

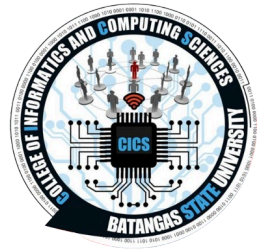


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**Proteq: A Web-based Emergency Response and Safety System for Batangas State
University TNEU - Lipa Campus**

In Partial Fulfillment
of Application Development and Emerging Technologies
Bachelor of Science in Information Technology
Major in Network Technology

By:

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Members:

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Adviser



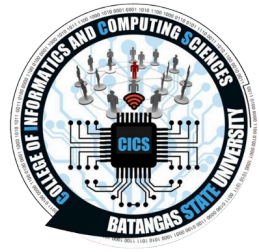
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Project Overview

Proteq is a mobile application developed to enhance campus safety and emergency response for Batangas State University TNEU Lipa Campus. It is developed to offer a centralized place where students, faculty and university personnel can easily report incidents, request welfare checks and be able to have access to real-time safety procedures and evacuation plans. Additionally, it has an interactive map feature, which can help users to determine the exact position of an incident and the location of evacuation centers nearby, making the response work more precise and quick.

The system allows authorities on campus to alert and notify people in real-time so that grave information is shared on time during emergencies. The app also allows users to receive immediate alerts and safety announcements from campus authorities promoting a culture of readiness and responsibility: safety resources are made more available and the active engagement in campus safety is encouraged. Furthermore, Proteq enhances the communication, incident tracking, and other emergency resources under the same platform and ties the community in the university and responders to enhance better coordination and delivery toward a safer and more resilient university environment.

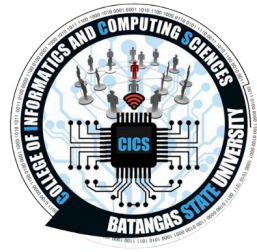


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Phase 1: Design

Phase 1 aims to lay a solid visual and functional base on the mobile application, Proteq, by developing a user-friendly interface and a smooth user experience that would complement the app's purpose of promoting campus safety and emergency preparedness. In this phase, the team were tasked to outline the overall structure of the app through wireframes, define the application's visual identity by utilizing color schemes and icons, and map out the user journey for smooth navigation. Figma was used as a prototyping tool to bring these elements together into a clickable prototype ensuring that the design is clear, consistent, and ready for development.

