FESTMASTER

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Summary

This document presents the design and evaluation process of **FestMaster**, a desktop application for music festival management, developed following a **User-Centered Design (UCD)** approach. The main objective of the project is to provide an effective, usable, and well-structured tool that supports the complete management of festivals, artists, and related information, addressing the real needs of event organizers.The project begins with a requirements analysis based on semi-structured interviews conducted with potential users. This phase allowed the identification of key user profiles, their goals, and the main usability issues found in existing festival management solutions. A brief competition analysis was also carried out to identify common strengths and weaknesses in similar applicationsBased on the collected requirements, a **low-fidelity (Lo-Fi) prototype** was developed to define the system structure, navigation flow, and information organization. Subsequently, a **high-fidelity (Hi-Fi) prototype** was implemented using Windows Presentation Foundation (WPF), integrating all core functionalities within a consistent and intuitive graphical interface.Finally, a usability evaluation was conducted with representative users using the Think Aloud technique. The results confirmed a high level of user satisfaction while also highlighting minor areas for improvement. Overall, the project demonstrates how applying UCD principles and usability heuristics contributes to the development of an efficient and user-oriented software solution.

FESTMASTER

The organization and management of music festivals involve handling a large amount of heterogeneous information, including event details, artist schedules, logistical data, and user interactions. As festivals grow in size and complexity, the need for effective digital tools that support event organizers becomes increasingly important. Poorly designed management applications often lead to information overload, usability issues, and inefficient workflows, negatively affecting both organizers and participants. This case study presents **FestMaster**, a desktop application designed to support the comprehensive management of music festivals and participating artists. The project has been developed following a **User-Centered Design (UCD)** approach, with the aim of aligning system functionalities and interface design with the real needs, expectations, and limitations of its target users.The development process includes a requirements analysis based on user interviews, a competition analysis of existing festival management solutions, and the creation of both low-fidelity and high-fidelity prototypes. The final prototype was implemented using Windows Presentation Foundation (WPF) and evaluated through a usability study involving representative users.The goal of this work is not only to present the final solution but also to demonstrate how usability principles, design heuristics, and iterative evaluation can contribute to the development of an efficient, intuitive, and user-oriented software system.

2. Requirements Analysis

2.1 User Identification

The user analysis has been carried out following the User-Centered Design (UCD Sprint) approach, with the aim of identifying the main user profiles that interact with the festival management application, as well as their objectives, needs, and context of use. This analysis allows the functionality and interface of the application to be adapted to the real characteristics of its users.

2.1.1 Festival Administrator User

The festival administrator user is the main person responsible for the comprehensive management of festivals within the application. This role generally corresponds to event organization staff or a manager with basic computer skills.

The main objective of this user is to efficiently manage all information related to festivals, artists, and stages, ensuring that data is kept up to date and properly organized.

This user requires a clear and well-structured interface that allows CRUD operations to be performed quickly, as well as confirmations for critical actions and contextual help to reduce the likelihood of errors.

The context of use corresponds to a desktop environment, typically in organization offices or from home, during work sessions of medium or long duration.

The technological experience level of this profile is medium, with previous experience using management applications, although without advanced technical knowledge.

2.1.2 Artist Manager User

The artist manager user is specifically responsible for managing information related to artists or musical groups, including personal data, fees, performance schedules, and special requirements.

The objective of this user is to register and keep the information of artists participating in festivals up to date.

This user requires well-structured forms, data validation, and clear visualization through lists and tables that facilitate information consultation and modification.

The context of use is frequent but occasional, especially during the festival planning and organization phase.

The technological experience level of this user is medium-low.

2.1.3 Consultant or Guest User (Optional)

This user accesses the application only to consult information about already created festivals, without having editing permissions.

The objective of this user is to consult general festival information, such as dates, participating artists, and location.

This user requires an intuitive interface, simple navigation, and quick access to relevant information.

The context of use is occasional, in short sessions, and the technological experience level is variable.

2.2 Information Gathering Techniques: Interviews

To obtain the requirements, semi-structured interviews were conducted, allowing both quantitative and qualitative information to be collected regarding the needs and expectations of potential users of the application.

2.2.1 Participants

The interviews were conducted with a total of 6 participants, selected by convenience. All of them were Spanish university students aged between 20 and 23, with a technological profile similar to that of the development team.

The general characteristics of the participants were as follows:

• Average age: 21 years.

• Nationality: Spanish.

• Technological experience: regular use of management and leisure applications.

• Relationship with festivals: frequent attendance at music festivals or knowledge of the organization process.

Each of the three members of the development team conducted two interviews, which allowed the workload to be distributed and the obtained results to be compared.

The results of the interviews are summarized in the response table included in the appendix, which collects participants' opinions and preferences in a structured manner.

2.2.2 Interview Protocol

The interviews were conducted by the three members of the development team following the same protocol, in order to ensure homogeneity and comparability of the results.

The protocol followed was as follows:

- Presentation of the interviewer and the project authors.

- Explanation of the academic objective of the study.
- Reading and acceptance of the informed consent.
- Conducting the questionnaire.
- Acknowledgment and interview closure.

