



What's the Impact of Local Cultures on the User Experience of Software Solutions?

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Abstract. Culture has a direct influence on the user experience. Good experiences should consider the context in which users belong and live, whether social, or organizational. For this, the qualitative research plays an essential role, since it is the one that will give the designer the possibility to know the users of the solutions he/she designs, understanding their needs and problems, process and tasks that he/she performs, as well as the famous '*gambiarra*', a quick fix so frequently seen in computer systems. This article aims at exposing the importance of qualitative research in order to understand the cultural context of users. It is a theoretical article in which the authors use examples to demonstrate the importance of the research, especially the research that is carried out at the users' workplace. Hopefully, it will be able to contribute to future research and reflections in the field, influencing designers and researchers alike, in their work.

Keywords: Cultural context · Culture · User experience

1 Background

About twenty years ago, in 1998, Karen Holtzblatt and Hugh Beyer published their book, *Contextual Design: defining customer-centered systems*, based on a method they created another ten years back. By then, plenty of computer systems were delivered late and over budget, and did not perform as expected. Unfortunately, it has not changed much, ever since.

The problem with such approach is that it just doesn't work. Today, twenty years later, still many systems are delivered in a far from optimal condition. The costs with rework, change requests, support, and maintenance are still extremely high. There are potentially many reasons why the quality of delivered software is still not good enough and one of the most important ones is that cultural context is almost never considered in the requirements definition.

Work does not happen in a vacuum. Instead, work takes place in a culture, which, according to the authors, defines expectations, desires, policies, values, and the whole approach people take to their work.

So, this article aims at exposing the importance of qualitative research in order to understand the cultural context of users. It is a theoretical article in which the authors use examples to demonstrate the importance of the research, especially the research that is carried out at the users' workplace, since it is the one that will give the designer the possibility to know the users of the solutions he/she designs, understanding their needs and problems, process and tasks that he/she performs, as well as the famous '*gambiarra*', a quick fix so frequently seen in computer systems. Hopefully, it will be able to contribute to future research and reflections in the field, influencing designers and researchers alike, in their work.

2 Computer Systems and Culture

Erin Meyer, in her 2014 book, *The Culture Map*, brings to our attention the most common business communication challenges that arise from cultural differences. Many of the situations raised by such issues can be significantly mitigated if taken into account at requirements definition and design time, and addressed by means of User Experience principles and guidelines.

One of the reasons behind this level of disregard for cultural context is the assumption that all existing differences are due to personality. Actually, before individual differences come into play, people see things through their own cultural lenses, and thus, judge (or misjudge) them accordingly. This is a default and automatic mechanism people acquire from their cultural context. Therefore, it is essential to have an appreciation for cultural context, as well as respect for individual differences.

Jakob Nielsen (2017), in his keynote to the UX Conference last year, pointed out that it is time we made technology work; we need to stop accepting that it always crashes and freezes, and does the wrong thing. He ventured to say that he would like to call for a moratorium on new features for an entire year, or maybe even for two years, where all the programmers in the world would create no new features, not a single one. The programmers would only work on fixing the errors or defects in the features that they had already developed. Based on empirical data, it is known that many of those defects could have been avoided if proper research had been done upfront. In fact, some code might even be unnecessary, since it was written to implement features that were not necessary or wanted, in the first place.

If work takes place in a culture, in order to be successful, a system must fit into their customers' culture. Otherwise, regardless of how well designed and built the system was, or whether it does solve a real problem, it will not succeed. 'Not succeeding' here includes low and lengthy adoption, minimal use, abandonment, high number of incidents, too many unhappy customers, in addition to not selling well.

In order for a system to succeed with a given group of target users, it must not conflict with their self-image. The system must account for the constraints these users are under, and it must not underestimate the values that are important to these users. That would be a guaranteed shortcut to failure.

According to Interaction Design Foundation (2015), the success and failure of a design is not just about one user sitting in front of a screen. It's the result of a broader,

more social interaction which means that a designer must have a toolbox full of concepts and methods drawn from the field of Sociology. Simply put, Sociology is the study of social human relationships—and such knowledge is thus necessary to designers.

