Evaluating interfaces and users' profiles

Introduction

To show the relevance of the process of User Centered Design, particularly the stages of inquiring and evaluation when involving real users is crucial to thoroughly approach them. It is important to establish consistency of interface design complexity accordingly to the user's experience, to properly drive the design process by defining the level of development of a project. Design Process could be defined as a set of successive steps that aim at finding a solution to interface design. A set of qualitative and quantitative data could be gathered when approaching to Users taking them into account as a systemic element, which in integration with the other subsystem elements (Object, environment, and Activity) allows arising information to be identified, collected and with it, feeding the design process.

1. Introduction

The design process “generally emphasizes the importance of generating a solution concept at an early stage of the process, thus reflecting the nature of design thinking aimed at problem solution. This initial solution conjecture is then subjected to an analysis, evaluation, refinement, and development. Sometimes of course, the analysis and evaluation stages show fundamental flaws in the initial guess, and therefore it has to be abandoned, generating a new design concept and starting the cycle again. (Cross, 2008)” “Well defined problems have a clear goal, right answers and rules or well-known procedures that should gather an answer. The characteristics of not well defined (or wicked problem) could be the following”(Cross, 2008).

In the field of applied ergonomics to Interface Design (which considers people, activities, mediating objects of these activities and the use environment) it has been an increasing interest to integrate the users during the development process of those interfaces; the named User Centered Design (UCD) approach considers diverse kind of evaluations, which allows to observe the level of development reached out in a specific design process.

Three techniques that help define user profiles are considered: designing user profile, scenarios and use and design requirements.

Figure 1. User Centered Design Process (UCDP) model from ergonomics perspective

In order to improve the inquiry stage of the design process through that approach, it is been resorted to using diverse techniques that provide qualitative and quantitative data, necessary to include the social, emotional and cognitive user's characteristics during the development of the interface design.
• Inquiring about the problem to solve. It provides starting information, useful in defining what aspects will be considered at the project.

• Definition of the system. In which is needed to establish a context of use, who the Users are, what is the activity developed by the Users, which objects do mediate such activity, features of the environment of use that may impact positively or negatively in the task, in other words, definition of the system narrows the system boundaries.

• Definition of variables: It means to be aware of which aspects we want to control or to observe during the design process.

• Definition of instruments. There are selected the correct type of appropriate instruments to obtain the required information. It refers to the media that allows obtaining qualitative or quantitative information relating to any (cognitive, physical, emotional or social) human dimension.

• Evaluation; at this stage, there are used different instruments to measure or to observe the interaction of the system’s elements, in order to determine if there are found problems in both, the design process and the resulting design proposal obtained.

• Modeling. This stage is carried out considering the information gained from the feedback process promoted by the assessment stage so, it is based on real users profile and not only on a hypothetical one.

• Communication. This is the stage where are already known the technical, formal and of use qualities of the product, and are about to be communicated to who will carry out the process of completing the prototype.

• Prototyping. It gives a detailed caption of the specific product qualities for doing or manufacturing it.

Figure 2. User Centered Design Process (UCDP) model (Mercado, 2014) main stages

Those inquiring and evaluating stages are tightly linked, because specifications corresponding to the inquiring stage, done during problematization, are the ones that must be evaluated and assessed across the design process.

For instance, during the inquiry stage and after analysis of the information the following aspects are determined: the necessity or problem to solve, the objectives persecuted, the system’s limits, the attentional focus must be set, the design restrictions must be stipulated and precise evaluation criteria are established for the final solution. Moreover, the design applied assessment is a process that allows to identify the level of development of a project with respect to the established objectives, because through the application of several tools, useful data are obtained that allow the formulation of judgments for decision making, that will provide feedback to the design team to continue to refine the process and outcome of the design project.

At the inquiring stage is crucial to firstly address the question “what will solve the problem” (problematize) and secondly, is mandatory to explain how to do it (conceptualize); thirdly, to present solutions (models) during development stage, and finally, to assess the characteristics of each possible solution in the evaluate stage.

The assessment is a process of obtaining information and using it through the application of methods and techniques that allow identifying the level of development of a project with respect to the objectives previously specified. The main goal of assessment stage is making useful judgments for decisions making, i.e. allows feed backing design team during the design process.

At this point is useful to clarify when referring to evaluations in UCD processes, that are classified according to their purpose (diagnosis, formative or summative); the moment of its application in the Design process (early or late); those are also segmented accordingly on the type of participants in the test (beginners, advanced or experts users); or depending on the kind of the observed data (qualitative or quantitative); evaluations are even segmented by the User’s dimensions to be assessed (physical, cognitive social or affective).