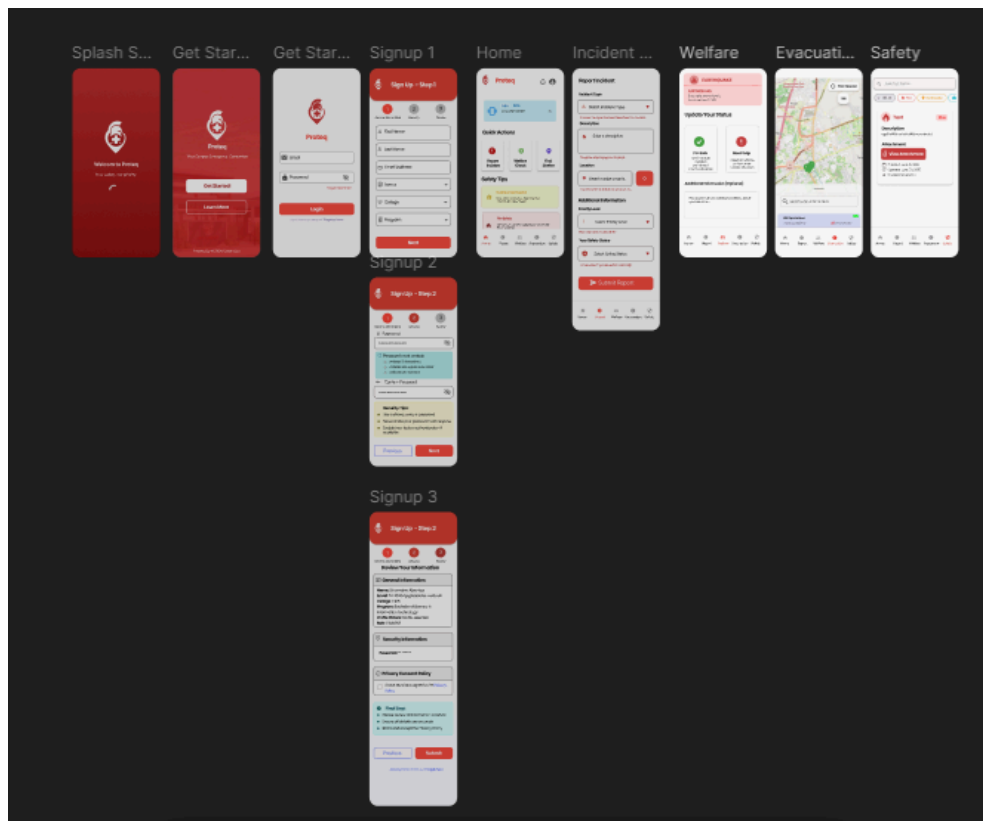


Figure 1: Proteq Mobile App Wireframes

Proteq mobile application is easy to navigate and has a logical, user-friendly flow to allow quick and efficient access to emergency features. This experience will start with the

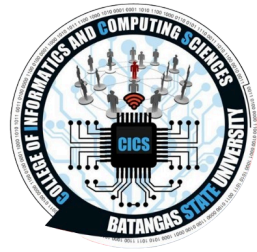


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splash where one will see the logo of the app, the tagline, and the option to Get Started or Learn More about the app. Users are then redirected to the Login Screen where returning visitors or those users who have already created an account can sign in or, new users can start with filling in the Sign-Up Form which is structured into three steps with a view to capturing basic data about the user, followed by information about security-related issues, a final Summary of information entered. After logging in, users get into the Home Screen that serves as a central dashboard. This includes Quick Actions to Report Incident, Welfare Check and Find Shelter and rotating Safety Tips to support awareness creation.

The bottom menu, which stays throughout the site, makes it easy to navigate as people can visit other sections at any moment. When tapping Report Incident, a form with a certain structured design is initiated where you can select the type of the incident, give a description of it, pin the location to the map, assign it a priority level, and state your safety status and send the report directly to campus responders. Within the Welfare Check tab, a user is able to change their status to I Am Safe or Need Help in the case of an emergency such as an earthquake, which allows responders to provide assistance as a priority. The Evacuation screen is a map that can be used to see evacuation centers and safe areas that are close to the user and safely navigate in the crucial moments. Finally, the Safety Protocols will have searchable and categorized emergency manuals with descriptions and downloadable attachment. Combining these screens helps to facilitate a logical and friendly flow that would allow the fast reporting, effective response coordination, and greater preparedness, all of which could be done on the use of a handheld device.

Figma Link: [ProteqMobile](#)

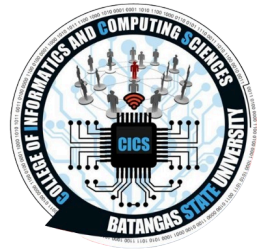


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Phase 2: Development

The Development phase is where the design is enhanced into the actual implementation, and the features and user interface of Proteq mobile application will come into shape through coding. This phase is aimed at creating functional elements, depending on the accepted UI/UX patterns and flow of the system where the developers work on making the application have essential parts of functionality, such as the user authentication, the incident alerts, welfare check-ins, and alerting to state safety resources. With tools and technologies being part of the mobile development best practices, this stage is focused on clean and maintainable code, third-party integration, and cross-device responsiveness. Iterative testing and debugging are also done to achieve stability and performance as the development process continues.



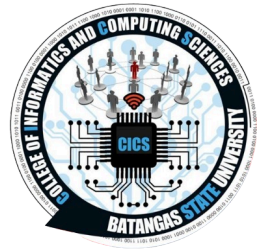


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Figure 2: Agile Methodology

The approach used in this project is the Agile methodology, which focuses on iterative development, a continuous feedback loop, and close cooperation between team members, making it very well-suited for the development of Proteq. This can help Proteq to achieve its objective of providing a trustworthy user-centered campus safety app due to flexibly planned intensive steps and dynamic reactions to stakeholder feedback. In addition, it has the potential to support an endless loop of planning, designing, developing, testing, and reviewing processes through short strides which are very compatible with the changing requirements of a university emergency system. In this way, the team will be able to focus on the main features (incident reporting, welfare check and evacuation instructions) but still be flexible to adjustments proposed by users and the ACTION Center at the university. Agile also makes sure that any given module has been tested and enhanced before proceeding in order to have a more stable, efficient and responsive mobile application which is configurable to real life safety scenarios.