In a similar way to Psychology, Sociology remains fairly stable because groups of humans still have roughly the same dynamics today as they did a hundred years ago. Therefore, design knowledge based on Sociology is a stable foundation to stand on, even when it seems like the world is moving at an ever-increasing pace.

A person working on a computer in the 1980s used technology that differs largely from the technology used by today workers. Nonetheless, their psychological apparatus are identical, and their needs to get things done in collaboration with their colleagues (i.e. sociologically) are also identical (Interaction Design Foundation 2015). That has not changed much. Both workers still make similar choices when trying to get things done at work.

As Beyer and Holtzblatt (1997) point out, culture influences work by altering the choices that people make. However, the design team that understands these constraints is fully equipped to build systems to account for them.

You may be asking yourself by now, if culture is in fact invisible, how can one get to know it, and build a system that accounts for it. Fortunately, like with many other intangible aspects, it can be deduced from indicators that are observable, that can be seen and heard when the team takes the opportunity to join target users in their environment and spend time with them.

“Culture is to us like water is to a fish - pervasive and inescapable, yet invisible and intangible. Cultural context is the mindset that people operate within and that plays a part in everything they do. Issues of cultural context are hard to see because they are not concrete and they are not technical. They are generally not represented in an artifact, written on a wall, or observable in a single action. Instead they are revealed in the language people use to talk about their own job or their relationships with other groups. They are implied by recurring patterns of behavior, nonverbal communications, and attitudes. They are suggested by how people decorate and the posters on their walls.

The cultural context includes the formal and informal policy of an organization, the business climate created by competitors and by the nature of the business, government requirements, the decor of the site, the self-image of the people doing the work, and the feelings and fears created by the people or groups in the organization” (Beyer and Holtzblatt 1997) (Fig. 1).

The indicators are the tone of the place, the policies, and organizational influences. In the following paragraphs we will examine the indicators, individually.

The first indicator is the tone of the place. If the place looks clean and organized, it tells you that this customer values cleanliness and organization, and thus it is unlikely that they will accept a system that looks messy and cumbersome.

Second, the policies, people do follow policies at work – both formal and informal, even if these are unwritten. Policies can be unveiled through the words people use and relationships they maintain. Most importantly, the words people use will show the policies they care about, which, in other words means, it points out to which problems should be solved first. Policies that are followed let us know how the work is done, what the

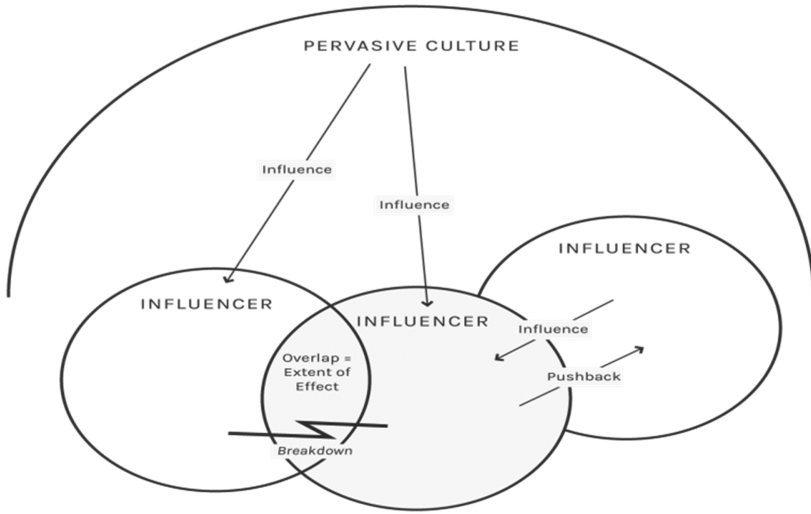


Fig. 1. Cultural model

power relations are like, how flexible processes are or are not, or what kinds of communication are used.

The third indicator is organizational influence, which relates to who or what group is the source of conflicts and irritation in the workplace. When listening to people talking about other people in the workplace, it becomes evident which colleagues, departments, or job functions they trust and/or the ones they would rather avoid. It can be clear the potential workflows that will work.