The average duration of each interview was approximately 15 to 20 minutes.

2.3 Competition Analysis

In order to contextualise the development of the application and justify the design decisions adopted, a basic competition analysis has been carried out, examining existing applications and platforms related to the management of music festivals and events.

For this analysis, both event management tools and festival information platforms have been considered, focusing on aspects such as information organisation, ease of use, navigation, and the functionalities provided.

Among the analysed platforms are event management and ticketing applications, as well as official websites of music festivals. From this analysis, the following general conclusions have been drawn:

- Many applications provide a large amount of information, but present overloaded interfaces that make it difficult to quickly locate relevant data.
- Artist and schedule management is usually well structured, although in some cases it requires excessive navigation between screens.
- Not all applications include clear confirmations before performing critical actions, such as deleting information.

- Context-sensitive help and user assistance elements are not always present or are poorly visible.

Based on this analysis, it has been considered essential to design an application with a clear and well-organised interface, reducing users' cognitive load, minimising unnecessary navigation between screens, and providing confirmations and contextual help to prevent errors, in line with usability principles and the User-Centred Design (UCD) approach.

2.4 Informed Consent

All participants accepted an informed consent form prior to the interview, guaranteeing at all times the anonymity of the responses and the exclusive academic use of the collected data.

Appendices

Appendix A. Informed Consent

Study title.

Requirements analysis for a festival management application.

Study supervisors.

Three Spanish students aged 21 from the Bachelor's Degree in Computer Engineering, within the subject Human-Computer Interaction.

Study description.

The objective of this study is to collect information about the needs and expectations of potential users of a desktop application for festival management.

Use of data.

The collected data will be used exclusively for academic purposes and will not be shared with third parties.

Confidentiality.

Responses will be treated anonymously and confidentially.

Participant rights.

Participation is voluntary, and the participant may withdraw at any time without providing justification.

Consent.

I declare that I have read the above information and voluntarily agree to participate in the study.

☐ I agree to participate

☐ I do not agree to participate

Appendix B. Interview Questionnaire

The following questionnaire was used as a guide during the semi-structured interviews conducted with the participants. The questions were aimed at identifying needs, difficulties, and preferences related to the use of a festival management application.

1. Have you previously used any application to manage events or festivals?
2. What type of information do you consider most important when managing a festival?
3. What aspects do you find most useful in an application of this type?

4. Have you encountered difficulties when using similar applications? If so, which ones?
5. Do you consider it important for the application to request confirmation before deleting information?
6. Which visualization format do you prefer for consulting information (lists, tables, forms)?
7. Do you find contextual help, such as tooltips or explanatory messages, useful?
8. How important are visual elements such as images, posters, or videos to you?
9. What would you improve or add to a festival management application?

Appendix C. Spreadsheet of Responses

The responses obtained during the interviews were collected and organized in a spreadsheet to facilitate their analysis. Below is an excerpt from that spreadsheet, summarizing the most relevant responses from the participants.

Participant ID	Age	Previous experience with management apps	Identified difficulties	Importance of confirmations	Visualization preference	Help usefulness rating	Additional comments
P1	21	Yes	Lack of visual clarity	High	Tables	High	Simple interface
P2	22	No	Too many screens	Very high	Forms	High	Avoid errors
P3	20	Yes	Accidental deletion	Very high	Tables	Very High	Confirmations
P4	21	Yes	Usability complexity	High	List	Medium	Clear design
P5	23	No	Lack of help	High	Forms	High	Visible tooltips
P6	21	Yes	Information overload	Medium	Tables	Medium	Better organization

2.5 System Requirements

This section presents the functional and non-functional requirements defined by the development team for the festival management application. These requirements constitute the basis for the design and implementation of the system.

2.5.1 Functional Requirements

Festival Management.

The application must allow the complete management of festivals, including the following aspects: festival name, dates, venue, list of artists by day, sponsor poster, artist lineup poster, links to the event's social media profiles, and ticket and pass prices. Optionally, information about previous editions of the festival may be included. In addition, the application must allow the inclusion of promotional videos, event rules, information on how to get there, and accommodation options.

Festivals may have different states, such as planned, past, cancelled, or postponed.

Artist Management.

The application must allow the management of information related to participating artists or musical groups, including: artist or group name, official image, musical genre, brief description or biography, contact information and personal data, links to social media profiles and/or official website, artist or group fee, performance day, time and stage, accommodation location, and special requests.

The artist status may be confirmed or cancelled.

CRUD Operations.

The application must allow create, read, update, and delete operations for festivals, artists, and stages.

The information must be displayed using lists and data tables that facilitate visualization and dynamic data handling.

Login and Authentication.

The application must provide an access system based on identification and password.

After successful authentication, the user's profile picture and the date of the last login will be displayed.

Help Systems.

The application must provide context-sensitive help through tooltips and information associated with interface elements.

It must also include dialog boxes to confirm actions that may cause errors or data loss, as well as information about the application authorship, including author names, development date, and version.

2.5.2 Non-Functional Requirements

Usability.

The application must comply with usability principles, taking into account aspects such as Gestalt laws, the appropriate use of metaphors, color selection, and proper interface organization.

