principles are generated. Design principles propose to transform insights into project recommendations and indicators/guidelines for the development of a solution related to the experience that is being designed (Kumar, 2013).

By using this structure, this method allows constant iterations along its application and predicts these iterations especially in its central phases – plan and action. Enabling iterations means that the plan of the experience can be reviewed at any moment, which will impact in the simulation of the experience simulation with the users, which can result in a new process of investigation. This new investigation can be of a new premise to be explored, or about a reformulated old one. The method, that is user-centered and developed in

the context of experience design, is oriented to design research processes with great potential of participation of designers, other team members, and users, and qualifies the stages of an investigation and problem definition in projects.

Storytelling and Low-resolution prototype for Innovative Simulated Experiences

As mentioned, the low-resolution prototype and storytelling will play an important role in the PLAN phase of the proposed method. This phase starts with narrative writing using the information gathered in the previous phase. This previous information is essential to bring meaning to the story. To write the narrative we needed to establish some directions. So, we reviewed the branding storytelling framework from Smith (2012). As Smith's framework is focused on creating branding narratives, we adapted it to focus on the simulation of experiences (Figure 5). As the original framework, ours consists of three stages: environment, experience, and outcomes.

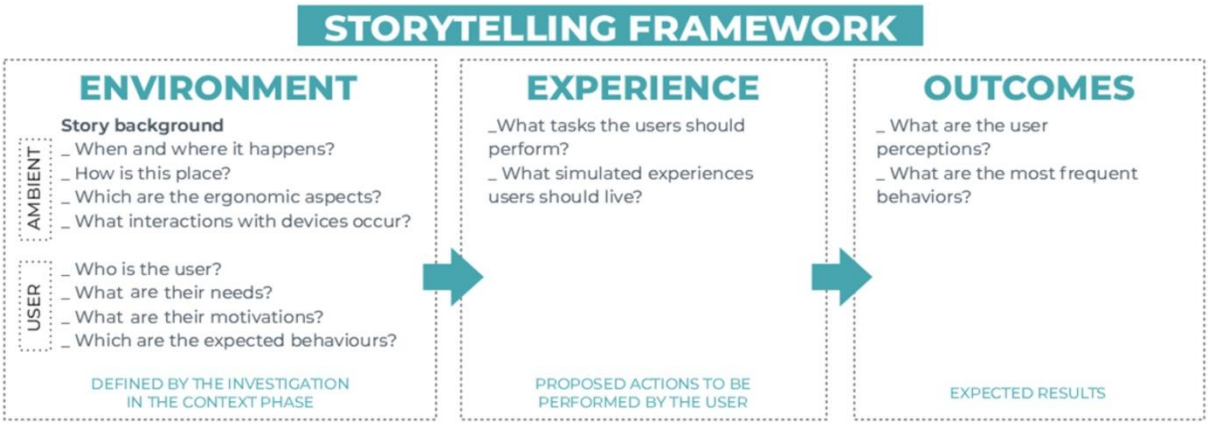

Figure 5: Storytelling framework, adapted from Smith (2012). source: the authors.

On the ENVIRONMENT stage, the goal is to define the experiment background. Every experiment we planned, we had to make related decisions about where the story will be placed and who are the users that will interact with it. In order to do that, we planned considering two main aspects: ambient and user. In the ambient phase, we answer questions like when and where the experiment happens? How is this place? Which are the ergonomic aspects? What interactions occur? But we also needed to have a better understanding of the user who will be interacting in this space. For that, we answer questions like who is the user? What are their needs? What are their motivations? Which are the expected behaviors?

Having all these answers makes it possible for us to visualize what needed to be done and start designing the first sketch (Figure 6). Besides telling the atmosphere of the story, this information also defines exactly what is going to be built: what kind of devices, how many of them, what the ideal distribution of elements to compose the environment, and other needed information. In addition, in this stage, we gather the information regarding the user profile (as their needs, motivations and expected behaviors that were previously investigated) to address it in the tasks that users are going to perform in the simulated experience. The user profile is also considered for the recruitment of participants who will be invited to the experience.

Figure 6: Sketch for an ambient with low-resolution prototypes. source: the authors.

On the EXPERIENCE stage, we define the tasks that users are going to perform in the experience. These tasks can be very detailed (when the intention is to test the relevance of a product and/or service, or its usability), or can be very broad (when the intention is to understand behaviors or cultural aspects). These tasks can be consolidated as text and/or storyboards, and are the base to the scripts and protocols that are followed by the researcher to conduct the experience. If in the ENVIRONMENT phase we are focused on the context of the narrative, the experience phase is related to the action step, where the user is the center of it. Based on Smith's (2012) framework, we also separate the defining tasks step from the contextualization one when designing narratives. So, decisions made on the environment phase will guide the tasks definition, but only after finishing the environment phase is it possible to define coherent and consistent tasks for the user. In our experience, the second stage will demand not only general storytelling knowledge to be accomplished but also a deep understanding of the user and the story you want them to experience.