In order to visualize the data observable and thus, make culture tangible, Holtzblatt and Beyer (1997) created *Cultural Models*. In a Cultural Model, the influencers (those that affect or constrain work) are shown as *bubbles*. *Influencers* can be internal (colleagues, formal groups, “management”) or external (customers, vendors, competitors, government). When bubbles overlap, it shows how much the work is affected by this influencer. *Arrows* represent the direction of the influence and the extent to which an arrow enters a bubble shows how pervasive it is. Breakdowns or problems that are particularly harmful are represented in the model as *lightning bolts*.

The influences that tend to be more relevant to design are: standards and policy (e.g. allowed software, gifts, security procedures), power formal and informal (e.g. the weight of hierarchy, knowledge experts influence, family or affective relationships outside work), values of a company or team (e.g. conservative vs innovative, social responsibility), a group’s own sense of identity (e.g. ‘we don’t do process’, ‘in this team we have a barbecue on the last Thursday of the month’) and people’s emotions about what they do (positive or negative, e.g. fear of losing the job, professional pride, gossip).

All of the aforementioned elements, as relevant influences on design, can be captured or better understood through qualitative research, especially through observation in the workplace. Interviews are also useful, however, people do not always say what they really think or do. The practice in user research shows that, when interviewed (especially

if outside their workplace), people tend to tell what they consider to be an ideal process for accomplishing their daily tasks rather than describing what they actually do, shortcuts they use, and the *gambiarra*¹, which are nothing more than improvised solutions, with whatever means are at hand. *Gambiarra*s, at first, are created as quick fix and a firm intention to be temporary, but that is often forgotten, and they become permanent.

*Gambiarra*s are an example of cultural practice that is worth exploring a bit further, since it so ingrained in the Brazilian culture, that it interferes with work in all its forms. For example, considering only the Information Technology field, we can find *gambiarra*s both in software and in hardware. Hardware *gambiarra*s are those that use components that are not suitable for equipment, such as desk fans to replace computer fans, or using cables, wires and pins of other equipment. Software *gambiarra*s are those in which programmers seek to solve organizational and technological problems, such as the absence of qualified professionals in the team, poorly designed systems, lack of time, managerial pressure, low budget, short deadlines, inadequate hiring, low involvement of professionals, etc. with seemingly miraculous solutions, that are to be used temporarily and that, for whatever reason, end up becoming part of the permanent solution. And that means that more effort will be required from the users, in the long term.

Hence, we must not expect to find information about the cultural context of a company in its organizational chart, instead we need to collect qualitative data and find a way to make it explicit. By using Beyer and Holtzblatt's cultural model based on observation, we can model what people think but don't say, what people do rather automatically, and thus, do not say either.

The field research techniques used in Contextual Design are not very different from the techniques used overall in User Research, which stem from Ethnography, although with a higher degree of structure and constraints, so that it can fit the business constraints of Software companies. The cultural model, specifically, can be a very powerful tool to product teams, by providing a solid foundation to build their products upon.

Notwithstanding, in order to capture cultural context, we must embody the traveler metaphor (Kvale 2007), where the Researcher is a traveler on a journey to a distant country in a quest for a tale to tell back home. The Researcher-traveler must walk along with the target users, asking questions and encouraging them to tell their own stories of their world. The Researcher can then transform those stories into cultural models that can be understood and considered by the product teams.

¹ *gambiarra* means an "improvised solution to solve a problem or a need" (PRIBERAM, 2018). It is so common that on Wikipedia there is a page describing the term in several areas. According to the authors, "in programming, *gambiarra* is a palliative (and creative) way of solving a problem or correcting a system in an inefficient, inelegant or incomprehensible way, but that nevertheless works. In Brazil, *gambiarra* in computer programming is also referred to as POG (Programming Oriented to Gambiarra), alluding to the concept of object-oriented programming" (Wikipedia, 2018).

3 Qualitative Research and Cultural Context

Qualitative research is based on text and image data, it has unique steps in data analysis and draws on different investigation strategies (Creswell 2010). Contextual Design, in turn, is an approach to collect data in the context of users, which uses analysis and interpretation of data in an organized way. The purpose of contextual design is to understand the goals, desires and motivations of users, which can only be verified in the field and by asking and observing users (Holtzblatt and Beyer 2013).

