

## **IMPORTANCE OF USER-CENTERED DESIGN: "iTunesU Siena" EXPERIENCE**

Dr. Antonio Giardi, PhD

Università di Firenze, Italy

### **ABSTRACT**

In this article I add a further testimony in favor of the use of User-Centered Design methodology in the design of computer systems. The experience that I bring is based on three experimentations carried out before placing on-line platform "iTunesU Siena" (analysis and design, development of a prototype, the prototype evaluation, redesign of the platform, deploying a second prototype, new evaluation, platform release). Adopt the UCD and add it within the processes of design requires, for a company, both a change of mentality and a change in procedures. Thanks to the design User-Centred can "evolve", questioning their rigidity and become more flexible companies.

**Keywords:** User-Centred Design, iTunesU, Participatory design, Mobile learning

### **1. INTRODUCTION**

The User-Centered Design (UCD) approach started to develop in the late 1970s in the USA. The aim was to design with a better understanding of the range of users and their needs (Karat and Karat 2003) [1].

Within the UCD approach, a representation of the users' interests in design is required to ensure the development of efficient and usable systems. To do this, in every step of the design process, should be given the utmost attention to the "point of view" and the "needs" of the end users.

The ISO 13407:1999 "Human-centered design processes for interactive systems" (Revised by ISO 9241-210:2010 "Ergonomics of human-system interaction - Part 210: Human-centered design for interactive systems") stabilize four main activities for the UCD process [2]:

- specify the context of use;
- specify requirements
- create design solutions;
- evaluate the design.

The process consists of several activities and is based on the iteration of different tools: observation and analysis, design, evaluation and implementation (Fig. 01). A product can be released – and fully realized – only when the design solutions reflect the requirements.

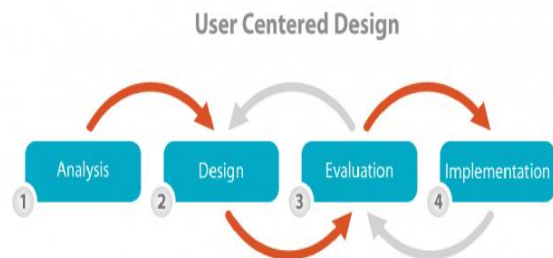


Fig. 01 – User-Centered Design

The observation and analysis are very important aspects; for this reason is necessary to analyze them carefully before proceeding to create “effective” design solutions.

The context of use is needed to identify which people will use the product, what they will do with it and in which conditions they will use.

The requirements are used to specify and the tasks to be carried out by users and any business goals. Only then the product will begin to be conceived and designed (in the form of prospectus, pattern, prototype, up to a complete model).

But the really crucial step is the last – the verification of the product – especially if it is made with real users.

Preece (1993) describes the User-Centered Design as a design approach that includes a continuous focus on “users” along an iterative process, from the early stages of analysis to the final implementation [3].

John Karat (1996) argues that the User-Centered Design is a process that considers the “users” or the “data on users” as the criterion for generating ideas and – consequently – to evaluate the quality of a project [4].

Donald Norman (2013) used the term User-Centered Design to describe design based on the needs of the user, leaving aside what he deems secondary issues like aesthetics. User-Centered Design involves simplifying the structure of tasks, making things visible, getting the mapping right, exploiting the powers of constraint, designing for error, explaining affordances and seven stages of action. He goes to great lengths to define and explain these terms in detail, giving examples following and going against the advice given and points out the consequences [5].

Designers are therefore called upon to analyze and predict not only the way in which the user will use the end product, but also carry out audits of usability and accessibility of the product in the real world

(test User eXperience), to understand if the choices design is correct or not.

The main difference compared to other design philosophies is that the UCD try to optimize the product around the needs and wishes of users (using the artifact), rather than forcing them to change their behavior.

## 2. MATERIALS AND METHODS

The research project for my doctorate, lasting three years, was divided into two phases.

The first phase of the project involved the design and implementation of the platform “iTunesU Siena” followed by the production of some “Collections” relating to specific events.