Finally, the OUTCOMES stage consists of the end of the experience. In Smith's (2012) original framework, the end of the narrative presents the story's main point, but because we are focusing on understanding experiences, the end of the story is determined by the user. How they decide to end the experience is an important result and can help us confirm or refute a hypothesis. Based on the research goal, it is possible to define expected results, especially when the intention is to validate an idea, a product and/or a service. In this case, there is an expected result that, if attended, the hypotheses are confirmed. On the other hand, if the expected results are contradictory, the hypotheses are refused and new hypotheses can be defined.

As the results are uncertain, we must emphasize that the narrative is not immutable, and can be adapted and reviewed as much as necessary. The narrative aims to tell the stories that will be experienced by users, and that simulates the context where the user is going to use the real product and/or service in the future. When it is well explored, it captures and maintains the user's attention and generates interest and enthusiasm. Because of that, it must be detailed enough to help the user to go deep into the immersion - so it must include the product and/or service to be tested and all its context of use (Denning, 2005).

Figure 7: Construction of the ambient where the experience simulation is going to occur. source: the authors.

Although the storytelling can be an important player when building experiences for users, it cannot do everything by itself. Besides creating a consistent narrative, in order to have users completely immersed in an experience, it is necessary to build scenarios to make them feel that they are truly living and making the tasks we need them to perform. Also, it may be risky to make project decisions based only on user interaction with the product prototype without an understanding of the context of use of the product - that is why the prototyping of the scenario is essential for the completeness of the experience and the identification of the contextual factors that direct the use of the product.

The low-resolution prototyping of the product/service is necessary not only to test functionalities, ergonomic issues and other aspects of the product itself but also to investigate the meaning this product has to the user and how relevant it is in the user's life. As the low-resolution prototypes has the advantage of bringing a playful aspect to the experience, the user feels more comfortable doing the simulations and easily talks about their perceptions, motivations, and concerns. So, after creating the experience narrative, we build scenarios, devices, and what else is necessary to make the story happens. As in this phase, we already have protocols and scripts done, we need to think about how to make the planned flow possible and what kind of scenario will be assembled.

In our past experiences using this method, most of the time our focus is on testing technologies and understanding how people interact with it. So, we need to build an environment where these products would really take place. For us, this is where the storytelling makes sense. All the interaction we planned is tested when a user interacts with a real size prototype and express their behaviors, beliefs, doubts, and concerns about the product/service they are testing.

Using low-resolution prototypes at this point of our method allows us to make users live the interaction in a simulated environment where they feel free to express themselves. As said before, because we are using simple and cheap materials, interacting in a simulated environment, the participants do not feel the pressure to like the product or any resentfulness in telling what they are really thinking. These insights are very valuable when defining projects directions.

Simultaneously with the low-resolution prototype construction, we define the media recording set - that can be in video, audio, and photography, for example. It is interesting to do that while the prototypes are made, to choose the best angles to position the cameras aiming for a better recording of facial and body expressions of

participants, but also to not make the user uncomfortable with being recorded. This material will be really important when the analyses phase starts.

The use of narratives and low-resolution prototypes allows us to make more certain decisions when it comes to product/services directions. We know it is possible to make products validation only using storyboards (or any other method), but in order to simulate the real experience, low-resolution prototypes are necessary. People can imagine scenarios and tell how they would feel. However, living a simulated experience will get deeper on feelings and behavior, because the participants are not thinking about what they would do in a hypothetical situation. In this case, the participants are living it, and behaving in a really close way to how they would do in a real situation.

Findings and discussion

In eight applications with this method, it was possible to collect feedback from 180 participants about their perceptions and feelings. On that, 75% of participants reported they enjoyed immersing themselves in experience simulations to evaluate them. The fictitious built scenario and products, the script (storytelling) conducted by the researcher and the clear willingness of the researcher for the user's contribution in imagining, were mentioned as facilitators for evaluating the experience. Besides that, 60% of the participants mentioned that despite being a visibly fictitious ambient, the environment gave them a good sense of reality.

We noticed that the playful aspect of low-resolution prototyping allowed the user to feel more at ease to express their perceptions and opinions, without suffering unconscious influences derived from brands or products already known by him. By simulating interactions with simple prototypes, the comments made by the participants become more spontaneous, without much prior elaboration before the speech, and therefore more reliable to their feelings and opinions. Moreover, the recognition of the real environment associated to the playfulness of its look helped them to imagine unknown situations. One of the participants said *"It was beyond my expectations, I was really able to feel in a real environment, in my own bathroom, and I felt stimulated to imagine interactions I don't have nowadays"*. Another one said *"I felt I was immersed in a real situation that felt concrete, even though I was simulating technological interactions with pen and paper"*.

There are probably two main reasons for this. The first one is connected to the playfulness of the scenario, which gives people the feeling that this is a product under construction and they can really contribute to it. The second reason is related to user's ideation. Because they are not in a real environment, they are not limited by what already exists or it is possible to create. One of the participants mentioned that there is a lot of difference between simulating it in a real environment or in one made of cardboard. He felt freer to express his ideas because everything was possible, an argument already brought by Savoia (2011), when he approaches the concept of pretotyping.