Holtzblatt and Beyer (2013) proposed five models of focus group and participant observation to carry out field research, namely:

- “Flow model, which is used to capture communication and coordination to complete a task. This model reveals formal and informal work groups, critical communication points and formal and informal division of responsibilities;
- “Cultural Model, which is used to show the cultural policies that involve the execution of work, explaining what strategies users choose in order to deal with everyday situations;
- “Sequential model, used to show in detail the sequence of steps, strategies and difficulties of the users when trying to complete each step of a work;
- “Physical model, which is used to understand what physical environments prevent or assist in completing a task;
- “Artifacts model, which is used to make explicit the artifacts that are created and used to complete a task.

The contribution of these models in designing a good solution is to bring the users’ mindset and their perspective to the Design and Development teams. It is an efficient way to bring to attention issues and structure of the users’ context, that might otherwise not be perceived, and thus, lead to future confusion, errors, or even more impactful consequences.

Differently from quantitative research, which focuses on numerical data and can be characterized as a linear series of steps moving from theory to conclusions (Bryman 2004), in User Experience, best represented by Mike Kuniavsky, qualitative research is concerned with the natural environment, it has the researcher as a fundamental instrument, it uses multiple sources of data, such as observation, interviews, documents, and audiovisual material. It then performs inductive data analysis, while considering the meanings given by the participants to the study (Creswell 2010).

According to Creswell (2010), when using qualitative research, the researcher can study individuals, explore processes, activities and events, or learn about the broad behavior of individuals or groups with relation to their own culture and how they share it with outsiders. The latter is essential for design and for ensuring a user experience that is appropriate to the context of use, since values, origin, gender, history, interpersonal and intrapersonal relations, socioeconomic status, among others, can shape the users’ relationships and experience.

The quality of the qualitative research is guaranteed by the questions asked (Creswell 2010), as well as the collection of other data and artifacts, such as spreadsheets, notes, memoirs, process maps, training manuals, and even objects that are used to solve one

problem or another in the workplace, like for instance the use of a stapler by a user tired of pressing the “enter” key on his keyboard when the system often opens a (or several) confirmation window, as you can see in Fig. 2.

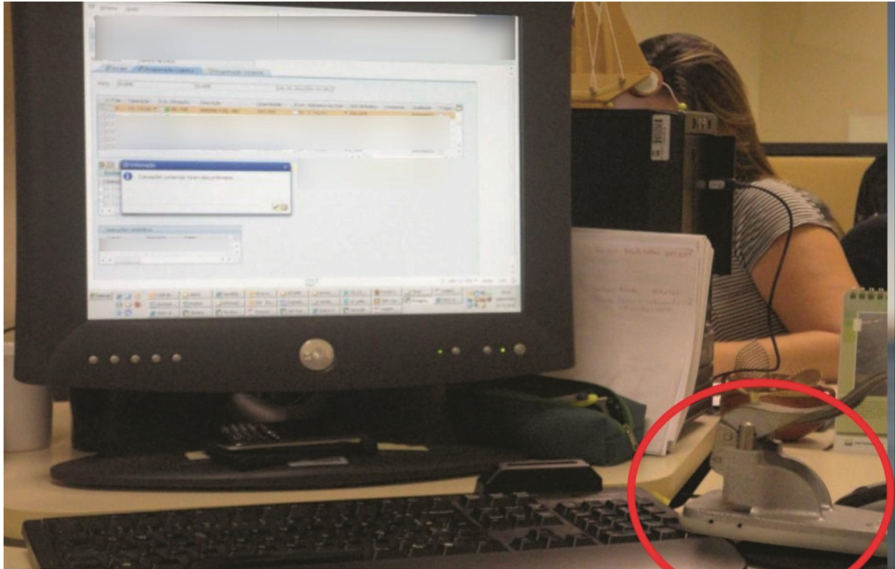


Fig. 2. Use of a stapler by a user to trick the computer and press the “enter” key on your keyboard when the system often opens a confirmation window. Authors’ collection.

This type of research seeks to extract meaning from the collected data, considering, mainly, the context and the individuals’ current and previous experiences. That is to say, while quantitative research explains the phenomena in the light of hypotheses and theories, the qualitative research understands them from the reflection upon the data collected. Thus, population, location, and the historical moment of the research are considered as fundamental elements that will influence the results, which means that there is no measurement, but rather interpretation; that there is understanding and not explanation; that results cannot be generalized to other contexts, and that the application of the same research in other contexts requires adaptation of the same (Creswell 2010).