Graphical User Interface (GUI).

The user interface must be developed using WPF (Windows Presentation Foundation).

The window design must be optimized, with clear forms and navigation that avoids excessive screen transitions.

Temporary Data.

Data persistence after closing the application is not required.

Test data must be included in the application code or in text or XML files.

Accessibility.

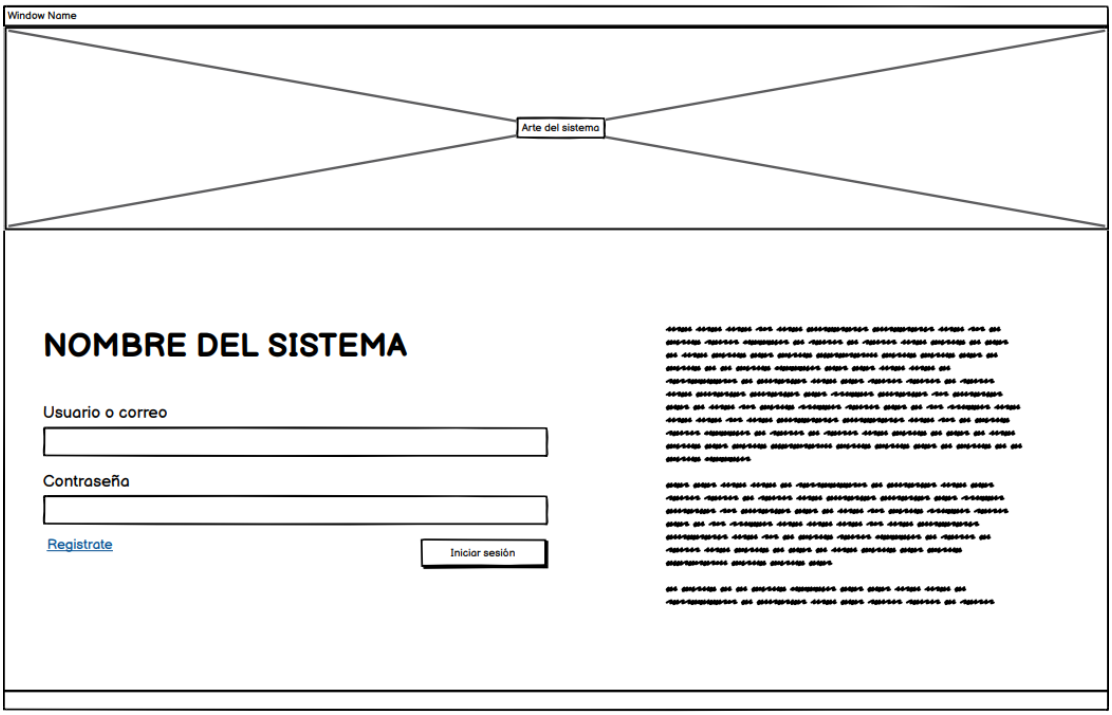
The application must include options that allow the user to exit the application and access help at any time.

Optionally, interface adaptation capabilities may be included to adjust to user preferences, such as changing font type and size or modifying the layout.

Low-Fidelity Prototyping (Lo-Fi)

This section presents the low-fidelity (Lo-Fi) prototype developed during the early stages of the design process. The prototype is represented through a set of illustrative screens created to explore the main structure of the system and the proposed navigation flows. The objective of this prototype is to validate the fulfillment of the identified requirements by focusing on information organization, screen layout, and user interaction flows, rather than on visual design details. The following images are discussed to explain how each screen and its connections contribute to meeting the functional and usability requirements of the system.

1.



2.