The second phase of the project involved the design and implementation of a mobile learning course.

For both phases of the project I have tried to implement – within the limits of the rigidity imposed by Apple™ – a user centered approach. I speak of “rigidity” because the Apple™ defines a platform-specific format to be followed, with some broad categories (Features Boxes) and lists (Text List) fixed and others that can be managed freely by users (fig.02).

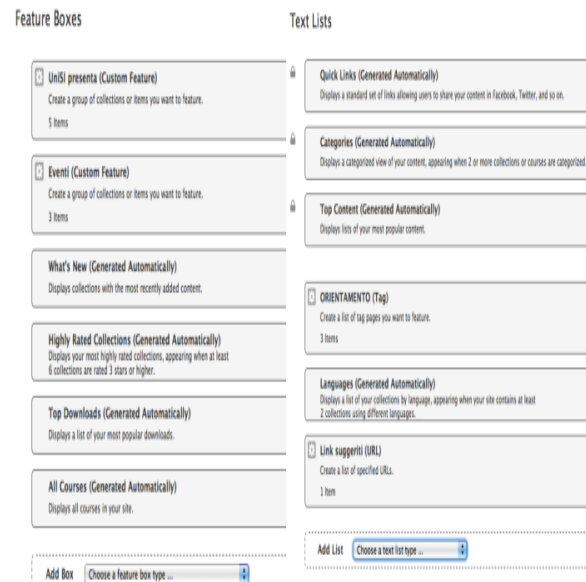


Fig. 02 – Macro categories of iTunesU

iTunesU is a MOOCs (Massive Open Online Courses) that the Apple™ makes available free of charge to universities. The environment is divided into macro areas (up to three at present) containing the collections in which is possible to add the content: audio, video, pdf and epub.

The methodology used is the User-Centered Design implemented through techniques such as focus groups, interviews, questionnaires (paper and online) and experimentations on samples of users.

For each phase I followed the same mode

- **Research** (listen to users and collect information): preliminary activities to be carried out with users to gather requirements on which to base the concept;

- Concept (design solutions based on the needs identified): design the information architecture, the mode of interaction and the graphic;
- Evaluation (evaluating the platform together to end users) takes place after the implementation of the prototype, through the involvement of end users in specific tests of usability;
- Release of the platform.

## 2.1 First experimentation

As part of the design and evaluation of the platform iTunesU Siena, I made a first experimentation whose goal was to engage users in a participatory planning, in order to define the standards of the structure to implement.

Participants: were involved in the experimentation 30 subjects (15 males and 15 females), aged between 20 and 60 years. The sample was representative of the academic community: 10 students, 10 professors, 10 technicians and administrative staff. Also 10 subjects claimed to have computer knowledge (the remaining 20 no).

Procedure: the subjects participated in a focus group in which it was shown: User-Centered approach, the importance of participatory planning, the aim of the experimentation. So began the discussion (in

order to bring out the expectations of the users, the type of content included in the platform, the format to be used – considering also between different graphics options).

After the focus groups I interviewed the subjects (in order to better understand their habits and behavior, while ensuring that each of them could freely express their design ideas) and asked them to fill out a questionnaire mixed. The first part (socio-identifying) contained open-ended questions (Last Name, First Name, Age, Place of birth, etc.). The second (technological) contained closed questions type YES/NO (Knowledge of iTunes, Knowledge of iTunesU, etc.). The third part (teaching) included questions on the scale 1-5 (Utilities iTunesU for guidance, Utilities iTunesU as teaching support, etc).

Finally, we have sought to define location and label for the contents of the platform (card sorting), so as to define the three macro areas to implement.

Results: Regarding the graphics to use on the home page, were analyzed both solutions of strong impact (graphically charges) and solutions more simple and minimal. The 87% of the sample suggested using a linear and lightweight graphics, with no “frills graphics” and “online” with the usability standards of the App (fig. 03).