For example, in 2015, at a Brazilian bank, when the customer wanted to pay the credit card invoice at the ATM, the machine requested that the customer insert the card and. When the user selects the option ‘*payment > credit card*’ in the menu, she sees the following message: “*Please enter the credit card number or, if you prefer, insert/remove the credit card in the card reader to capture the card number. Do you confirm the transaction?*”, as shown below (Fig. 3). However, unless the user knows by heart all sixteen digits of their credit card number – which is unlikely – she is in a deadlock. The message asking the customer to insert and remove the card to read the data does not make sense to the user because the card was already inserted in the machine, but since the system did not recognize the card, of for whatever reason, did not read the card

number, it now forces the user to remove the card, copy the numbers to a piece of paper, which would then restart the operation.

The image shows a screenshot of an ATM screen. At the top, there are two input fields: the first is labeled 'NÚMERO DO CARTÃO' and the second is labeled 'VALOR DO PAGAMENTO'. Below these fields is a block of text: 'POR FAVOR, DIGITE O NÚMERO DO CARTÃO DE CRÉDITO OU, SE PREFERIR, INSIRA/RETIRE O CARTÃO DE CRÉDITO NO LEITOR PARA CAPTURA DO NÚMERO DO CARTÃO.' Below this text is the question 'CONFIRMA A TRANSAÇÃO?'. At the bottom, there are two buttons: 'CANCELA' with a left-pointing arrow and 'CONFIRMA' with a right-pointing arrow.

Fig. 3. ATM screen of a Brazilian bank. Authors' collection.

This episode was experienced by the authors in two Brazilian cities and when narrated in a course taught in Brazil, a student, who was an IT professional from the aforementioned bank, was surprised to know that this was happening at ATMs of different cities. According to the student, this had never been explicitly considered, and it was likely that the bank was not aware of the fact. The student took note of the fact details and volunteered to report it the responsible area in the bank.

What does this experience tell us? That the bank did not conduct research with its users? That they did not consider the context of use? That the process was not mapped? That the task was not previously described? For these questions, perhaps the most appropriate answer is “yes and no”. It is possible that the bank carried out surveys, considering the clients' profiles and the context of use, in their own way. They might even have had the process mapped. But it is also possible the design was not validated or usability tested after the system went live. So, when the new demands were not met, they brought up not only the non-attendance of users' needs, but also the presence of possible system bugs.

There might also be an indirect impact on other users, other customers who want to use the ATM machine, people bothered with the queue that forms due to the delay in finishing the transaction, and so on. That means, a single, simple example might indirectly create a lot of problems, that could have been avoided if only the bank had done their research and validation.

In view of the above, considering the context of the users, especially when the researcher makes observations in the workplace, one can learn (Spool 2007): (1) processes and terminology: what users actually do and what terminology they use, as they do it, subtleties of their work which they do not realize; (2) context: what external

forces influence the design, if the needs change in extreme situations, details of the environment that the user does not know how to describe; (3) similarities and differences: by observing several participants, it is possible to identify more critical needs, which are common to most.

4 Final Thoughts

Currently accepted in several knowledge areas, the qualitative approach lends itself to the study of opinions, values or beliefs of a particular group, showing itself to be very useful in design because it allows a broader, more complete understanding of reality, enabling the generation of more detailed information about human experiences.

Back to the *gambiarras* example, it seems clear that they are bad for the user experience. Once a provisional and apparent solution is in place, it remains for a long time, since it gives the organization the false impression that the problem is no longer an issue. To the organization, there doesn't exist errors or failures that would justify the investment of time and resources. Analyzing and understanding how, when, where and why *gambiarras* happen, can enable us to promote a good user experience, by highlighting to us mainly what not to do for different cultural contexts.

Qualitative research, especially interviews and observation in the workplace, are essential to avoid the generalization and replication, so common in the business software realm. It is from the research with users, especially the one held in the workplace that the design can understand the context of use, the processes, the accomplishment of the task, the needs, the problems and the pains of the user, within their cultural context.

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