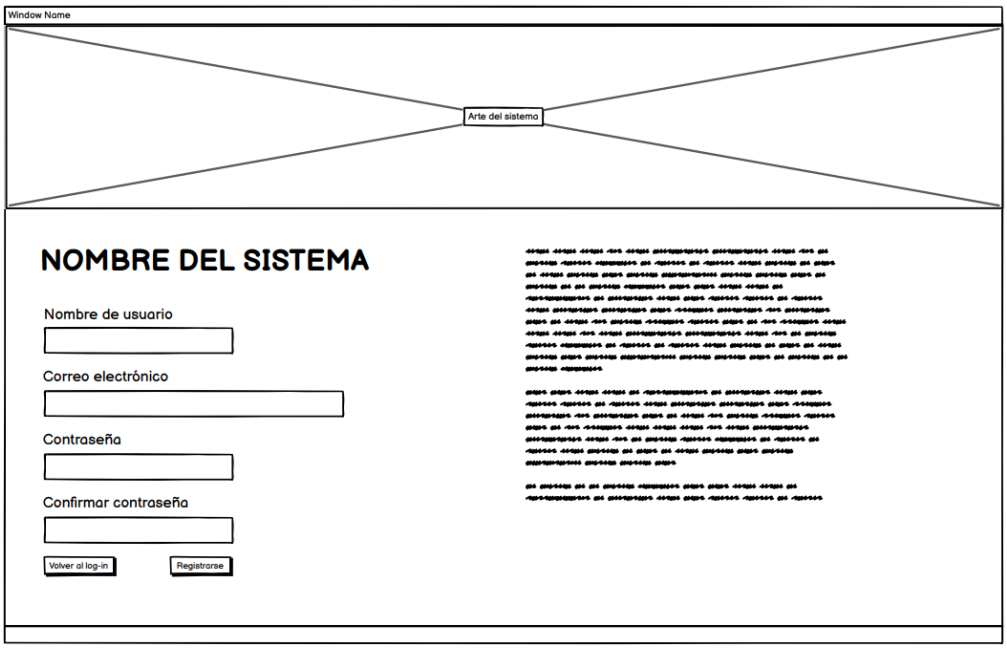


Image 1 and Image 2 Login and Registration Screens

Images 1 and 2 represent the authentication process of the system. Image 1 shows the login screen, where users are required to enter their username and password in order to access the platform. In addition, this screen includes an option to register, which allows new users to navigate to the registration page.

Image 2 corresponds to the registration screen. This screen provides the necessary input fields for creating a new account, including username, email address, password, and password confirmation. The separation between the login and registration screens supports a clear and intuitive navigation flow, ensuring that both existing and new users can complete the authentication process efficiently while satisfying the system's access requirements.

3.

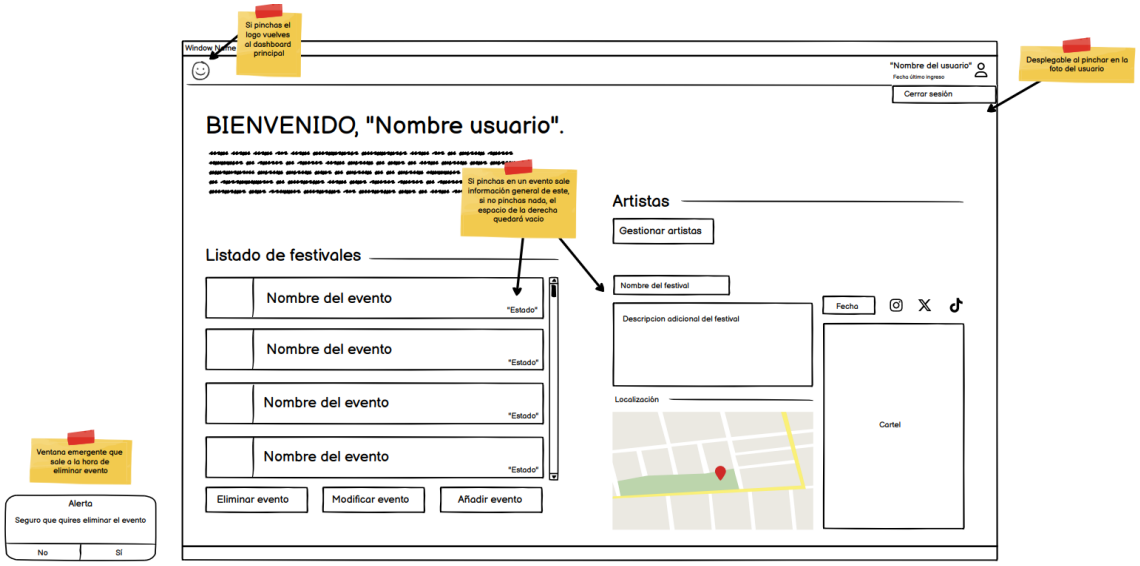


Image 3 Dashboard and Event Management

Image 3 illustrates the main dashboard of the system, where a list of previously created events is displayed. By selecting an event from the list, the user can access its detailed information, including the festival name, a brief description, the festival poster, the event date, and the venue address.

This screen also provides a dedicated button to manage associated artists, as well as additional controls to add, edit, or delete events. When the user chooses to delete an event, a confirmation alert is displayed to ensure that the action is intentional, thereby preventing accidental data loss. This design supports efficient event management while enhancing user safety and control.

4.