The use of storytelling to predefine narratives aims to tell stories that will be experienced by users in a relevant way to assist them in their immersion on the simulated experience, involving the interaction with the product being validated and sharing ideas and knowledge in a persuasive way. In this sense, storytelling is essential for the experience to take place in depth. When the storytelling is followed by low-resolution prototypes it makes it possible for participants to really immerse on the experiment. The big advantage of it is to let the user finish the story that is being told. When they are performing the activities, they can imagine this situation in their daily lives, and express how they would behave and feel when actually using these concepts (or future products) that are being validated. For Liedtka (2018) this is probably the surest route to win consumers support and involve them in the process of generating ideas, in order to improve solutions.

It was also noticed that the use of low-resolution prototyping brings advantages even before the stage of application of the simulations with users. Considering that this is a quick way of materializing ideas, the design of prototypes helps design teams to see more clearly the product/service they are designing once they "build to think". In this way, when building the prototype, the designers can imagine different situations of use that can interfere in the experience of the user, being possible to ponder possible qualities of the prototypes. The act of building becomes part of the process of ideation. Still, from this perspective, the low-resolution prototyping is advantageous within the proposed method because it allows numerous iterative cycles. Paraphrasing Savoia (2011), one can thus fail faster, recover quickly, make necessary adjustments and restart the experiment cycle - and with this process, find out what the real value that the product or service in question has for the users.

Finally, one of the interviewees stated that even though he was working in technology, the experience was valuable to make him think about things that are indirectly related to the interaction, such as issues related to privacy, trust and data storage that could influence features in the product development process. So, the creation of basic, low-cost artifacts that will capture the essential features of users experience results in more-accurate assessments of value, because helping people “pre-experience” something can stimulate this type of feeling (Liedtka, 2018).

Final considerations

The use of narratives, prototypes, and simulations are important factors in the process of getting the user immersed in the experience, which leads to co-creation since it encourages the user to talk more about their perceptions, opinions, feelings, and ideas. As people are driven by a fear of mistakes, they focus more on preventing errors than on seizing opportunities (Liedtka, 2018). So, living experiences in simulated environments can output that. Besides that, low-resolution prototypes represent low costs in terms of material and technological resources, which enable new applications of the experience simulation whenever necessary in the product/service development process, making it easier for the whole team to restart when necessary.

As for the context of the application of low-resolution prototyping, this has been used in investigations in the field of technological products, which have physical objects and different environments of use. However, the potential for the tool is also perceived in the context of service design, with the same intention of simulating experiences. In addition, even though prototyping was described as a tool to be used specifically in the “plan” and “action” phases of the presented method (when the simulation of the experience is constructed and applied), it is strongly recommended to be used in other phases of the method. Considering the previously mentioned premise of "build to think", prototyping can be used in other phases where it is necessary to ideate about the problem or make representations that help the design team think or present a concept.

Moreover, we can highlight storytelling as an important tool used in conjunction with prototypes. Scripts are elaborated to all moments of user participation in the simulation, from the arrival of the user to the research site until their exit, in a dynamic and active way. They are used as interactive guidelines for the interactions and happen during the simulation like a conversation between the researcher and the user, which is engaged to the point that he or she feels part of the narrative. These guidelines purposely do not bring too much detail, so the user will fill the gaps with their own imagination, adding to the story pieces of evidence that will influence the design of the experience. The combination of both tools gives the researchers a qualified amount of data that covers what the users consciously speak, automatically does and unconsciously expresses.

It is understood that within the presented method, the construction of prototypes of products and its environments have important sub-phases that can still be explored in future studies. The application of different techniques for the construction of narratives, and the insertion of new tools to support research still present potential for study and detailing in future publications. Also, we can go further on understanding the differences in having a narrative that the user can finish when experimenting or have a complete narrative with the end already defined previously by the researcher.

Involving the participant in the low-resolution prototyping construction could also be a research phase. This would make co-creation reality in different phases of the method and not only the results that come from the experiment would have the users look, but the whole planned experience. Although this method has been used several times in the context of our projects, there is still space for more testing. More methods and tools can be incorporated into each phase. However, we claim that the application of our method can definitely be a first step to co-create and get insights for projects in different areas. It can be used by small companies and in projects with low budget and short time.

Finally, design role as a main contributor for innovation is a clear point (Acklin, 2010; Bertola, Vacca, Colombi, Iannilli, & Augello, 2016; Brigitte Borja de Mozota, 2015; de Goey, Hilletofth, & Eriksson, 2017; Kumar, 2009; Liu, Liu, & Zhang, 2018; Moroni, Arruda, and Araujo, 2015; Tidd and Bessant, 2013; Verganti, 2006; von Stamm, 2003), and design-driven innovation involves an understanding that people do not buy products and services, but meanings (Verganti, 2006). In this context, using a user-centered research method is an easy way to complete the task of finding meanings. Using the proposed method, companies will be able to identify the value perceived by customers, and by iteration phases, create a better experience.

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