Design and Usability: A Case Study on Selecting Exhibitors for the National Fair of Craftwork – FENEARTE - Recife, PE, Brazil

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Abstract. The article describes how virtual tools and processes were constructed to develop and manage the processes of registering and selecting craft workers from Pernambuco for the XI and XII National Fair of Craftwork Business – FENEARTE. The processes and tools were developed by *O Imaginário* Design Laboratory, Federal University of Pernambuco, from the perspective of adhering to the 10 heuristics described by Nielsen [1]. The main results indicate to the individual FENEARTE exhibitors qualification of portfolio and a knowledge base built about craftwork activities. These were actions that guaranteed more effective, efficient and transparent results besides reinforcing the importance of the contribution of research and university outreach activities towards social transformations.

Keywords: Design, usability, craftwork, virtual tools, heuristics.

1   Introduction

Fenearte, the largest craftwork fair in Latin America (Figure 1) is one of the actions of PAPE - the Program for Craftwork in Pernambuco, sponsored by the Agency for the Economic Development of Pernambuco - AD/Diper, through its Directorate for Promoting a Creative Economy and mounted by the Instituto 12 de março - Recife Convention and Visitors Bureau. This Fair, conceived with a view to enhancing, promoting and stimulating the economic potential of craftwork activity in Pernambuco, has been held since 2000 in the Fairs Pavilion of the Convention Center of Pernambuco, the total internal and external area of which is 29,000 m². The Fair takes place every year, always from the first Friday of July and remains open to visitors for ten days, until the second Sunday of that month.

A survey on the profile of visitors [2] made at the 2011 Fair showed the most frequent visitors to it were: women (67%), with an income of over R$ 2,075.00/month (32%), who were between 26 and 45 years old (45%) and hold a higher education degree (53%). The survey also showed that 96.4% of visitors found their expectations were met or exceeded, indicating that the diversity of products, comfort and organization are great strengths of the event.

Fig. 1. Entrance to XII Fenearte 2011

The Fair has kept on improving over its first twelve years, with increasing impact, as shown in Table 1, in which the advances of the last six events are recorded.

Table 1. Information on Fenearte (2007-2012) - Source: AD/Diper and authors´ research

Edição	Year	Area (yd²)	Number of stands	Number of exhibitors	Turnover (Brazilian Real)	Visitors
VIII Fenearte	2007	26	600	2,500	18 million	220,000
IX Fenearte	2008	30	750	3,200	22 million	250,000
X Fenearte	2009	30	800	3,775	27 million	270,000
XI Fenearte	2010	35	800	4,500	28 million	275,000
XII Fenearte	2011	35	800	4,530	33 million	290,000
XIII Fenearte	2012	35	800	5,000	40 million	312,000

The spaces set aside for the Individual Exhibitors of Pernambuco[1] in 2010 and 2011 accounted for 34% of the total floor area, this being the category with the largest presence at the Fair and the one with the highest rate of competition for the stands made available.

For each new event, those interested in taking part in Fenearte undertake a registration process, in which the whole of each craft worker's output is evaluated. If selected by the committee, the craft worker proceeds to choosing the position of his/her stand on the Fair's floor plan (by following the order established by public lottery), signing the contract and other legal requirements.

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[1] Individual exhibitors from Pernambuco are craftsmen and craftswomen, in the form of the self-employed or companies, who bid for the space as free-lancers, and who would otherwise have their participation linked to State city halls or associations, which have their own selection criteria.

Until 2009, on the occasion of X Fenearte, the registration and selection process for taking part in the Fair was still conducted internally by a small team from AD/Diper, based on a form printed which provided little information and on an undefined number of photos without standardized formatting. This systematics caused the evaluation team much trouble both because of the lack of transparency and due to those craft workers not selected venting their frustration.

The aim of this paper is to present a comparative analysis between the virtual tool for registering individual exhibitors from Pernambuco to participate in the XI and XII Feneartes - National Fair[2] of Craftwork Business, Recife - Brazil, developed by the team from the *O Imaginário* Design Laboratory of UFPE and 10 heuristics proposed by Nilsen [1].

To seek solutions that might improve the processes and instruments for registering and selecting craft workers from Pernambuco and so as to understand the problem, the dialectical approach [4] was used and as to the method for the procedure, this was a case study [5], which with the aid of comparative analysis enabled convergences and divergences to be identified between the interests of the agents involved: State government, craft workers and experts. Thereafter, the foundations of a new format were constructed for the registration and selection process.

2   Process of Developing the Virtual Tool

The first activity was to analyze the information available regarding the historical series of the period between 2007 and 2009. The registration and selection process was shown to have vulnerability of various kinds: conceptual, credibility, and archiving information and, especially, the lack of interaction between craft workers and members of the selection committee, the activities being predominantly face-to-face and extensive use of paper documentation being made.