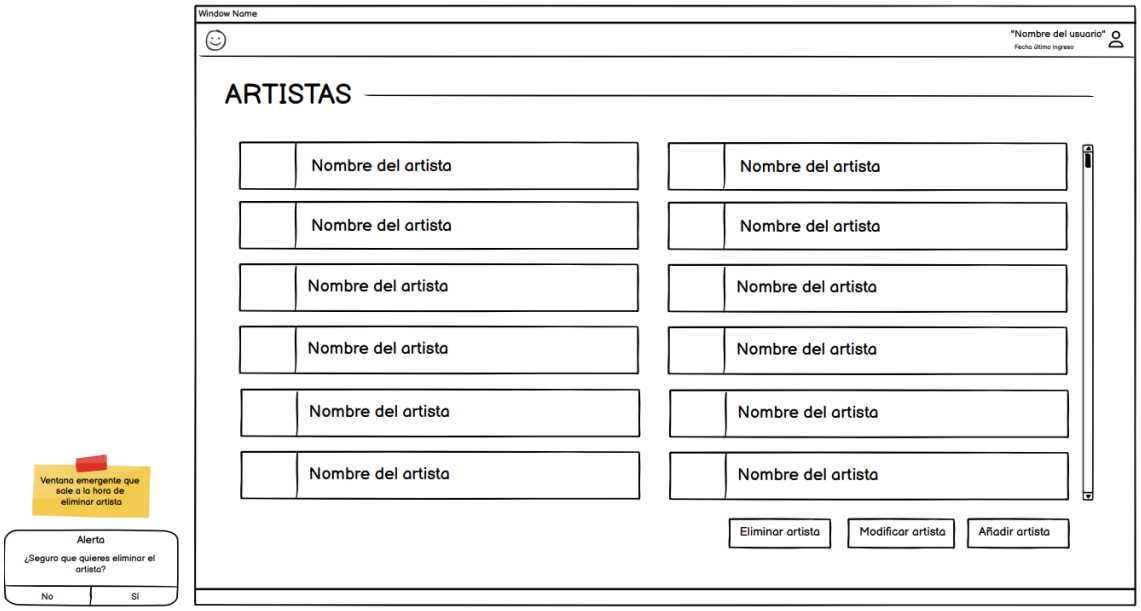


Image 4 Artist Management Section

Image 4 corresponds to the artist management section. This screen presents a list of all available artists within the system and provides controls to add, edit, or delete artist entries.

Similar to the event management process, deleting an artist triggers a confirmation message that asks the user to verify the action. This mechanism ensures awareness of irreversible operations and contributes to a consistent and reliable user experience ac ross the platform.

5.

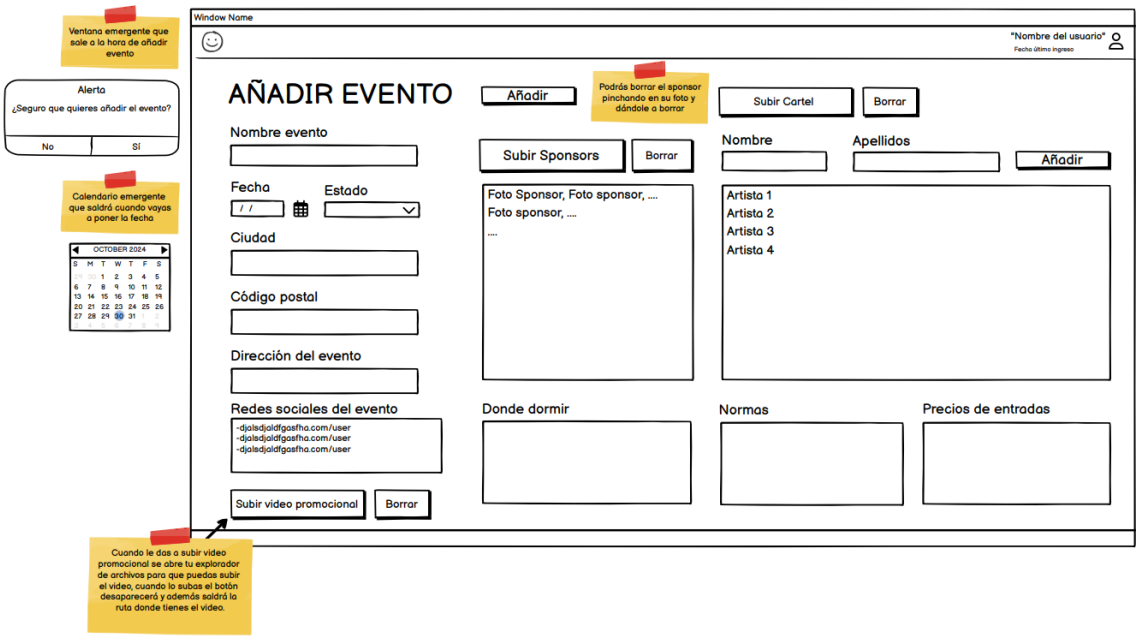


Image 5 Add Event Screen

Image 5 shows the screen dedicated to creating a new event. This form includes multiple input fields that allow the user to define all relevant event information, such as the event name, date, and status (activated, cancelled, postponed, planned, or active). Additional fields are provided for the city, postal code, and event address.

The screen also includes sections for entering the event's social media links, uploading a promotional video, and adding images related to sponsors. Further inputs allow the user to specify accommodation information, upload the event poster, select participating artists from a predefined list, and define event rules and ticket pricing. By grouping all these elements within a single interface, this screen supports a structured and comprehensive event creation workflow that aligns with the functional requirements of the system.

6.