Development Process

The development of the ProTEQ mobile application begins with building the front-end using Flutter in Visual Studio Code and Cursor, focusing on implementing the UI components and navigation flow based on the finalized design prototypes. The UI components, including the buttons, forms, and interactive maps, are generated in such a way that they are consistent and responsive to different devices of Android. In parallel with it, the backend system is created on the basis of MySQL and PHP, which fits within the existing base of the Proteq web-based system. Data operations of registering a user, authenticating a user, reporting of incidents, and updating welfare status are done by the backend.

To manage server-side logic and database interactions, a local development server is configured, and connection to the MySQL database is securely handled using environment configurations. Once the backend is stable, it is deployed on a web hosting service to allow

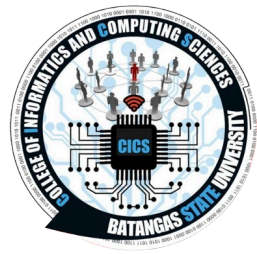


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remote access from the mobile app. APIs are created and tested to enable the mobile frontend to communicate with backend services through sending and retrieving live data like incident reports, user status, and safety alerts. Integration testing ensures that each feature functions correctly, from submitting an incident to displaying evacuation locations on the map. This development process results in a fully operational Android application connected to a real-time backend system that supports a safer, more responsive campus environment.

Hardware and Software Requirements

To ensure optimal performance, compatibility, and user experience, the development and use of the ProTEQ mobile application require minimum hardware and software specifications. These specifications support the app's core functions such as real-time incident reporting, welfare checks, and access to campus safety resources. The following outlines the recommended requirements for both end-user devices and the development environment.

Category	Requirements
Device	Smartphone, tablet
Memory	2 GB RAM (4 GB recommended for optimal performance)
Storage	150 MB of free storage for cached data
Internet Connection	5 Mbps broadband (minimum) for real-time processing

Table 1: Hardware Requirements

Category	Requirements
Operating System	Android 11.0+

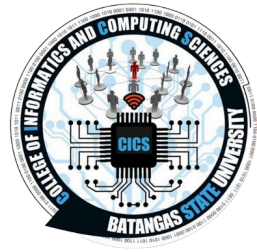


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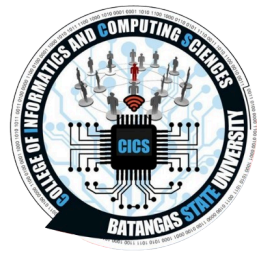
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Permissions	Location
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Table 2: Software Requirements



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Phase 3: Testing

To maintain this phase of reliability and functionality of the Proteq system, tests were performed on various devices and scenarios. The details of the bugs tested during development and the test cases performed to test the system functions are summarized in the following tables.

Bug ID	Description	Device / Condition	Status	Fix Implemented
BUG-001	App fails to connect to the database when the device and server are not on the same network	Android & iOS / Device on mobile data, server on local Wi-Fi	Fixed	Plan to use public IP or cloud hosting;
BUG-002	Location is sometimes inaccurate when submitting an incident	Android & iOS / Weak GPS signal or indoor location	Fixed	Improve accuracy by combining GPS, network, and Wi-Fi sources
BUG-003	PDF or image file cannot be viewed inside the app	Android & iOS / Viewing uploaded PDF or image file	Fixed	Investigate file path handling, permissions, or file viewer compatibility

Table 3. Bug Fixing

Test Case Description	Expected Result	Actual Result	Status	Remarks
Signup with complete and valid details User account is	User account is created and redirected to login	Account created successfully	Pass	



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created and redirected to login Account created successfully Pass -				
Login with valid credentials	User is redirected to the correct dashboard	User successfully redirected to home	Pass	
Submit incident report with complete details	Incident is submitted and confirmation message appears	Incident is submitted and confirmation message appears	Pass	
View attachment (uploaded PDF or image file)	File viewer opens and displays PDF or image	Viewer fails to open file	Fail	Check file path and permissions
Request password reset with valid registered email	OTP is sent to the provided email	OTP received	Pass	
Submit welfare check	Welfare check is submitted	Confirmation message appears	Pass	
Validate incident successfully	Validation status updates, and Edit Details section becomes	Validate success	Pass	

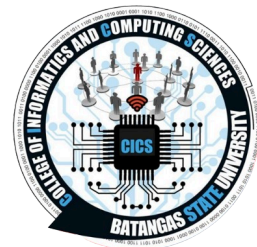


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	active			
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Table 4. Testing Logs

