Analysis of case study Environmental Sustainability - ICESI

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Cali, November 13, 2023

Problem Specification Table	
Client	ICESI University
User	Users type visitors, data gatherers or researchers
Functional Requirements	● RF1 - Register ‘Visitor’ user ● RF2 - Register 'Information Collector' User ● RF3 - Register 'Researcher' User ● RF4 - Link Collectors to a Project ● RF5 - Approve 'Review' Type Evidences ● RF6 - Create Comments ● RF7 - Register Projects ● RF8 - Update project ● RF9 - Delete project ● RF10 - Register of project’s evidence ● RF11 - Register evidences review’s type ● RF12 - Modify evidence ● RF13 - Deactivate evidence ● RF14 - Register of interest’s points ● RF15 - Modify interest’s points ● RF16 - Delete interest’s points ● RF17 - Map visualization ● RF18 - Query project ● RF19 - Query pillar ● R20 - Query interest’s point
Problem Context	This system aims to facilitate the management and retrieval of information related to pillars, projects, points of interest, and evidence associated with the university's sustainability strategy. The system will contain three user profiles: Visitor, Information Collector, and Researcher, each with specific functions and capabilities. Users will be able to register information, manage projects and evidence, access detailed information, view maps of points of interest, and more. The system interface should be simple and accessible from mobile devices and web browsers. Additionally, the system needs to be flexible and scalable for future functionalities. The prototype should provide key features such as user registration, project and evidence management, user access simulation, and detailed information queries.
Non-Functional Requirements	1. Query Performance: The system should be able to respond to queries within a maximum of 3 milliseconds (3 ms). This sets a performance requirement to ensure fast query responses. 2. Simplicity and Ease of Use: The system should be very simple, straightforward, and easy to use from mobile devices and web browsers. This implies a focus on usability and user experience. 3. User Interface Design: The application's user interfaces should be designed by a UX/UI specialist, which sets a requirement for the quality of the user interface design. 4. System Flexibility: The system should be flexible and adaptable to allow for future query implementations for other elements of the system, such as project sponsors or points of interest. This implies a scalable and modular architecture.

User:

Identifier and name	*RF1 - Register 'Visitor' user*		
Summary	This requirement registers a 'Visitor' user with a name and a password.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Username	String	Must contain at least 5 characters, and none of them can be special characters.
	Password	String	At least 8 characters, with a mix of uppercase letters, lowercase letters, and numbers.
Results or postconditions	A new record is generated in the database or storage system that stores the user's information.		
Outputs	**Output name**	**Datatype**	**Format**
	"User created successfully!"	String	N/A

Identifier and name	*RF2 - Register 'Information Collector' User*		
Summary	This requirement registers an 'Information Collector' user with a username, password, full name, email, and phone.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Username	String	Must contain at least 5 characters, with none of them being special characters.
	Password	String	At least 8 characters, with a mix of uppercase letters, lowercase letters, and numbers.
	Full Name	String	Must contain at least one first name and one last name, without special characters or numbers.
	Email	String	Format should be user@domain.

	Phone	String	A valid number with the appropriate format for the region (+country code/local number).
Results or postconditions	A new record is generated in the database or storage system that stores the user's information.		
Outputs	**Output Name**	**Data type**	**Format**
	"User created successfully!"	String	N/A

Identifier and name	*RF3 - Register 'Researcher' User*		
Summary	This requirement registers a 'Researcher' user with a username, password, full name, email, phone, university area, and position.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Username	String	Must contain at least 5 characters, with no special characters.
	Password	String	At least 8 characters, mixing uppercase and lowercase letters, and numbers.
	Full Name	String	Must contain at least a first name and a last name, without special characters or numbers.
	Email	String	Format should be user@domain.
	Phone	String	A valid number with the appropriate format for the region (+country code/local number).
	University Area	String	A valid field of study, research, or work within the university.
	Position	String	A valid position within the educational institution.
Results or postconditions	A new record is generated in the database or storage system that stores the user's information.		
Outputs	**Output Name**	**Data type**	**Format**