The association of concepts and techniques of cognitive ergonomics and design was intended to make technical solutions compatible with users' characteristics and needs, and to incorporate innovations when constructing new processes, and as well as developing virtual tools, in line with the concept of cognitive ergonomics [6] which "refers to mental processes such as perception, memory, reasoning, and motor response, to the extent that they affect interactions among humans and other elements of a system."

To do so, a review was conducted of the processes previously adopted when constructing and validating a new proposition for classifying craftwork production in the State, with the selection committee. This joint construction between consultants, the selection committee and the AD/Diper team assured there was a shared conceptual base, which made members of the selection committee more comfortable and secure about giving values in their assessments.

In parallel, the support given to the development of friendly computer programs, used by both by craftsmen and members of the selection committee, and made available through the Internet, optimized time and facilitated the participation of craft workers

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[2] Making use of the most practical and traditional concept used to define Fairs, which is, above all, a meeting point between those interested in selling and those interested in buying [3].

from around the State. The monitoring and the use of graphical and management tools lent support to the process, which also featured publishing manuals that guided craft workers and the selection committee, and making support teams available face-to-face and remotely.

3   Conceptual Bases: Cognitive Ergonomics, Usability of Software and Heuristics

The difference between the machines of the automation era dealt with in the ergonomics of information and the machines of the era of computerization dealt with in cognitive ergonomics is very important: the former act as extensions to expand the physical action of a human being while the latter act as extensions of the brain [7].

Cognitive ergonomics is directly related to the ergonomics of software acting at the level of human-computer interaction to ensure that skills and human capabilities are considered when designing a software interface.

The objective is that software designers can build easy-to-use systems and cover the whole process of generating software, ranging from analysis, through specification, design, testing to assessment for replicability.

In the work environment in any human-machine interaction, there will always be at least three aspects: physical, cognitive and psychological ones. These aspects are interrelated although an overload in one aspect is not necessarily accompanied by a heavy load on the other two [7].

In any software development what is sought is an internal quality, called usability and a quality of use represented by effectiveness, productivity, safety and satisfaction.

The set of heuristics, such as those built up in 1995 by Jakob Nielsen [8] aim at addressing all the problems identifiable from a generic interface. Nielsen's heuristics are classic and relevant, though not exhaustive, as there are many other aspects not considered, for example, those presented in the focus of semiotic heuristics.

It is worth pointing out that heuristics is the synthesis of a greater knowledge, a constant and structured reminder of which enables the group responsible for development to keep the focus on usability throughout the project with the consequent minimization of efforts during the development of the work [9].

To develop the virtual tools described here, a group, coordinated by the *O Imaginário* Laboratory, was formed of experts in web interface programming, specialists in concepts of craft work and folk art, representatives of government agencies responsible for policies on promoting and developing craftwork production and by end users of the registration virtual tools (craft workers) and assessors (members of the selection committee).

4   Methodology and Development of the Virtual Tools

As previously described, participation in Fenearte is preceded by a selection process consisting of two stages: one for registering applicants and the other which deals with the selection itself.

In the registration stage, the aim, besides that of seeking information about the pieces and the whole work of the craft worker, was that of supporting the selection, and prompting the craft worker to reflect on his/her own production. The medium for this reflection was the detailed description of the production chain, from obtaining the raw material to what to do with any waste; and questioning on the possibilities for setting their work in a conceptual framework, which could vary between the classifications: popular art, traditional crafts, non-traditional crafts, plastic arts, manual works or semi-industrialized works. It is important to remember that the conceptual basis and the selection criteria and their respective weights were constructed previously by the selection committee, in an environment of discussion and negotiation, which operated throughout the management of the process.

The premise for planning and constructing the virtual tool for registration was to bring it close to the logic of making craftwork, which enabled the experience to become more user friendly, because even though most craft workers were not familiar with how to use computers, they had little difficulty. Filling in data (Figure 2) was organized into six large blocks: personal data; identifying the piece to be evaluated; raw materials and method of making; how he/she learned his trade and workers involved in the production; marketing and transportation; images of the products, and finally, choosing how to classify their production in line with the concepts laid down.

After starting filling in data, the registration tool issued a protocol number, with which the craftsman could complement their registration until the deadline set. The tool also gave information on evaluation criteria and weights, which facilitated choosing the classification.

The virtual tool created for the selection committee had similar features with some advantages: the information filled in by the craft workers was arranged on a single screen, thus facilitating the work of the assessor; images could be seen more clearly by using the zoom tool; and the process of giving scores was supported with information about concepts, criteria and weights. To make a better comparative assessment, the selection tool ranked registrations by the score given, thus enabling it to be instantly known which submissions would be incorporated into the Fair up to that moment. The virtual tool also offered the assessor the possibility of changing his/her assessment until the deadline. Usability conferred best performance for the assessor and less stress on his/her decision making, because it could be accessed as per their availability of time and place.

