Theme #4: eQuality

Learners and quality; New approaches to quality; Quality and innovation

A user-centered design process to ensure the quality of the new e-classroom

(Work-in-progress)

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This work-in-progress describes the redesign of the virtual classroom using User-Centered Design (UCD) methodologies. The UCD approach is used to ensure the quality of the resulting virtual classroom so that it meets students' needs and expectations. This project began in September 2005 with the user requirements gathering phase. Focus groups, interviews and user tests with students and faculty were the techniques used to obtain information about the usage of the current classroom as well as its positive and negative aspects from the student point of view. These user requirements were the base for the iterative design process. Several prototypes of different fidelity were created and tested with students to evaluate their usability and added value. For Fall semester 2006 a set of pilot classrooms were launched to evaluate the new classroom in a real learning setting. With the results from this evaluation, a second set of test pilots will be run before deploying the new classroom university-wide. When this will happen, we can ensure that the new product is going to meet the learners' needs and that it will be useful and usable for them thanks to applying a UCD development process.

1. BACKGROUND

The UOC, in English, Open University of Catalonia, is a completely virtual university founded in 1995. It currently has more than 40,000 students and offers 19 official undergraduate degrees as well as several graduate programs. UOC's virtual campus is an integrated e-learning environment that allows students to pursue their studies completely online except for final exams when appropriate. The current platform was developed in 2001 and although modifications to the initial system are done on a regular basis, after five years with the same application, the virtual campus needs to improve in quality and users' satisfaction.

At the same time, in 2006, the Campus project was born from the will of nine Catalan universities and promoted by the Catalan government. This project aims to create a virtual campus in open source and under the license of General Public License (GPL). This campus will allow offering higher education both in a completely online fashion and combining online and offline for more than 300,000 students.

The key aspects of this project are what make it unique in the field of e-learning. First, this Campus will support up to 10,000 users connected at the same time. Second, the product design will follow a user-centered designed (UCD) approach. Third, the user interface will follow usability and accessibility principles and standards. This work-in-progress focuses on the second key aspect: the UCD process as a tool to guarantee the quality of the end product.

From a UCD perspective, the project follows the principles of ISO 13407 [2]: the active involvement of users and a clear understanding of the user and task requirements, an appropriate allocation of functions between users and technology, iteration of design solutions and multi-disciplinary design. Moreover, this international standard established in 1999 describes four user-centered design activities. We will see in this presentation how we will apply these activities in our project: understand and specify de context of use, specify the user and organizational requirements, evaluate designs against requirements and produce design solutions.

1.1 User profiles, personas, scenarios and needs

The Campus project is divided into 12 work packages, the first one being related to understanding and specifying the contexts of use as well as gathering the user requirements. Regarding the organizational requirements also mentioned by ISO 13407, in the case of the Campus project some are defined by e-learning

standards such as SCORM [3] and IMS [1] and others are institution-dependent. The output of the first work package is the knowledge of the user, the environment of use, and the tasks that he or she uses the product for.

The first step of this activity is to define the user profiles; that is to obtain a detailed description of the attributes of the Campus users (students, faculty and staff). These user profiles are defined based on quantitative data such as socio-demographic, psychographic and academic information. A qualitative analysis combined with these user profiles will help define the personas, scenarios and needs.

Personas are fictional characters created to describe typical users. These personas have a name, a face, goals and tasks, skills, hobbies, etc. This design tool is used to narrow the gap between the end-users and the design teams and help these teams focus their efforts on the users' needs and expectations.

Scenarios are descriptions of the actions needed to accomplish specific tasks and might include the behavior description in a given situation. Scenarios include the context, the actors, the goals, the sequence and the outcome.

The needs deliverable describes the key aspects of an online Campus from the user's point of view and will also include new technologies that can be applied to e-learning. These needs will be grouped following the functional areas of the Campus: learning materials, learning tools, communication tools, planning tools and support tools.

1.2 User testing and prototypes

This second work package – user testing and prototypes - is centered on the evaluation of designs and the production of design solutions.

In order to accomplish this goal, we have defined the following steps for this package:

- Develop accessibility, usability and style guidelines.
- Define wireframes for the basic application and modules.
- Conduct usability and accessibility testing.
- Give support to the development teams in the application of usability and accessibility criteria.

The accessibility guidelines will be an adaptation of the newest draft of the Web Content Accessibility Guidelines (WCAG) [4] to our needs. The usability guideline will also follow the structure of the WCAG (principles, guides, and checklist) and will be created with the input from the user analysis deliverables. A third guide defining the style and interaction of the Campus will be created.

On top of these guidelines, there will be an iterative evaluation process for all Campus modules. This process can include heuristic evaluation, low fidelity prototype user testing and high fidelity prototype user testing depending on the development stage of the module. All evaluations will result in a document with changes and improvement suggestions. Each development team will be in charge of implementing the changes.

2. THE CASE OF THE NEW CLASSROOM REDESIGN

The new classroom is a key factor in the Campus project and we have used its redesign to apply our UCD approach, more specifically the user testing and prototyping phase. For this project, we have worked close to the users (students, faculty and staff) to understand their needs and desired improvements. The project started in September 2005 with the user requirements phase and was followed by the iterative design and evaluation of prototypes. Five pilot classrooms were launched this Fall semester 2006 to evaluate the redesign in a real learning environment.