	"User created successfully!"	String	N/A

Identifier and name	*RF4 - Link Collectors to a Project*		
Summary	In this requirement, the investigator will associate collectors with a specific project by entering the project they want to be associated with and the collector's identification number. Only an investigator can perform this function.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Project Name	String	Must be an existing project name.
	Collector Name	String	Must be an existing collector name.
Results or postconditions	The program will validate whether the information collector provided correct information to be responsible for a specific project.		
Outputs	**Output Name**	**Data type**	**Format**
	Confirmation	String	"The collector has been associated with the project."

Identifier and name	*RF5 - Approve 'Review' Type Evidences*		
Summary	From a pending review-type evidence, an investigator can approve it to make it available to the public. Only an investigator can perform this function.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	Evidence ID	String	Must be an existing pending review-type evidence ID.
	Approve or Disapprove	Boolean	Must be one of the two valid values: Yes or No.
Results or postconditions	If it's approved, the status of the evidence will change to "available," so that the review can be viewed by users.		
Outputs	**Output name**	**Datatype**	**Format**
	Confirmation Message	String	"Your evidence is now available!" or "Your evidence has not been approved."

Identifier and name	*RF6 - Create Comments*		
Summary	A user creates a comment on a specific point of interest.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Text	String	Must be greater than 30 characters.
Results or postconditions	The comment will appear in the comment box associated with each specific point of interest.		
Outputs	**Output name**	**Datatype**	**Format**
	Displayed Text	String	N/A

Projects:

Identifier and name	*RF7 - Register Projects*		
Summary	A project is registered, and it must be created by an investigator. It includes a name, a start date, an end date, a status, and a list of collectors linked by an investigator.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Name	String	Must be at least 8 characters.
	Description	String	Must be at least 30 characters.
	idPilar	String	Must be one of the valid IDs: 1 for biodiversity, 2 for water, 3 for solid waste treatment, and 4 for energy.
	Start date	Date	Must be a valid date and fall within the system's date range, format DD/MM/YYYY.
	End date	Date	Must be a valid date and later than the start date, format DD/MM/YYYY.
	Status	boolean	Must be one of the two valid states: Active or Inactive.
Results or postconditions	If the data is correct, a project is created with the entered information.		
Outputs	**Output name**	**Datatype**	**Format**
	Confirmation Message	String	"Project created successfully!"

Identifier and name	*RF8 – Update project*		
Summary	This requirement aims to modify the attributes of the project specified by the user.		
Inputs	**Inputs name**	**Data type**	**Valid values conditions**
	Name	String	Only entered if it needs to be modified. Must be at least 8 characters.
	Description	String	It is only entered in case you want to be modified. It must be at least 30 characters.
	Collector List	Array	It is only entered in case you want to be modified. It is a list of collectors linked to the project. They must be existing IDs.

	idPilar	String	It is only entered in case you want to be modified. It must be one of the valid IDs: 1 for biodiversity, 2 for water and 3 for solid waste treatment and 4 for energy.
	Start date	Date	It is only entered in case you want to be modified. It must be a valid date and be within the date range in the system, format DD/MM/YYYY
	End date	Date	It is only entered in case you want to be modified. It must be a valid date and be greater than the start date, format DD/MM/YYYY
	state	boolean	It is only entered in case you want to be modified. Must be one of two valid states: Active or Inactive
Results or postconditions	If the data entered is valid, the pillar can be modified if a project was entered incorrectly, project status, name, identifier, description or start date and end date. According to what the user wants to modify.		
Outputs	**Output name**	**Datatype**	**Format**
	Confirmation	String	“Project modified successfully!”

Identifier and name	*RF9 – Delete project*		
Summary	This requirement will allow you to delete a project. Only an investigator can perform this function.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	Name	String	Must be an existing project name.
Result or Postcondition	Allow the researcher to delete the project and the components it contains.		
Departures	**Output name**	**Datatype**	**Format**
	Confirmation	String	“Project “…” successfully removed!”