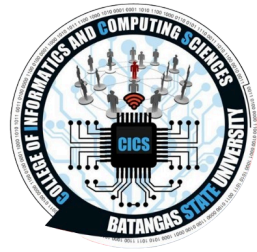


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Phase 4: Deployment

The procedures of deploying are initiated following the development of the app. The application would be designed using Flutter being a cross-platform tool but in this particular implementation, the application is targeted towards Android devices. The key activities are to arrange and complete fundamental capabilities like real-time emergency messages, report and monitor the incident, digital welfare check, real-time communication, emergency resource availability, and work without the internet connection. The application also contains role-based access control (RBAC) which enables several users-students, staff, or admins, to access various functions depending on their roles. After integrating the features, the app is put to test to test its performance, rectify bugs, and verify its connectivity with the PHP backend and MySQL DB through Restful APIs. This comprises checking data processing of user reports, emergencies and safety requirements. The last APK is finally packaged upon successful testing and optimization. Then it is ready to be distributed either manually or submitted to the Google Play Store where it can be accessed by the others.

App Icon:



Figure 3. App Icon of Proteq Mobile Application

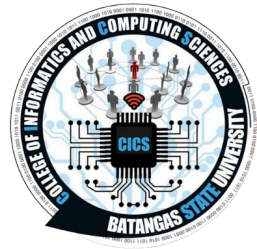


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App Screenshots:

The first screenshot shows the Proteq login screen. It features the Proteq logo at the top, followed by input fields for Email and Password. A 'Forgot Password?' link is located below the password field. A red 'Login' button is positioned below the input fields. At the bottom, there is a link that says 'Don't have an account? Register here'.

The second screenshot shows the Proteq home dashboard. It includes a header with the Proteq logo, a notification bell, and a user profile icon. Below the header, there is an 'Info' banner. The main content area is divided into sections: 'Quick Actions' with buttons for 'Report Incident', 'Welfare Check', and 'Find Shelter'; 'Safety Tips' with cards for 'During an Earthquake', 'Fire Safety', 'Medical Emergency', 'Intruder Alert', and 'General Safety'; and 'Emergency Contacts' with a list of contacts including 'Campus Security', 'Health Center', and 'Emergency Hotline'.

The third screenshot shows the 'Report Incident' form. It includes a dropdown menu for 'Incident Type', a text input field for 'Description', a dropdown menu for 'Location', a dropdown menu for 'Priority Level', and a dropdown menu for 'Your Safety Status'. A red 'Submit Report' button is located at the bottom of the form. The bottom navigation bar of the app is also visible, showing icons for Home, Report, Profile, and other functions.

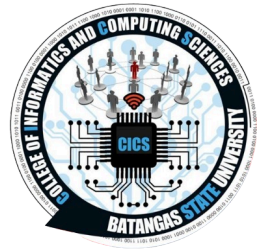


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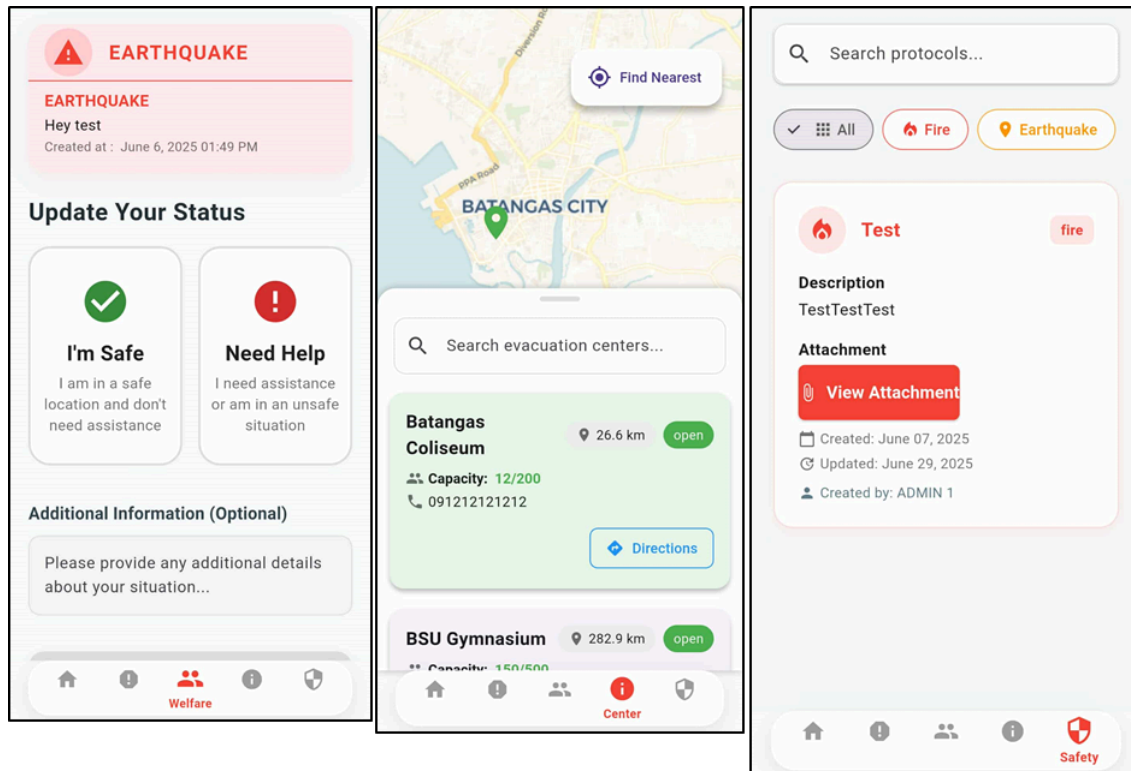
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App Description