Generally, when each project design is developed, it should be determined all useful aspects that would feed the design process. The growing concern of designing products that meet the needs of
users from their perspective -and not designer’s- has revealed the advantages of applying the UCDP. These processes are characterized among others by:

- Integration of end-users in the stages of investigation and evaluation.
- There is an appropriate distribution of the cognitive demands of objects with Users.
- Iterative design solutions allow feedback the whole process.
- Approaching to problem has a systemic vision.
- Capabilities and limitations of users in their physical, cognitive, emotional, and social dimensions are clearly identified.
- The products of design process (resulting designs) are evaluated at some point validating it.

By emphasizing the inclusion of end-user in the interfaces for interactive systems designing process, accentuates at this process Users are considered in a systemic context. This means that the user’s characteristics, as well as the objects which mediate its activities at specific use environments when interaction is to be carried out.

Design processes focused on people consider -as a fundamental part of its focus- the possibility to identify, to capture and to evaluate the results of these processes in function of user goals, and the objectives of the project meaning, it is not only important the process but the result.

Since the 80’s of last century, Design has been enriched by a number of approaches that promote product development teams to approach people who should use these products. This phenomenon has been considered in different ways. From one that rises only an approach for getting general characteristics related to desires, behavioral, aspirational or motivational of users, to another which integrates Users in the development groups, and even reaching out a processes of co-creation. Such approach has led to gain a better understanding of Users as of their motivations and needs, positively impacting the search for efficient processes to get effective and more satisfying products, easy to use for different types of users.

In any case, it is important to consider in a way, part of the success development of the design process rely on the accuracy with designers get know Users, as well as on the designer’s skills to convert the contextual information –including individual characteristics- in design features which optimally respond to User’s needs.

2. Speaking of Users

To speak about User in terms of design should mean we know the identity of the people for whom a design is directed. However, quite often User is mentioned as a formless, aimless subject, without differentiated skills, without previous experience that could aid guiding designers -to designate- how the way interaction with design products should be.

Nevertheless, during the lapse of interaction with products Users expresses their selves, leading and reflect their experiences, their skills and knowledge in various ways, and is for this reason and aiming to get closer to the observation of users and their differences, here are stated some aspects that are intended to help identify aspects of the design process that would allow defining the User’s characteristics: the User profile.

The User Centered Design is a tool that focuses on the design process to encourage development teams have a realistic approach to Users, with the aim of knowing and designing for real people who have needs, constraints, opportunities and expectations.

2.1 The systemic perspective and its relationship to the requirements

To ensure the phases and the result of the User Centered Design Process applied to the development of interfaces is being satisfactory and efficient, it is necessary to observe the interaction of the system (user -object- activity - environment [ uoae ] ) running simultaneously, and observe emerging information from such interaction ,meaning those features which arise from the interaction of specific variables considered in that system; to observe how the variables (uoae) are related , how does impact each other to define the technological and of usage characteristics, and of interface design in an interactive system.
• In systems, variables have a common goal.
• All variables are impacting each other (interdependent).
• All variables are interrelated.
• Emerging characteristics of the system are observable and in these:
  o “A User is involved.
  o That User is doing something.
  o That User is doing something with a product, system, or other things” (Tullis, 2008).
  o That User is doing something with a product in a specific use of context.
  o The capabilities and limitations of Users in their physical, cognitive, emotional and social dimensions are considered, related those with the User activities with the product, and having a perspective in which the observation of information allows be both, qualitative and quantitative.

![Figure 3. Systemic Map](image)

Through the analysis system (uoae) is feasible to identify how will relations of binomial variables would be, user-environment, environment-activity, activity-object, object-user; the interrelation of these variables will identify the conditions, resources, knowledge and skills required by the user to interact with the system; This helps to define the limits and scope of the system, which promotes knowledge of the context in which target Users will be involved.

During the inquiring stage is necessary to address the information what will solve the problem (problematize); This involves knowing who, what, when, where and how the system and its interaction variables work, taking into account user-object-activity-environment variables, which obviously consist of raw material for the definition of the system development.

An evaluation of interface design should observe all aspects that impact on the User interaction - with the interface and the environment of use-, i.e. systemic approach must aid responding to the questions: Why to evaluate?, What to evaluate?, Where to assess?, When to evaluate?; all questions are associated with the objective of design aim of evaluating the complexity of interfaces related to the User experience (which involves affective, cognitive, physical and social aspects) so
that the methods, techniques and tools for inquiry or evaluate must be properly selected and applied during the interfaces design process.

Evaluation of the interface is useful for feedback during the design process. Such evaluation requires considering consistency between interface complexity and experiences of users, and because that it is important to define a typology of the user, centered in the relation of user-object-activity.

This implies that it is necessary to determine the objectives that meet the designed object in that the objective is related to the characteristics to be evaluated, if there are not an objective, evaluations should not be useful to feedback processes, neither can be set the level of development reached a project when complete.

