

User Interface Design for E-learning Platform and Institutional portal of University of Foggia

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Abstract

As of March 2020, educational processes have undergone a significant transformation by moving to massive and almost exclusive use. The effects of this change have manifested themselves in the school setting, in university education, and in vocational training.

All educational agencies have had to adapt very quickly to these new paradigms, to remain at the side of the students and to continue their educational activities, using new computer tools and virtual learning environments towards which, in the past, there was a lot of resistance.

All teachers have had a double task: to carry out the educational program in the best possible way and above all to continue to maintain a human relationship with their students.

The development and wide diffusion of ICT and communication have brought to light the need to develop new interfaces of online platforms. These trends pose a challenge to all people working with educational technologies.

The role of the user interface (GUI) in e-learning is critical because it is the means by which a user can intelligently interact with a machine to perform a task.

A user-friendly user interface (GUI) is an essential tool in the design phase of online platforms and sites. Instructional designers and Web designers must work to ensure that the interface allows students to interact nimbly with any type of tool (including mobile tools).

This article illustrates the innovations in the GUI both on the E-learning Platform of the University and on the website, the main communication spaces used by the University and the whole Administration.

Keywords

GUI, Instructional design, Visual Elements, Interface Design, e-learning

1. Introduction

With the rise of e-learning, learning processes have become faster [1]. The term e-learning refers to the fields of online learning, web-based learning and technology-based learning that enables more and more learners to learn anytime, anywhere. Very important aspects of online learning processes include the graphical interface of platforms, just-in-time information delivery and design. It can be argued that e-learning is a useful solution to reshape the traditional roles of learning, helping students [2] to make the most of their learning styles, to strengthen their confidence in their own abilities and to personalize their learning paths, allowing them to make more "active" decisions and transforming their learning style from "inactive" to "active" [3].

The most important result of this change is the continued expansion of electronic instruction.

Teachers, despite the problems related to the perception of inadequacy with respect to the use of new modes and new tools, have been the main support in the management of relational dynamics with students [4].

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Platforms need to be rethought by looking at the psychology of students. There have been numerous studies on the nature of learning and the factors that influence it [3][6][7].

An online learning path must be designed on the basis of tools inspired by established pedagogical models [5]. In the design phase of an online learning path it is necessary to take into account adaptations derived from the conventional nature of education, although sometimes these adaptations may clash with the trend towards open, distance and massive learning. The educational goals cannot be achieved if there is no interaction between these two factors; in fact, often the relationship problems are developed in User Interface Design for E-learning (UIDEL)[6].

E-learning simplifies the learning path so that users can see, hear, discuss, experience and teach others. Very important is the choice of learning materials and technological infrastructure that must allow [7][8]:

- an ease of effective relationship between learner and lessons using sight and hearing;
- to continue to keep the learner engaged.

The training market has now reached its limit and traditional methods and tools no longer work. A deep rethink is needed in the educational environment [9].

To be successful within an online course it is necessary to consider psychological, political, social, scientific, educational, economic, behavioral, and technical issues simultaneously.

2. The ADDIE model

The factors that influence teaching and learning are:

- *stimulus* - it is necessary for motivation on the part of students to grow;
- *the role of work and memory in learning* - center of mental activity, where all active thoughts take place [10];
- *use of multimedia content to present lessons* - use of instructional materials through a combination of visual (such as text, graphics, etc.) and auditory (such as speech, music, etc.) elements [10];
- *availability* - users must have easy access to content. Students regularly refer to previously delivered materials, and the platform must provide students with the ability to search for content and help them easily reach the desired content.

Among the Instructional System Design models, the most famous is the ADDIE (Analysis Design Development Implementation Evaluation) model. This model, developed since the 1970s [11], aims to plan, develop, manage, and evaluate an instructional process in order to ensure adequate performance by students. ADDIE allows to decompose, document and set up, for each phase of the educational project, the interventions necessary for the success of the intervention, allowing different professionals to work in parallel on the areas of their respective competence [12].

The ADDIE model, compared to the other models, is the most widely used in the field of Instructional Design, and many of the more recent models are based on the basic principles of the ADDIE model. Through this model, the instructional designer moves from having a general concept of the process to finding more and more detailed information [13].

The model is structured according to a path that follows five phases, concatenated between them:

1. *Analysis*: this first phase of analysis is necessary to define training needs and objectives. It also identifies the methods of delivery and the places where the activities will take place;
2. *Design*: this is the phase of structuring the educational path. In fact, the objectives, teaching strategies, selection of resources, etc., are detailed.
3. *Development*: this is the development phase in which the process is filled with content and the training devices are adapted to the real context;
4. *Implementation*: this is the implementation phase of the process, in which the classrooms and technological supports are set up;
5. *Evaluation*: the evaluation phase of the project, in all its aspects.