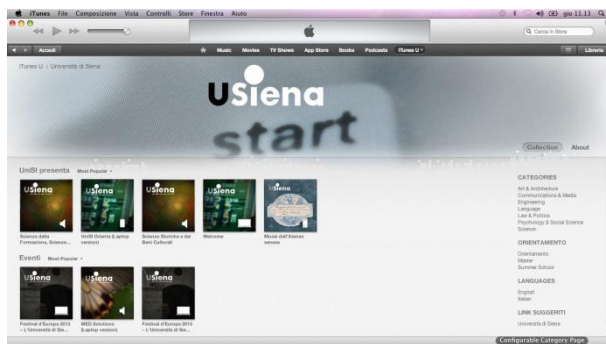


Fig. 03 – Platform iTunesU Siena

A crucial point of the design was the choice of the graphics to use, both for the icons of the collections and for the slides that introduce each video (since each video begins with the same image used in the icon).

This has meant a sharp rift in the design ideas of the users, that can be summarized in two scenarios.

In the first scenario 57% of the sample, after an analysis of the content and trying to standardize the visual impact, suggests grouping similar collections in similar categories, each of them belongs to one of three macro areas made available by the Apple.

The three main areas identified are: “UniSI Presenta” (pun to say that the University of Siena presents itself – in Italian “si presenta” – using the word “SI” that identifies the city of Siena), “Events” and “Tasting of Unisi”.

For each category identified will be used the same graphics. Figure 4 shows the macro

area “Events” with the categories “Creative Events” (first and third icon), “Environmental Events” (second icon) and “Educational Events” (third icon).

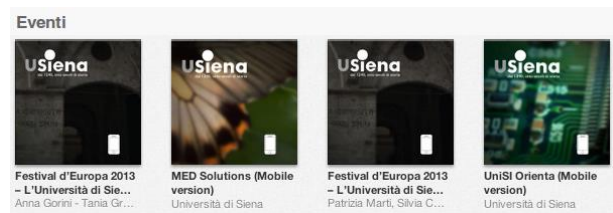


Fig. 04 – Main area “Eventi”

Considering the system architecture, the standard Macintosh™ and following the suggestions of some designers iTunesU (Apple™), the 60% of the sample suggests using the “available” option, that allows to create a “tripartite twin” of the same content, making it usable in the audio format, video in high resolution and video in low-resolution (fig. 05).

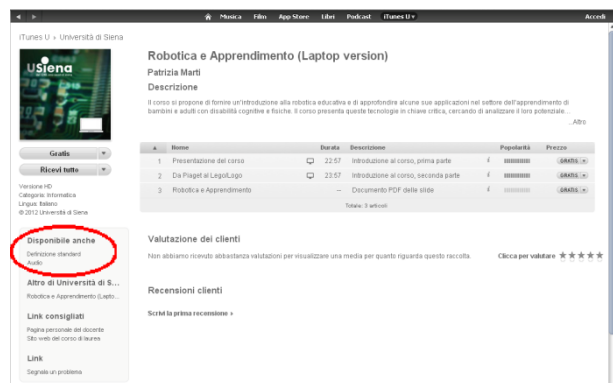


Fig. 05 – Collection – first release

To distinguish – but at the same time to connect – the collections belonging to the “tripartite twin” the 87% of the sample suggests using a minimal graphics differentiation. I chose to use three stylized drawings (smartphone, notebook and speaker) to be included in the icon. Figure 06 illustrates the collections “Robotics and Learning” (audio version, video in high-definition and video in low definition).

Fig. 06 – Example of tripartite twin



In the second scenario, 41% of the sample suggests the use of different graphic solutions for each published collection (the remaining 2%, suggests some intermediate options). Choose between the two scenarios was been very difficult, given the tight gap in the percentage (57% versus 41%).

The choice fell on the first scenario (seemed more innovative). After implementing the first release of the platform and after scoring some collections, I started the testing phase (the design solution identified).

