

Proposal of digital interface for the system of the air conditioner's remote control: analysis of the system of feedback

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Abstract. Develop a proposal of digital interface for the system of the remote control, that functions as support system during the manipulation of air conditioner adjusted for the users in general, from ergonomic parameters, objectifying the reduction of the problems faced for the user and improving the process. Participants: 20 people with questionnaire with both qualitative and quantitative level. Linear Method consists of a sequence of steps in which the input of one of them depends on the output from the previous one, although they are independent. The process of feedback, when necessary, must occur within each step separately.

Keywords: Feedback.User.Remote Control. Usability.

1. Introduction

Today it is unthinkable to live without remote controls which is an electronic device. In a middle-class home at least four remote controls, demonstrate that they are more than facilitators of modern life, the remotes are a fundamental part of the world we know today.

At the interface of the remote control air-conditioner in the absence of icons is harmful to the user in understanding what hinders the full use of the services provided by the device. How can design work together to facilitate the use of user's interface?

According to data from surveys conducted during the user ID found that more than about 59% of users use the services of the air conditioner with remote control and among them only 7% say they have a good satisfaction in the use of its interface.

From these observations, we suggest that a computerized system, construct from sound and

visual languages designed specifically to meet the handling of the users, can facilitate and improve the quality of the remote control with the operation of this system as is meeting all requirements.

2. Methodology

The methodology to be used for this intervention, in proposing improvements in the interface of the air conditioner's remote control, focuses on the concepts of ergonomics through human-machine interaction - SHM that, as McCormick (1980 apud MORAES, 2000) "a man-machine system is the operative combination of one or more men with one or more components, from data elements (input), certain results, considering the limitations imposed by a data environment."

The interface and the equipment that surrounds the former execution activities of tasks in the use of air conditions. With a systemic approach and vision of

the IHC, ergonomist proposed by Professor Dr. Anamaria de Moraes, in her book "Ergonomics: Concepts and Applications," will address the following steps:

- Ergonomic Assessment - Exploratory mapping of ergonomic problems;
- Diagnose ergonomic - deepening and prioritization of problems encountered, macro-ergonomic analysis considering the ambience of technology, organizational and physical environment;
- Ergonomic design by - suitability of jobs to the physiological and anthropometric workers, the proper execution of tasks and the needs and constraints of the system.

3. Ergonomic Assessment

By assessing ergonomic, we have the first contacts with the target system to be studied, this is an exploratory stage where we identify ergonomic problems, most notably in a first moment, which generates difficulties of use, we believe the system works.

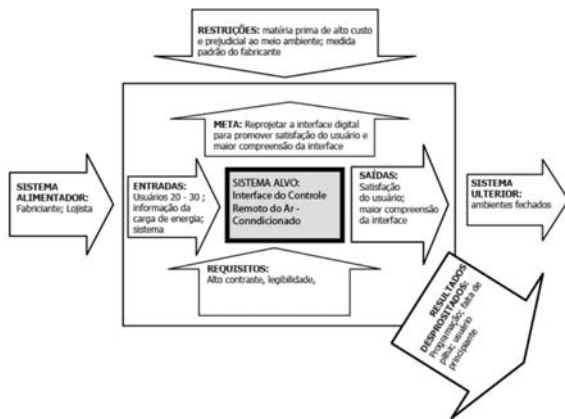


Fig. 1 Characterization and Serial Position System

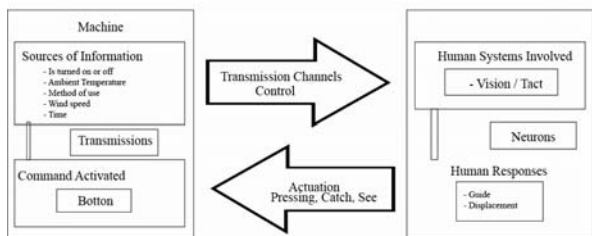


Fig. 2 Communicational Modeling System

3.1. Problematization Illustrated

Informational / Visual - weaknesses in detection, discrimination and identification of information, screens, panels, displays and signs, resulting from poor visibility, readability and comprehensibility of visual signs, with damage to the perception and decision making.