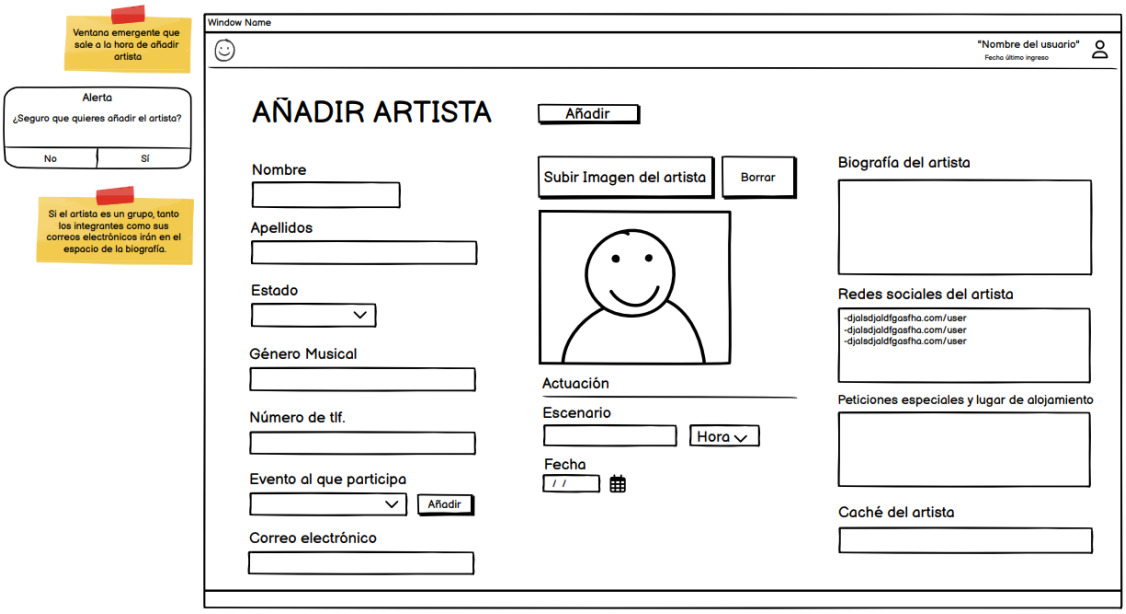


Image 6 Add Artist Screen

Image 6 presents the screen used to add a new artist to the system. This interface includes a set of input fields for entering the artist's personal and professional information, such as first name, last name, status (pending, rejected, or confirmed), musical genre, and phone number.

Additionally, the form allows the user to link the artist to a specific event, enabling a clear association between artists and their corresponding festivals. The screen also includes fields for the artist's email address, a button to upload an artist image, and dedicated sections for writing the artist's biography and adding social media links. This structured layout supports accurate data entry and facilitates efficient artist management in alignment with the system's functional requirements.

7.