Evidence:

Identifier and name	*RF10 – Register of project’s evidence*
Summary	The program allows users with the "Investigator" role to record evidence, which can be files in audio, video, image, text or results reports. Each piece of evidence must be associated with a specific

	project through its identifier and, in some cases, optionally, with a point of interest.		
Appetizer	**Inputs name**	**Data type**	
	Name	String	It must not contain numbers or special characters.
	Description	String	Must be a string of valid characters.
	Registration date	Date	It must comply with the dd/mm/yyyy format.
	idPillar	String	It is an optional entry. Must be an existing ID.
	File URL	String	It is an optional entry. They must be URLs of files in audio, video or image format.
Result or Postcondition	If all data entered by the user is valid, the evidence is successfully recorded within the associated project. Otherwise, an error message will be displayed and the evidence will not be recorded.		
Departures	**Output name**	**Datatype**	**Format**
	Confirmation message	String	"The evidence has been recorded successfully"

Identifier and name	*RF11 - Register evidences review's type*		
Summary	This requirement registers a review based on a previously created project, taking into account data such as name, description, the address of the files, the list of evidence and point of interest. Only a collector or researcher can perform this function.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	Name	String	It must be at least 8 characters long.
	Description	String	It must be at least 30 characters.
	Registration date	Date	It must comply with the dd/mm/yyyy format.
	Status	boolean	When created by Data Gatherers, it is automatically false until review
	URL list	Array	They must be valid addresses.
Result or Postcondition	If the data entered is correct, if the evidence was created by a data gatherer, becomes pending until approved by an investigator. Else, its immediately approved.		
Departures	**Output name**	**Datatype**	**Format**

	Confirmation message	String	“Successful creation, now your review is pending approval”

Identifier and name	*RF12 – Modify evidence*		
Summary	The system must allow users with the “Investigator” role to modify the information of evidence associated with an existing project or point of interest. To do this, it is allowed to change details such as the descriptive name, description, related files (if applicable), the associated project identifier and the name of the associated point of interest. Only an investigator can perform this function.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	New descriptive name of the evidence	String	It must not contain numbers or special characters. Additionally, the name must be unique and not match the name of other evidence existing.
	New description	String	It must be a string valid characters.
	New file URL (If applicable)	String	They must be file URLs in audio, video or image format.
	New idPointInterest	String	It must be registered in the system database.
	Registration date	Date	It must comply with the DD/MM/YYYY format.
Result or Postcondition	The user only has to enter the data they want to modify. If the data entered by the user is valid, the information of evidence is updated successfully. Otherwise, an error message is displayed and the changes are not saved.		
Departures	**Output name**	**Datatype**	**Format**
	Confirmation message	String	“The evidence has been successfully updated”

Identifier and name	*RF13 - Deactivate evidence*		
Summary	The system aims to allow users with the "Investigator" role to disable/deactivate evidence associated with a specific project.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	Name evidence	String	Must be an existing evidence’s name.
	disabled	Boolean	It must be true to be valid.

Result or Postcondition	The system will indicate whether the removal of project evidence was successful or not. The system will return a boolean value that informs the investigator user about the result of the operation		
Departures	**Output name**	**Datatype**	**Format**
	Confirmation message	String	[success/failure]

Points of interest:

Identifier and name	*RF14 - Register of interest's points*		
Summary	The application must allow you to create points of interest, that is, physical locations on the organization's map related to projects in the sustainability area of the ICESI University. Only researchers or administrators can register points of interest. The coordinates based on a matrix that simulates the map of the University and a photo are received as input to easily identify its location.		
Appetizer	**Inputs name**	**Data type**	**Valid values conditions**
	Point of interest name	String	It must not contain numbers or special characters.
	X coordinate	Int	It must be a coordinate in (X,y) format appropriate to the map matrix.
	Y Coordinate	Int	It must be a coordinate in (X,y) format appropriate to the map matrix.
Result or Postcondition	If all entries are valid, the app will create a unique QR code, and save the entered data creating a point of interest.		
Departures	**Output name**	**Datatype**	**Format**
	Confirmation message	String	"Your point of interest has been successfully created!"
	QR code	String	N/A