Fig. 3 Air Conditioner's Remote Control Interface

Table with ergonomic advice was possible to identify the class of problem: in this case we have two classes of problems - informational and cognitive, the problem – no feedback and lack of compression in icons, what the possible solution to this problem - develop feedback system and redesign of the interface, their icons and their disposal, the constraints which the user is due to the problem - repeat the same task multiple times and identification of the function of the icon or button, the human costs of work - frustration, fatigue and irritability, the malfunctioning of the system - prevents the continuation of the next steps of action of the function and delay in carrying out the task or the failure. So we can generate the table and assess your points GUT and than prioritize the problem.

Table 1
GUT – Gravity, Emergency and Trend

	G		U		T	
iconography that hampers the use and understanding of the system	3	X	2	X	2	12
absence of information of the action taken	4	X	3	X	4	48

4. Ergonomic Diagnosis

At this stage, we focused our efforts on the identified problems, at first, in the stage of assessing ergonomic, in order to confirm them or refute them. For this work with the questionnaires. With the preliminary analysis found that the lack of a feedback system which causes the user to repeat the same action multiple times and generate constraints in user frustration. Quiz 20 questions with both qualitative and quantitative research to gather data and verify the problem with the interface. Applied with 20 peoples with age, education varied level.

4.1. Posture Records

To prove the hypothesis previously reported observations were developed based on a task: set the clock of the air conditioner's remote control and that also allows us to evaluate the system as a whole.

The tests were performed just as a very close situation of the user's reality using the control. Where a camera was used to make records of these actions. With the results of the applied tests, we discovered that the absence of information of the action taken and a serious problem and that actually reaches the user. With the result of applying the tests, we found that the absence of information of the action taken and a serious problem and that actually reaches the user.

Job's Analysis - The task will be analyzed: run "turbo" mode. For the task you need the air conditioner, which should be connected to an electric current, the same control with batteries for its operation and the user will manipulate the remote control.

Prescribed activity – The user should take the remote control with his/her hands and point it to the device that should be in "Cool" mode and remain pointing until the end of the task, then click the "turbo".

Performed Activity - The user can take the remote control with his/her hands, point to the device at the beginning or at the end of the task (before clicking the "turbo") , the device must be running and working as "Cool", "Auto" or "Heat" mode, then click "turbo".

5. Ergonomic Design

This is the moment to start adapting the system as discussed in the ergonomically diagnosis.

Concept Design the usability can be understood as the capacity in functional terms, a system been used easily and efficiently by the user. Moraes (1999) lists the key factors related to the scope of the term usability: ease of learning, effectiveness, attitude, flexibility, perceived usefulness of the product, suitability to task, task characteristics and user's characteristics. Analyzing interface similar brands, we can recognize the strengths and weaknesses of the interface as for example:

Strengths - large screen size, background color with contrasted with the source for reading; font size of text and pictograms, among others.

Weaknesses - it has no system of feedback for completed actions, difficulty in understanding the symbols, among others.

With these data plus the result of brainstorming was possible to make the three alternatives to solve the problem with the highest score in the table GUT - gravity, urgency, and that trend had 48 points for lack of feedback for action completed.

The first option "OK" message pop up when the user ends action, the second audible alarm option, and the third option vibration system.

5.1. Alternative Choices

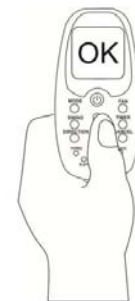


Fig. 4 The pop-up is used to open any extra information. Faster and cheaper to respond user's activity, if it's completed or not.

References

- [1] Moraes, Anamaria from. Ergonomics: concepts and applications / Anamaria de Moraes, Cláudia Mont'Alvão - Rio de Janeiro: 2AB, 2009 (3rd. Ed.)
- [2] Santa Rosa, Jose Guilherme. Evaluation and design interface design / José Guilherme Santa Rosa, Anamaria de Moraes - 1 ed. - Teresopolis, RJ: 2ab, 2008.
- [3] Cybis, Walter. Ergonomics and usability: knowledge, methods and applications / Walter Cybis, Adriana Holtz Betiol, Richard Faust. 2ed. New York: Novatec Editora, 2010.