Besides the advantages presented, incorporating the concepts and design tools brought other gains to the registration and selection process, including: the creation of an extensive database of craftwork producers, which can support public policies that target the segment; the possibility of replicating the system in other selection situations and especially having a larger number of more qualified assessors at a reasonable cost because of the possibility of conducting selective processes by remote access.

For the group of consultants from *O Imaginário* Laboratory, the importance of the task was clear, and although recognizing that the heuristics could be developed individually, the collective, constant and structured construction helped keep the focus on usability throughout the process, and thus minimized efforts during the development of the project.
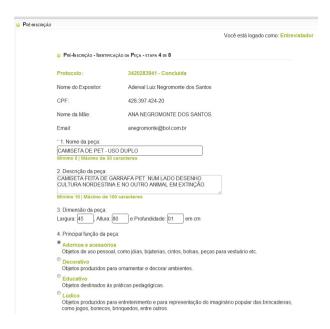
Fig. 2. Screenshot of the Pre-registration Virtual Tool

Nevertheless, as it is rare to perceive errors in one´s own work, it is essential to proceed to a heuristic, economic and objective evaluation, this being the test of usability with future users who were not involved in the development stage.

Testing with real users is the best way to find flaws in the design of the interface. By means of this process, the most critical errors of usability of the interface can be identified quickly and economically.

If problems are found in this evaluation that have nothing to do with any of the predefined heuristics, this is indicative that a new heuristic should be created [1]. And thus minimizing the problems of system usability evolves when setting the most appropriate heuristics.

Before making the final version of the registration tool available as a web page, compatible with the browsers most used, a test in a closed beta version was conducted for a target audience of 10 users with similar features to those of the end users.

The test was divided into two stages. In the first, more informal one, users browsed freely using the virtual tool and gave their opinion on appearance, usability, etc. These still subjective data, although valuable, do not point up usability errors. In the second stage, the more objective one, users should follow a list of tasks, such as locating the instruction manual, establishing a classification, inserting images, identifying the weights of each criterion, leaving the registration open for future modifications, and so forth. When difficulties were identified, a review of the functionality of buttons and interactions was conducted.

The registration tool was used by nearly 650 craft workers in its first year (2010) and more than 700 in 2011, there being a gradual reduction in the activation of the support channels offered, namely: face-to-face, by telephone and by email.

5   Comparative Analysis: Virtual Tool and Nielsen´S Heurístics

The comparative analysis between the heuristics proposed by Nielsen [8] and the function of the virtual registration tool aim to identify the main examples of adhesion, as can be seen in Table 2.

Table 2. Comparative analysis of Nilsen´s heurístics and the funcionalities of the virtual tool

Nielsen´s Heurístics	Funcionalities of the tool
Feedback	
- The system should continuously inform the user about what he/she is doing; - 10 seconds is the limit for keeping the user's attention focused on the dialogue.	The tool had a header, which gave information on registration status (whether completed or in progress) and at what stage of the process it was. The questions were short, quick to read and easy to understand.
Speak the user´s language	
- The terminology should be based on the user's language and not be system-oriented. Information should be organized as per the user's mental model.	The sequence of questions is analogous to the craft worker´s production process: the collection of raw material passing through its being prepared, the construction of the piece, finishing, the destination of waste, transportation and marketing, etc. Only at the end of this process, which encourages reflection about the work itself, should the craft worker choose the classification by pondering on the concept, examples and the weights of each available option.
Exits clearly determined	
- The user controls the system, may, at any time, abort a task, or undo an operation and return to the previous state.	At all stages, the user could go back to the previous step, and whereas he/she might conclude the process he/she could enter again and change what he/she might have deemed necessary by means of the protocol number. These changes could be made as often as necessary, until the deadline of the process.
Consistency	
- A single command or action must always have the same effect; - The same operation must be presented at the same location and must be formatted/presented in the same way to facilitate recognition.	The standardization of colors, locations, types, and sizes of letters and signs were designed to facilitate understanding, including being repeated in subsequent years, when reapplying the registration tool.
Preventing errors	
- Avoiding error situations; - Knowing the situations that most provoke errors and modifying the interface so that these errors do not occur.	When filling in the information, they were told: the limits of the choice (when multiple choice); what characters were available (when textual responses), and how many images of the products were needed. When these limits were not respected, was shown a pop-up warning was shown when they tried to advance the process, stating in what question or stage there was inconsistency.