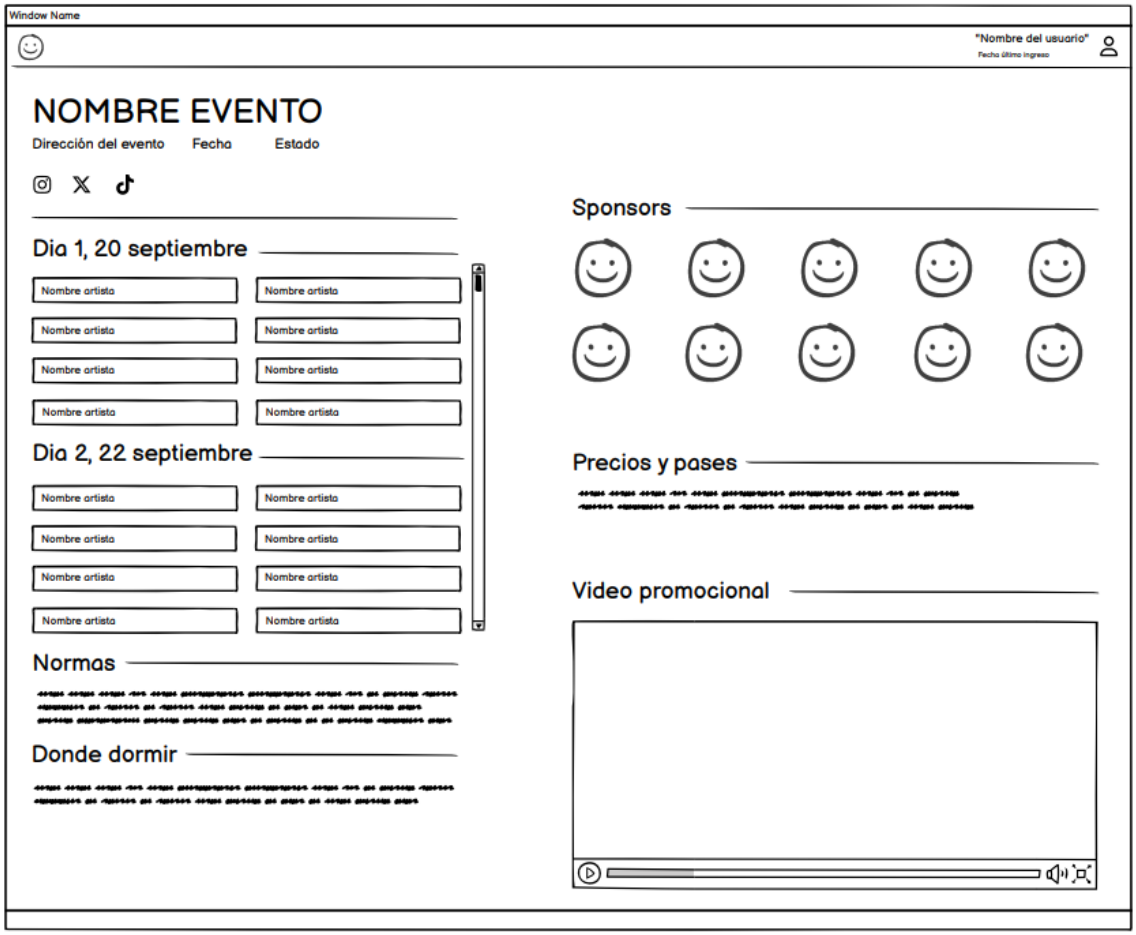


Image 7 Event Visualization Screen

Image 7 shows the event visualization screen, which is displayed when the user double-clicks on an event from the dashboard presented in Image 3. This screen provides a comprehensive overview of the selected event, including its name, current status, address, and date.

In addition, the interface displays all participating artists, associated sponsors, event rules, accommodation information, and ticket pricing details. The screen also includes a promotional video related to the event. By aggregating all relevant information in a single view, this screen allows users to efficiently review event details while supporting informed decision-making and requirement fulfillment.

8.

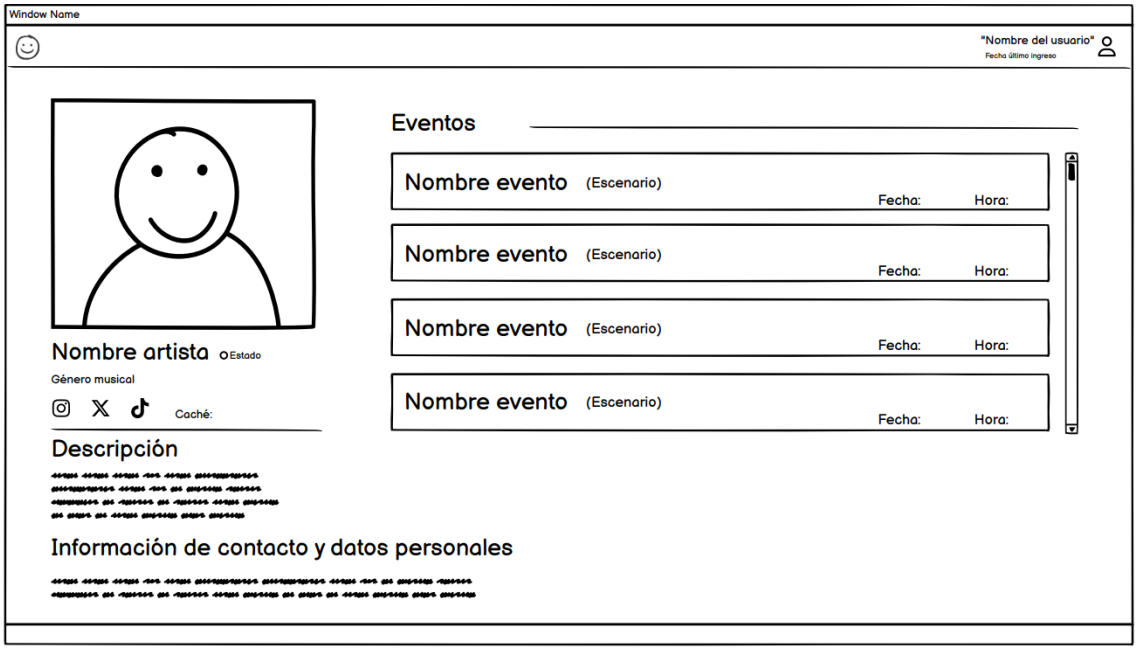


Image 8 Artist Visualization Screen

Image 8 corresponds to the artist visualization screen, which is accessed by double-clicking on an artist from the artist list shown in Image 4. This screen presents a detailed view of the selected artist, including an image, the artist's name, a brief description, and a list of events in which the artist is scheduled to participate.

This layout enables users to quickly understand the artist's profile and their involvement across different events, reinforcing clarity and consistency within the navigation flow of the system.

Design Principles

The design of the system follows a User-Centered Design (UCD) approach, focusing on the needs, goals, and limitations of the users. The low-fidelity prototype demonstrates how these principles are applied, ensuring an intuitive, accessible, and efficient interface. The design explicitly incorporates the Gestalt laws of perception and adheres to Nielsen's ten usability heuristics, as outlined below.

Gestalt Laws Applied

Law of Proximity: Elements that are closer to each other are perceived as a group or unit.

- **Application:** In the event manager, the date and time are placed close to the event title to be perceived as related information.

Law of Similarity: Elements that are similar in color, shape, or other visual attributes tend to be grouped together.

- **Application:** Buttons for "Add Event," "Edit Event," and "Delete Event" share the same shape, size, and color to indicate that they belong to the same group of management actions, making them easily identifiable as related functions.

Law of Closure: Closed boundaries are perceived as a single unit more easily than open ones; the brain tends to close incomplete shapes.

- **Application:** Cards and panels around event or artist information use borders and shapes that suggest completeness, enhancing clarity.