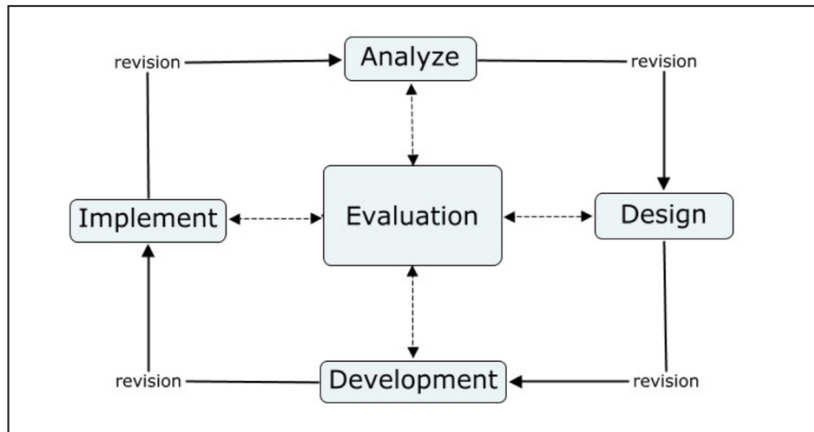


Figure 1: ADDIE Model [6].

Following the ADDIE model, in the first phase of analysis, a survey of the needs of the target community was done, and then went on to choose and apply the interface model to be used.

User interface (UI) design is the process of creating interfaces with a focus on appearance or style. The goal of designers is to create designs that are easy to use and enjoyable.

The user interface is based on interactive communication between user codes and computer software. Design planning starts from an understanding of the target audience, including information about age, education, motivation and goals [14].

To have an effective interface, three rules must be followed [15]:

- the user must be in control;
- reduce the memory load from the user;
- make the interface consistent.

The user interface design process includes four activities [16]:

- user, task, and environment analysis;
- interface design;
- interface construction;
- interface validation.

Four common design issues almost always arise: system response time, available user support services, error information handling, and command labeling. It is much better to consider from the beginning of the design, each of these issues and possible solutions with associated costs [16].

3. Unifg E-learning Platform Interface

The University of Foggia in 2021 has adopted a new template to dress up the University's E-learning Services Platform. The interface has been redesigned to ensure faster operation from the "user" side in the execution of tasks.

The more pleasant interface in terms of colors and graphics makes it more pleasant to use, making the product unique and well recognizable.

The elearning.unifg.it platform is simpler, cleaner and more functional. The space has been optimized by implementing the Moodle interface with the Klass template, fully responsive and coded with the latest techniques in HTML5 and CSS. The implemented template works on all devices and is navigable through any browser.

The factors that determined the choice of template were:

- *Brand* - the template chosen clearly outlines the identity of the University, through the images and colors used;
- *Responsive design* - most users connect from mobile devices and having a responsive site, especially from mobile, was essential (they are mobile friendly);
- *Basic functionality* - basic functionality such as the structure of the product pages and menu;

- *Costs* - the chosen template is free;
- *Security and updates* - collecting sensitive information and ensuring the security of all users.

Moodle is an online learning management system. It is an open source software, developed with the collaboration of several universities, companies, organizations and individuals according to a model in which the authors make the source code public, encouraging free study and allowing programmers to make changes and extensions. Moodle is both an e-learning platform but also an authoring platform that can be adapted to educational or professional projects.

The novelty with respect to the version used previously is especially noticeable in the Homepage, organized in boxes that offer a preview of the courses inserted inside. The user also has the possibility of opening a personal navigation menu (retractable) that provides quick access to the courses attended and those recently opened.



Figure 2: E-learning Platform Homepage

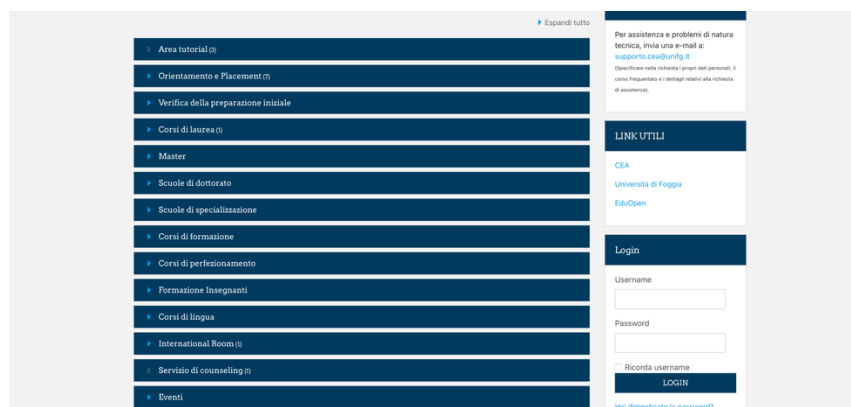


Figure 3: E-learning Platform Main Menu

In order to access the courses provided, students must authenticate themselves on the Login page with their institutional credentials (the material on the University platform can be consulted only after authentication).