2.2 The Tools

In the User Centered Design processes there are two stages that are particularly sensitive due to involve Users: The inquiring (stage where problematization is done, leading to a definition) and the assessment of the solutions obtained or evaluation. Both are of paramount importance in the UCDP cause it is in these, where materializes the possibility of integrating Users at various levels, given that at the inquiry process is required approaching to Users in order to obtain useful information for problematization, and at the evaluation stage is feasible to compare the level of development achieved in the solutions to the problem. During problematization arises the need to implement tools to help determining which variables are interrelated. This is a particularly sensitive stage to define the User’s characteristics.

The stages of inquiry and evaluation are necessary in order to use a technique of investigation. The research technique is a step, a tool for both qualitative and quantitative information. There are various User Centered Design appraisal strategies which provide -both objective and subjective data- useful to measure results of a design process, as well as provide an approach to the development of a design process itself, with tools that allow early or overall assessment of each design process stage.

To make an assessment (and identify systemic relationships established between the variables of the design process of interactive systems interfaces) it is needed to considerer the application of methods and tools that would incorporate human factors considerations into the process of designing and evaluating human-computer interfaces which would:

- Be usable also by non-human factors specialists (e.g., interface designers) for
- whom direct availability of human factors results is important;
- Be explicit so as to permit measurements, and sufficiently standardized to be replicated.1
- Consider the goals, desires, knowledge and skills in design.
- Determine the demands that will have the object to the user (cognitive, physical, emotional) and demands User should have over the object (response times, performance, capacity).

2.3 Person- Scenario- Requirements.

The analysis of the characteristics possessed by people (previous experiences, attitudes, knowledge, technical skills, etc.) is required to determine the characteristics of the interface, in terms of their level of complexity, cognitive or physical demands that does the object to the User, to interact in a satisfactory and efficient manner and demands that the user makes the object considering its technical and operational characteristics.

In order to define the user’s typology, it is necessary to know the mental model expert, advanced and novice users have. Accordingly with Romero (2002) some aspects of the mental models evolution phases are as follow.

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1º stage: The novices:
- Dominance of perceptual aspects
- Knowledge transference from previous environments

2º stage: The “concrete” expert (advanced):
- Interpretation according to an entrenched but inaccurate mental model.
- Disorientation in the face of novel and scarce flexibility. Conservative style of navigation
- Quick decision making but frequent errors.

3rd stage: The expert
- Capacity of transferring knowledge into new situations
- Rapidity and precision in execution

The way users solve problems, is based on the type of experience that has been exposed and the goals he or she have to use that object.

Some of the important aspects to define user’s profiles (not necessarily a unique profile expertiz level) should consider the patterns of group behavior and the differences that distinguish different groups within a population.

Another aspect to be considered is the User’s goals are related to the reason which he or she uses an object. For this reason it is vital throughout the design process to define a lens with a systemic vision, ie Who used the object or system? (User), what need requires solving? (Activity) What object solves this need? (Object) Where does the object is used? (Environment), allowing saying that a systemic process considers the user, carrying out development activities mediated by objects in a specific application environment. The filters that allow contextualizing goals among others are: the desires, needs, motivations, habits, attitudes and context of the user.

User profiles are connected to the scenarios putting in context the characteristics of users and their responses (actions) during interaction with system.

The scenarios allow understanding people, the difficulties faced during the processes of interaction, how they solve problems that are presented and decisions that are active in the process. To meet the people it is needed to apply a set of techniques that allow the observation of information which would be valued in the context of user goals and design objectives.

Scenario planning (narratives) is useful for describing how the scenario can aid defining the requirements for interface design by focusing on the action of the user with the system. Requirements should establish the specific characteristics of use, performance and technological aspects, meaning how the system is, what it does and how it does it.

The scenarios describe how tasks are performed with the system, these can include other actors. The scenarios are linked to the processes of inquiry and evaluation to jeopardize the relationship of the various users with the features of the interface. It is possible to construct two scenarios, applicable at different times of the design process (inquiry and evaluation); it is also feasible to modified their level of complexity. The first type of scenario is linked to the inquiry and permits to describe perceptions, desires, motivations and interests of users, while the second relates to the evaluation process, both early and global assessments; The early ones to give feedback to the process and the global evaluation to determine the level of development that the process got.

It is important to delve into the techniques that help the designer to define and test user profiles, as well as to identify the nodes on which it is productive, given the level of feedback into the design process, that generates the insertion of users scenarios, development of strategies and techniques to define accurately which nodes would better allow test development conditions of the development process. Mediated by observing scenarios it can be set attributes to determine the technical characteristics, usage, and performance. This part of the observation of the characteristics of the design process, the inclusion of users in such process, the steps in which the designer has the ability to approach to Users in order to determine their characteristics and therefore, the object features that meet the User’s needs.
REFERENCES