What does it offer? (Your Campus Safety Companion)

Proteq provides a secure mechanism of reporting any incident, delivering emergency messages and verifying the safety of users in difficult circumstances. It assists in simplifying the communication process among students, faculties, staff, and responders. Safety protocols are also accessed through the app and its emergency facilities. On the whole, it enhances safety and emergency preparedness in campuses.

For what purpose? (Stay Informed, Stay Safe)

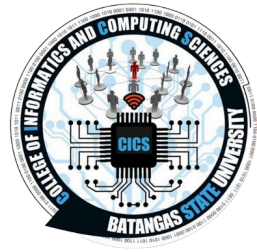


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From real-time alerts to digital welfare checks, Proteq empowers the university community to respond proactively and stay protected.

How can it help? (Accessible, Anytime, Anywhere)

Proteq helps by making safety tools and information available anytime, even without internet access. Its offline features allow users to view protocols and report incidents when needed. The app is also responsive and easy to use across different devices. This ensures that help and information are always within reach during emergencies.

How can it help? (For Everyone in Campus)

Whether you're a student, professor, or ACTION Center staff member, Proteq offers a user-friendly platform to support your safety responsibilities.

Features

- Real-Time Emergency Alerts
- Incident Reporting & Tracking
- Digital Welfare Checks
- Real-Time Communication
- Analytics & Reporting Dashboard
- Safety Guidelines & Emergency Resources
- Role-Based Access Control (RBAC)

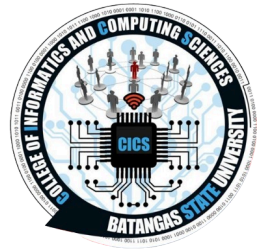


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Phase 5: Maintenance

The Proteq mobile application will need periodic support to be running well since it should be functional, secure, and reliable to all members of the Batangas State University. Once implemented, the developmental team will be keen to monitor the working of the app to pick up any problems and areas that need improvement. The collection of feedbacks by users particularly on Google Play Store reviews is a process that is important. This feedback assists in locating bugs, user issues or ideas regarding new features. The updates will be done regularly including the correction of errors, improvement of the performance and overall user experience. The app shall also be modified so as to be up-to-date with new mobile operating systems. New content or modification of existing material will take place on emergency material and safety resources. Maintenance also involves the checking of crashes, broken links or slow loading pages. First, the development team will ensure that the app will remain simple to use, accessible, and sensitive to the needs of the university. All round, the maintenance is in a position to see through the campus security with Proteq.

Sample Version History

Proteq v1.0.0

- Initial release of Proteq mobile app

Proteq v1.1.3

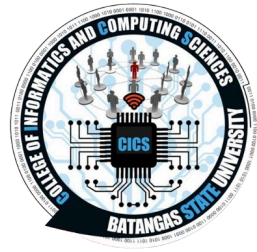


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- Improved offline access to safety protocols
- Fixed minor bugs in the report submission process
- Updated UI for better dashboard experience
- Added support for dynamic announcements

Proteq v1.2.0

- Enhanced welfare check responses with visual status
- Refined role permissions and admin control panel
- Improved location tracking accuracy
- Optimized performance for low-end devices

Proteq v1.3.5

- Integrated resource display for evacuation centers
- General performance improvements and code cleanup

Maintenance Plan

A maintenance plan shall be used to maintain the application stable and working as subsequently required. It consists of routine bug fixes, performance verification, and upgrading the program according to users' perception. User feedback and ratings will assist in deciding what features to upgrade or change.