2.1 User requirements phase

The goal of this initial phase was to gather information about the usage of the current classroom as well as its' positive and negative aspects from a student's point of view. In order to do so, we run 5 focus groups and 21 user tests with faculty and students.

The focus groups were used to obtain opinions and impressions both from students and faculty about the current classroom and how it should be improved. The user tests showed us how faculty and students really used the current classroom since they were asked to accomplish real tasks.

From the analysis of the results we found three main conclusive ideas:

- The current classroom works and is easy to use.
- The current classroom is improvable and the students are expecting this improvement.
- A radical change would be inconvenient.

The list of improvements obtained can be grouped in three categories: efficient interactions, flexibility and new technologies. With these improvements as guidelines, we constructed the prototypes for the next phase.

2.2 Iterative design and evaluation of prototypes

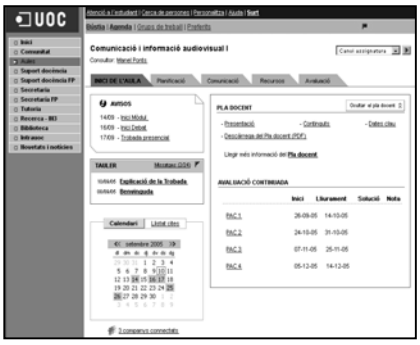
This phase began with the definition of a first low-fidelity prototype that translated the user requirements into a new classroom design. The design was iteratively evaluated and refined by an in-house interdisciplinary team. The prototype was improved with each iteration so that at the end we had a high-fidelity prototype that could be tested.

We run 30 user tests with students from different majors and in different school years. Three different prototypes were tested in order to compare their performance and acceptance among the students. Independently of the prototype, all students were asked to accomplish the same tasks.

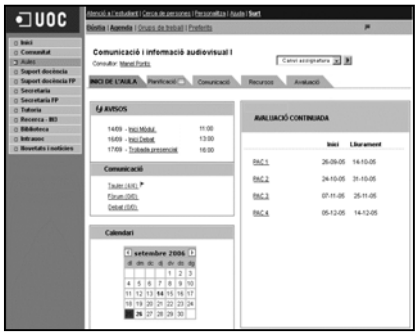
The analysis of these tests gave us information on how to improve the prototype. However, aware that a user test even when the tasks are real could not give us information about how the new design helped the student's learning process; we decided to run 5 pilots during Fall semester 2006.

The screenshots below show the evolution from the current classroom homepage to the homepage now being tested with 5 pilots. Since a radical change is not desired by students, we have opted to keep the same classroom structure of 4 tabs but have added a new homepage that summarizes what is important for the student at that point in time.

1. Current classroom homepage



2. Redesign – Low-fidelity prototype



3. Redesign – High-fidelity prototype

4. Redesign – Pilot classroom homepage

2.3 Pilot test groups

Five pilots with the new classroom interface were launched at the beginning of the semester. With these pilots we had the goal to analyze whether the new classroom helps students in their motivation, as a consequence in their learning. In order to do that, we defined two check points: a user test at the beginning of the semester, a set of focus groups at the end of the semester.

We run 30 user tests with students participating in the pilot group but also with people unfamiliar with the old classroom. From these tests we gathered that the new classroom is an improvement from the previous one, it is easy to use and students feel comfortable with it.

The goal of running three focus groups was to learn about the perception students and faculty had of the new classroom. From the user tests, we know it is usable, but do they like it? Is it improving their learning experience? The feedback obtained from these focus groups varied depending on the characteristics of the student.

Students that have been using the old classroom for several semesters feel lost in a new environment; although it didn't show in the user tests – therefore, not exactly true - that is how they feel. On the other hand, new students value the new classroom more than the old one. Overall, even though the new classroom provokes mixed feelings, the general impression both from students and faculty is that it is an improvement that still needs to be refined.

3. CONCLUSIONS

User-centered design is a design philosophy and a process in which the needs, wants and limitations of the end user of a product are the focus of each stage of the design process. By involving the user at each phase of the development process, we ensure that the end product responds to the users' characteristics. By following this approach, we have gathered enough information to know that we are moving in the direction desired by students and faculty but that it is not enough.

Students didn't want a radical change, so only an interface and information architecture change was made. However, since students are not very familiar with the classroom, they have perceived this small change as a radical change. On the other hand, professors consider that the change has been too small.

At present we are working on a more drastic change both in terms of design and content organization to implement a second set of pilots for next Spring semester. We are aware that it will require a learning process for students but we also know that the end product will answer their needs; therefore this process will not be perceived negatively.

4. REFERENCES

[1] IMS Global Learning Consortium, http://www.imsglobal.org.

[2] ISO/IEC. 13407 Human-Centred Design Processes for Interactive Systems, ISO/IEC 13407: 1999 (E), 1999.

[3] SCORM 2004: ADL (Advanced Distributed Learning Iniciative - http://www.adlnet.org)

[4] Web Content Accessibility Guidelines (WCAG), http://www.w3.org/TR/WCAG20/.