The flowchart has been redesigned to represent the sub-menu sections and the main courses. Users, through the "crumb menu", have a direct perception of their position within the system; they also have the possibility of clicking on a previous section to return to the higher level.

The "breadcrumb menu" keeps track of the position within the platform and allows to easily find the main road (e.g. to return to the Homepage without using the "forward" and "backward" arrows of the browser). The "breadcrumbs" always start with the most general link "Home" that leads to the homepage of the site and always end with the most specific item (e.g. a specific Laboratory of a Course).

4. New website and web ecosystem of the University

From June-July 2020, also by virtue of the digital changes that have radically involved public institutions, the University of Foggia has invested in enhancing communication starting from the first web interfaces with which the user relates to find information.

The strategic objectives set for the design of the new web communication ecosystem are:

- *Strengthen the presence and identity of UNIFG in the territory and in the social fabric through the re-engineering of the university's web ecosystem.*
- *Create a quality, immediate portal that engages and guides the future student in the choice of UNIFG and that vehicles the enrolled student towards the contents that are fundamental for him.*
- *Use graphic design elements for the communication component in line with current trends but sustainable and tailored to the needs of UNIFG content*
- *Adopt a user-centered approach that allows the development of a web solution based on specific needs, thus ensuring immediate access to content in response to any information need, with particular attention to the pages dedicated to the training offer.*
- *Enhance the University with a view to internationalization, offering all the contents of the site in English (bilingual portal).*

The redesign project of the new university portal considers the needs of users and, in particular, of the main target: students.



Figure 4: Unifg website Homepage- Header and main menu

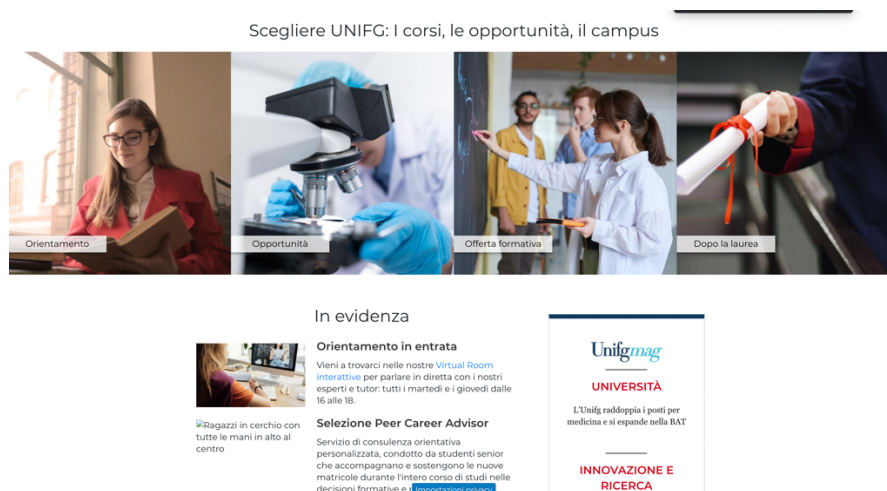


Figure 4: Unifg website Homepage- Featured contents

Prototyping is the result of a study that considers above all the "content first" approach, in which specific contents are conceived, designed and inserted according to the needs of the target audience.

In particular, the following main elements were established and developed for the new unifg.it Portal:

- Allow users to have a clear overview of the contents in order to ensure a comprehensive and satisfactory user experience based on their objectives
- Emphasize the engagement and retention component in equal measure
- Enhance the link between portal and magazine
- Be a useful, fast and effective means to support UNIFG users but also the territory
- Design a new Information Architecture that allows for an overall view
- Take these criteria into account: visibility, navigability, ease of use (clarity of display and graphics), identity and quality of content, cross-channel.
- Make the information and communication purposes of the individuals recognizable and easily identifiable components of the web ecosystem.

An absolutely new element compared to the past is the creation of an institutional communication channel for News and Events: Unifmag.



Figure 6: Unifmag Homepage

The magazine tool integrates and replaces all the University's scientific dissemination channels: in fact, news, press releases, events, talks and the story of the research are conveyed inside. The intuitive and user friendly interface allows you to access all sections of the portal. The contents are divided and accessible by sections: University; meetings and initiatives; innovation and research; sport and art and culture. All areas are made recognizable by labels of different colors.

This new tool, which is configured to all intents and purposes as a newspaper, aims to support activities dedicated to students, also enriching the promotion of the educational offer, through a narration throughout the year.