## 2.2 Second experimentation

I sought the cooperation of a new sample of users, with the usual method used previously, and asked them to interact with the platform performing specific tasks. With this first usability test I tried to evaluate the platform developed trying to bring out mistakes and weaknesses design. After the test I asked them to fill out a questionnaire mixed.

Participants: were involved in the experimentation 30 subjects (15 males and 15 females), aged between 20 and 60 years. The new sample was representative of the academic community: 10 students, 10 professors, 10 technicians and administrative staff. Also 15 subjects claimed to have computer knowledge (the remaining 15 no).

Procedure: I asked subjects to interact with the platform in a laboratory (so I could videotape the interaction). I also asked them to speak up, to record questions and concerns. The tasks were: access to the collections, see the contents, go back to a collection previously displayed. After the test I asked users to fill out a questionnaire mixed, so as to bring out the problems encountered. The first part (socio-identifying) contained the same open-ended questions (Last Name, First Name, Age, Place of birth, etc.). The second part (evaluative) contained both closed questions of type Yes/No (The platform corresponds to your expectations?) and questions on the scale 1-5 (Utilities iTunesU for guidance, Utilities iTunesU as teaching support,

Personal satisfaction in the use of the platform, etc.). The third part (design) contained open-ended questions (What difficulties have you encountered?, How would you improve the format?).

**Results:** from analysis of videotaped interactions and analysis of questionnaires revealed certain problems, which led to a redesign of the platform. In particular the problems identified were three.

The first feedback – very strong – we have received, has been a negative judgment on the tripartite division of the contents. 83% of users feel that such solution, besides being somewhat dispersive, would create the expectation of the diversity of content on collections that actually had different format only. To this we must add the fact that the Apple™, in the latest versions of iTunes, not implement more functionality “available”.

The second critical aspect is the use of the same graphic in different collections but which belong to the same macro area. The 80% of the sample said that by adopting this solution, we lose the peculiarities and specificity of single collection. On the contrary, several graphic images that uniquely identify the individual collection, by allowing the “recognition” faster access to the collection.

The third aspect of critical issues emerged during the analysis of video recordings. The 87% of the sample enacts fluid interaction;

there were many times when the users – or they did not know what to do or is blocked completely. Especially when they had to log on again to a collection previously visited, not directly clicked on the same but started from first and moving the mouse in a sequential manner to reach it (reading the names of the collections). The difficulty in performing the task is also evidenced by the words used by people: “*But where is the collection (for example) Robotics and Learning*”.

Plus 90% of users claim a “personal satisfaction” in the use of the platform inadequate/poor.

For these reasons I decided to make a second release of the platform and then testing it on a new sample of users. Following their indications, I put all the content within the same collection (audio, video and pdf). In addition, given the increased compression capacity of the compressors video, I decided to make available a single video content in high resolution (fig. 07).

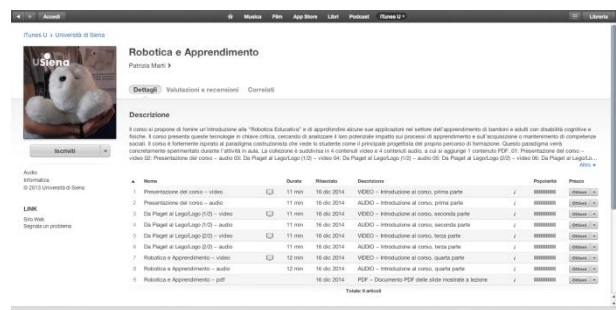


Fig. 07 – Collection – second release

Always following the indications of users – and to facilitate immediate recognition – I decided to use different graphics (fig. 08), limiting myself to use the same minimal standards in the collections belonging to the same group (as written “DPT” for the Departments).



Fig. 08 – Macro area “Events”

## 2.2 Third experimentation

To the new sample of users, chosen in the same way, I asked to perform the same tasks outlined above. After the test I asked them to fill in the same questionnaire mixed.