Law of Continuity: Parts of a figure that form a smooth curve or follow the same direction are grouped more easily.

- **Application:** Navigation flows between screens, such as from the dashboard to event details, follow logical, continuous paths that guide the user naturally.

Law of Good Form: The perceptual field is organized to form balanced, harmonious, and coherent entities.

- **Application:** Layouts are symmetrical and organized, creating visual stability across the dashboard and input forms.

Law of Past Experience: Users previous experiences shape their current perceptions, familiar forms are recognized more easily.

- **Application:** Common interface patterns, such as buttons, lists, and forms, follow familiar conventions, making the system intuitive for users.

Nielsen's Ten Usability Heuristics Applied

Visibility of System Status: Feedback is provided for all actions, including alerts when deleting events or artists and confirmations for critical operations.

Match Between System and the Real World: Terminology and workflows reflect real-world concepts related to events and artists.

User Control and Freedom: Users can undo or cancel critical actions to prevent mistakes.

Consistency and Standards: Layouts, button styles, and navigation patterns remain consistent across screens.

Error Prevention: Confirmation dialogs and structured input forms prevent accidental data loss.

Recognition Rather than Recall: Information is displayed through lists, dropdowns, and pre-filled fields, reducing the cognitive load on users.

Flexibility and Efficiency of Use: Dashboards centralize operations, minimizing unnecessary steps for frequent users.

Aesthetic and Minimalist Design: Only essential information and functionalities are presented, avoiding visual clutter.

Help Users Recognize, Diagnose, and Recover from Errors: Clear messages indicate issues and provide guidance for correction.

Help and Documentation: Tooltips, labels, and brief instructions guide users efficiently throughout the interface.

4. Hi-Fi Prototyping and User Evaluation

4.1. High Fidelity (Hi-Fi) Prototyping

The final prototype of FestMaster was developed using WPF (Windows Presentation Foundation) technology. This version represents the culmination of the user-centered design process, integrating all the operational functionalities required for managing festivals and artists into a coherent and efficient visual environment.

4.1.1. Prototype Discussion and Problem Solving

Compared to the initial (Lo-Fi) sketches and the competitive analysis, the high-fidelity prototype introduces specific solutions to identified usability problems:

Consistency and Aesthetics. A retro color palette (yellow and brown) has been applied to create a distinctive visual identity. Following Gestalt principles, the control and data display elements have been grouped so that the user can quickly identify interaction areas without cognitive effort.

Login

Workflow Optimization. To address the "excessive navigation" criticized in other applications, FestMaster uses a centralized dashboard. From the dashboard, users can manage the festival, view its location, and access the artist list with a single click, while always maintaining visibility of the system status.

Main Window

The dashboard acts as the application's operational core. It applies Nielsen's "System Status Visibility" heuristic, allowing the administrator to see the list of festivals and the current status of each at a glance.

Design decision: The visual hierarchy has been optimized by placing the critical "Add," "Modify," and "Delete" actions directly below the data list. The integrated map serves as a direct visual aid, fulfilling the non-functional requirement of avoiding excessive navigation between screens.

Gestalt applied: The Law of Proximity is used to group the management buttons with the festival list. This visually indicates to the user that these actions directly and dynamically affect the selected element.

Confirmation dialog

Security and Error Prevention. Following Nielsen's heuristics, confirmation dialog boxes have been implemented. This addresses users' fear of losing data due to accidental clicks, a recurring issue mentioned in the Phase 2 interviews.

Contextual Help

The question mark icon (?) opens a specific support window. This context-sensitive help ensures that the user never feels lost, meeting the project's accessibility standard.

Add events

This form demonstrates a clean design in WPF, using aligned data entry controls (TextBox and ComboBox) for easy visual scanning (F-pattern).

Design decision: The "Back" button is positioned away from the main "Add" action button to prevent accidental clicks, an error-prevention technique.

Functionality: It includes specific fields for logistics (Accommodation, Rules, Price), fulfilling the functional requirement of managing not only the event but also the entire attendee experience.

4.2. User Evaluation

4.2.1. Usability Study Details

To validate the effectiveness of FestMaster, an evaluation session was conducted following the User-Centered Design (UCD) Sprint approach.

Participants. The study involved three users with an intermediate level of technological proficiency, similar to the profile of university students identified in the requirements analysis.

Protocol. The process consisted of a brief presentation of the project, mandatory signing of the Informed Consent form, and the completion of three tasks: logging in, registering a new event, and accessing help.

Methodology. The tests were conducted in person using the Think Aloud technique, allowing for direct observation of interaction difficulties.

4.2.2. Problem Identification and Improvement

Proposals

Despite the high level of satisfaction with the aesthetics and clarity of the forms, the following areas for improvement were identified:

Organization of Information in Details. On screens with a high data load, such as artist details, some users suggested spacing the fields further apart to avoid a cluttered feel. Improvement proposal: Increase the vertical spacing between labels and contact information in future versions.

Visibility of Selection Status. A brief hesitation was observed when selecting items from the festival list before clicking "Modify." Improvement proposal: Implement a more intense color highlight for the selected item in the list, improving the visibility of the system status according to Nielsen heuristics.