An integral part of the new university magazine is the Unifg life section, dedicated to the digital storytelling of the academic community, with particular emphasis on students and doctoral students.

Unifg life narrative channels are video spots, video interviews and, above all, podcasts.

In fact, various narrative formats have been created that highlight the research activities of students and graduate students during their studies, with particular attention to experiences abroad.

All Unifg initiatives and activities are promoted through a careful content strategy that involves the use of institutional social networks.

Ad hoc programming and planning is reserved for the latter, defined on the basis of the target users of the contents.

Many initiatives, especially dedicated to the educational offer, are made exclusively for dissemination through social media (for example, Web talk; Story challenges with students; Reels, etc.)

The currently active social channels are Facebook, Instagram, LinkedIn, Twitter, Spotify, iTunes.

5. Conclusions

The user interface plays a critical role in achieving learning goals. Psychological aspects related to learning influence the design of the user interface.

Stimuli, informal style, learner control environment and colors must be used in the presentation of the services offered by the platform.

UID should not only be viewed as an artistic phenomenon, but artistic tools such as, graphics, music, animation, etc., must be compatible with psycho-pedagogical issues.

Future reflections related to the design of a simple and usable interface will lead to focus on many nodes such as, for example, the drop out of users, the skills they already possess. Design requires a significant degree of flexibility, especially linked to the choice of content and the language to be used. It is very important to simplify the search for information and the use of content so as not to lose the attention of the most motivated user. At this juncture the intervention of the is particularly important (with ad hoc textual and graphic communications) to increase the level of positive feedback. A survey will also be carried out to know some "data" relating to the users of these contents.

The *a posteriori* analysis will allow us to affirm how the design of learning experiences, which use user centered forms, can be an increasingly important resource for thinking and rethinking teaching both online and in person.

6. References

- [1] G.A. Toto, Limone, P., From Resistance to Digital Technologies in the Context of the Reaction to Distance Learning in the School Context during COVID-19. *Educ. Sci.* 2021,11,163.
- [2] S. Perrella, L. Borrelli, Progettazione didattica nell'e-learning: l'esperienza Unifg durante l'emergenza Covid-19, in P. Limone, G.A. Toto, and N. Sansone, *Didattica universitaria a distanza tra emergenze e futuro. Ripensare online forme e metodi dell'insegnamento*, Bari: Progedit.
- [3] Y. Ofosu-Asare, H. B. Essel, F. Mensah Bonsu, E-learning graphical user interface development using ADDIE instruction design model and developmental research: the need to establish validity and reliability, I.K. Press (2019), Volume 13, 2019.
- [4] G.A. Toto, P. Limone, Motivation, Stress and Impact of Online Teaching on Italian Teachers during COVID-19. *Computers* 2021, 10,75.
- [5] L. Tateo, Web accessibility and usability: limits and perspectives. In *Proceedings of the First Workshop on Technology Enhanced Learning Environments for Blended Education*, 2021.
- [6] V. Cho, T.C.E. Cheng, W.M.J. Laia, The role of perceived user-interface design in continued usage intention of self-paced e-learning tools. In *Computers & Education*, 53, 2, 2009, 216-227.
- [7] H. Mehrdad, *Art of teaching*, Tehran: Ravan, 2007.
- [8] M. Ahadyan, D. Mohammadi and O. Ramazani, *Fundamentals of instructional technology*, Tehran: Aizh, 2009.

- [9] P. Limone, Towards a hybrid ecosystem of blended learning within university contexts, Proceedings of First Workshop of Technology Enhanced Learning Environments for Blended Education – The Italian e- Learning Conference(teleXbe), 2021.
- [10] R. C. Clark and R. E. Mayer, E-Learning and the Science of Instruction, 3rd ed., San Francisco: Pfeiffer, 2011.
- [11] A. Marchi, F. Moino, A. Mercurio, Lo studio del processo di e-learning con IDEF, 2005.
- [12] G. Bonaiuti, A. Calvani, L. Menichetti, G. Vivinet, Le tecnologie educative. Criteri per una scelta basata su evidenze, Carocci., Roma, 2017.
- [13] M. Rossi, Design-based research and planning of training courses: the application model of Future Education Modena, Proceedings of First Workshop of Technology Enhanced Learning Environments for Blended Education – The Italian e- Learning Conference(teleXbe), 2021.
- [14] B. Faghieh, M. Reza Azadehfar, S. Katebi, User Interface Design for E-Learning Software, DOI: 10.7321/jscse.v3.n3.119, 2014.
- [15] B. Shneiderman, Designing the User Interface (3rd ed), Addison-Wesley, 1997.
- [16] R. S. Pressman, Software engineering: a practitioner's approach, 7th ed., New York: McGraw-Hill, 2009.