Table 2. *(Continued)*

Nielsen´s Heurístics	Funcionalities of the tool
Minimizing overloading the user´s memory	
- The system should show the elements of dialogue and allow the user to make their choices without the need to remember a specific command.	There are no commands via the keyboard such as shortcuts or pre-determined functions, each answer being given via typing text or selecting from a set of options.
Short-cuts	
- So that experienced users may perform operations more quickly; - Abbreviations, function keys, double click on the mouse, back function in hypertext systems; - Shortcuts also serve to retrieve information that is at a depth in the browser tree starting from the main interface.	For security reasons and bearing in mind the user profile of the virtual tool, the latter needs a sequence of steps that cannot be changed. However there are forward and back buttons on each page.
Simple and natural dialogues	
- You must submit the exact information that the user needs at the moment should be presented, neither more nor less; - The sequence of the interaction and access to the objects and operations should be consistent with the way in which the user performs his/her tasks.	The structure of the virtual tool was simple, without images or elements that could divert attention; the questions were synthetic for objective answers, always presenting the limitations of the number of characters or choices.
Good error messages	
- Plain language and no codes; - Should help the user to understand and solve the problem; - Should not blame or intimidate the user.	The message "registration complete" appeared only when registration was finished after all data were entered, and if there were any fields left blank or errors in completion, a pop-up appeared giving information on the field, the nature of the error and in which question it occurred.
Help and documentation	
- The ideal is that the software is so easy to use (intuitively) that there is no need for help or documentation; - If necessary, help should be easily accessible online.	To guide completion, there was an on-line manual integrated with explanations of all the questions and a completed example. However, it is known that manuals are not pre-read, so that in each question there was a mouse-over guideline on the respective answer field.

One of the challenges of developing the virtual tool was to design an environment that was familiar to the craft workers who very often have little formal education and even less familiarity with using computers. Thus, the use of Nielsen´s 10 heuristics facilitated the development of the virtual tool for registration and expanded its efficiency, such as by using the heuristic "Speak the user's language", one of the key pillars when organizing questions in the virtual registration tool.

6   Conclusions

In 2008 and 2009, the *O Imaginário* Laboratory joined the AD/ Diper team only as a member of the selection team, representing the Federal University of Pernambuco. It was only in 2010 and 2011 that the Laboratory coordinated the application and selection process and, simultaneously continued to represent the University as a member of the selection committee. The experience from previous years certainly facilitated understanding the process as a whole, but without the political will of AD/ Diper it would not have been possible to implement the new system.

The use of Nielsen´s heuristics as the foundation for developing the tool enabled the process to be managed, the tasks to be undertaken to see to it that the portfolio of individual exhibitors from Pernambuco qualifies for XI and XII Fenearte, thus constructing a knowledge base that may well be of great value in future Fairs or similar events that take place annually in various parts of Brazil and the world.

Objectively, there was a 3.6% increase in the supply /demand ratio for stands at the Fair between 2010 and 2011, and the following year, it was 26.6%. These numbers represent the wish of craft workers to participate in an event that sees a year-on-year increase in the number of visitors and cash turnover. Given that 724 works were entered for the 2012 Fair, and knowing that this number represents only 10% of the current number of registered craft workers in the State, what is important is to have a strategic format for making selections, objectively, transparently, suitably and fairly.

In summary, considering that about 7 million Brazilians are involved in the craftwork segment, further research in this area is justified as are actions that have become strategic for the sustainable development of various regions in Brazil.

This experience demonstrates the importance of involving design with process management and developing virtual tools, thus ensuring more effective, efficient and transparent results; and it reinforces the importance of the contribution of research and university outreach activities towards social transformations.

References

1. Nielsen, J.: 10 Usability Heuristics,
   `http://www.nngroup.com/articles/ten-usability-heuristics/`
2. AD/Diper. KIT encarte e CD-ROM para apresentação da XII Fenearte a patrocinadores potenciais. AD/Diper, Recife (2011)
3. AD/Diper. Manual do expositor da XII Fenearte. AD/Diper, Recife (2011)
4. Vergara, Silvia. Métodos de pesquisa em administração. Atlas, São Paulo (2006)
5. Yin, R.: Estudo de caso: planejamento e métodos. Atlas, São Paulo (2005)
6. IEA, `http://www.iea.cc/01_what/What%20is%20Ergonomics.html`
7. Guimarães, L.B., De, M.: Ergonomia Cognitiva. Produto e Produção. Editora da UFRS, Porto Alegre (2001)
8. van Amatel, F.: Usabilidade para o Design de Interação: as 10 heurísticas de Nielsen, `http://www.usabilidoido.com.br/as_10_heuristicas_de_nielsen_.html`
9. Holliday, O.: Para sistematizar experiências. Editora da UFPB, João Pessoa (1996)