Participants: were involved in the experimentation 30 subjects (15 males and 15 females), aged between 20 and 60 years. The new sample was representative of the academic community: 10 students, 10 professors, 10 technicians and administrative staff. Also 13 subjects claimed to have computer knowledge (the remaining 13 no).

Procedure: also in this case, I asked the subjects to interact with the platform within a laboratory, videotaping the interaction. The tasks were the same: access to the collections, see the contents, go back to a collection previously displayed. After the test we asked users to fill in the same questionnaire mixed.

Results: 93% of the sample said a good/great personal satisfaction in the use of the platform. Analysis of video recordings showed that the moments of uncertainty were reduced drastically (only 13% of users), making interaction more fluid and direct.

## 4. CONCLUSION

With the work done in this first phase of the research project for my doctorate, I was able to test the skills learned in recent years, receiving further evidence in favor of the utility and the “real” importance (for users) of UCD in the design of computer systems. Despite this, companies have begun to show interest in the User-centered approach only in recent years.

At this point we can ask ourselves two questions: why this methodology has been applied in the past rarely? Why business processes – only recently – have begun to be targeted to user needs, with specific activities such as those listed above?

Personally I think the reasons are basically two.

Firstly, because the UCD is a design philosophy relatively young and little taught (is essential add in schools, universities and courses in Web design). The great majority of software house work differently and many managers (or heads-project), with a formation rather “obsolete”, are not able to handle this methodology.



Traditionally, the process of realization of software and web sites has always been oriented to the system (System Centered Design), where the focus of the design is oriented to the potential of the instrument, on organizing the functionality of the system, rather than the needs of users).

Secondly because many companies see it as an “extra cost”, a “waste of money”. On the contrary, there are estimates that indicate how the processes User-Centered are able to ensure a rapid focus on the requirements of the system and on solutions, avoiding to lengthen the time (related to charges or threads unproductive) and leading to a product satisfactory in less time (Landauer 1996) [6].

In the past, the UCD was associated with the term “usability”. It is actually much more. Is the application of a philosophy centered and aimed at identifying the needs of the user, in compliance with those of the business. It is based on the belief that, thanks to the phase of analysis and evaluation (test), it is possible to identify the user needs and the defects of a product somehow managing to measure the evolutions produced.

To do that we need a change of mentality in the name of transparency and clarity: testing activities conducted during the trial showing the evolution of the product and can be used to overcome the resistance of some makers.

Adopt the UCD and add it within the processes of design requires, for a company, is a change of mentality that a change in

procedures. Many companies, to produce software and websites of good quality, should standardize much of their processes (whatever the training and the expertise of the employees). Thanks to the UCD may “evolve” by questioning their rigidity, becoming more flexible companies.

## REFERENCES

[1] Karat, J., and Karat, C., M. (2003). The evolution of user-centred focus on the human-computer interaction field. IBM Systems Journal 42 (4)

[2] Iso (web site)  
[http://www.iso.org/iso/catalogue\\_detail.htm?csnumber=21197](http://www.iso.org/iso/catalogue_detail.htm?csnumber=21197)  
[http://www.iso.org/iso/home/store/catalogue\\_ics/catalogue\\_detail\\_ics.htm?csnumber=52075](http://www.iso.org/iso/home/store/catalogue_ics/catalogue_detail_ics.htm?csnumber=52075)

[3] Preece, J. (1993). A guide to Usability: Human Factors in Computing. Addison Wesley. Wokingham

[4] Karat, J., Atwood, M., E., Dray, S., M., Rantzer, M., and Wixon, D. (1996). User Centred Design: Quality or Quackery? Paper read at CHI 96, April 13-16, 1996, at  
<http://delivery.acm.org/10.1145/260000/257232/p161-karat.pdf>

[5] Norman, D., A. (2013). Design of Everyday Things: Revised and Expanded. New York: Basic Books. London: MIT Press (UK edition)

[6] Landauer, T., K. (1996). The Trouble with Computers. MIT Press, Cambridge, at <https://mitpress.mit.edu/books/trouble-computers>