Identifier and name	*RF15 - Modify interest's points*		
Summary	The application must allow you to create points of interest, that is, physical locations on the organization's map related to projects in the sustainability area of the ICESI University. It receives as input the coordinates based on a matrix that simulates the University map and a photo to easily identify its location.		
Appetizer	**Entry name**	**Datatype**	**Condition valid values**
	New point of interest name	String	It must not contain numbers or special characters.
	New Coordinate	Int	It must be a coordinate in (X,y) format appropriate to the map matrix.
Result or Postcondition	If the entries are valid, the selected attributes will be modified.		
Departures	**Output name**	**Datatype**	**Format**

	Confirmation message	String	“Your point of interest has been modified”
	New QR code	String	The QR code generated from the changes made

Identifier and name	RF16 - Delete interest’s points		
Summary	The system must allow authenticated users to delete points of interest. To do this, the researcher selects the point of interest that they want to eliminate and confirms the action.		
Appetizer	**Entry name**	**Datatype**	**Valid values condition**
	nameInterestPoint	String	Must be an existent interest’s point name.
Result or Postcondition	The selected point of interest has been removed from the system.		
Departures	**Output name**	**Datatype**	**Format**
	Deletion confirmation	string	“The point of interest has been removed”

Identifier and name	RF17 - Map visualization		
Summary	This requirement shows the points of interest of the university. They are represented on a 20x20 map using x, y coordinates. The evidences shown depends if user wants to filer by pillar or project.		
Inputs	**Entry name**	**Datatype**	**Valid values condition**
	filterOpt	int	Must be 1 for pillars or 2 for projects
	idPillar or idProject	int	Must be existent pillars or projects
Result or Postcondition	The map is displayed on the screen, showing the evidences depending on their selection.		
Outputs	**Output name**	**Datatype**	**Format**
	Map	Matriz	Map
	Project’s evidences	String	Shown depending on user selection.

	Pillar’s evidences	String	Shown depending on user selection.

Queries:

Identifier and name	*RF18 - Query project*		
Summary	The user enters the project they wish to consult. The system searches for it and displays the corresponding information and lists.		
Inputs	**Entry name**	**Datatype**	**Condition valid values**
	Name	String	Must be an existing project name.
Result or Postcondition	Based on the name, the program will display the results. From the option, the database provides the corresponding ID, and the program displays the information according to the links of the respective ID. On the other hand, if you investigate with the project ID it brings the project information directly.		
Outputs	**Output name**	**Datatype**	**Format**
	Project information	String	
	Amount of associated evidence type review	Int	
	Amount of associated evidence of other types	Int	

Identifier and name	RF19 – Query pillar		
Summary	The system must allow users to consult detailed information on a strategic pillar of environmental sustainability. User can perform this query while consulting on the map, filtering by pillars and visualizing the evidence's type of the related projects.		
Appetizer	**Entry name**	**Datatype**	**Condition valid values**
	Pillar option	Int	Must be ne of the valid options.
Result or Postcondition	The application will show the pillar information		
Departures	**Output name**	**Datatype**	**Format**
	Pillar information	String	
	Evidences type	String	Must be "A", "V", "P", "T", "RR" or "R"

Identifier and name	R20 – Query interest's point		
Summary	The program must allow the user to consult general information about any point of interest based on its name.		
Appetizer	**Entry name**	**Datatype**	**Condition valid values**
	Coordinates	Int	It must not contain numbers or special characters. Additionally, you must already be registered in the system.
Result or Postcondition	If all the data entered by the user is valid, the system will show the general information of said point of interest and its comments. Otherwise, it displays an error message.		
Departures	**Output name**	**Datatype**	**Format**
	Point of interest information	String	
	Evidences information	String	
	Comments	String	