



# Improving Emergency Evacuation Communication in Thessaloniki, Greece

Katie Adiletta | ECE/CS | 27'

Matt Di Giovanni | AE | 27'

Sean Follis | AE | 27'

Angelina Popp | AREN | 27'

Project Advisors: Melissa Butler and Robert Kinicki

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Sponsor: SolidarityNow



## Table of Authorship

Section	Primary Author(s)	Primary Editor(s)
1.0 Introduction	All	Angelina Popp
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3.0 Methods Chapter	Matt Di Giovanni	Katie Adiletta
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# 1.0 Introduction

Natural disasters are an inescapable reality that occur “more often and with greater severity than ever” (Ma et al., 2023). The number of natural disasters has increased dramatically, rising from 50 events in 1960 to 450 in 2024. (EM-DAT & CRED/UCLouvain, 2025). These events cause economic disruptions, long-term social and psychological effects, and between 40,000 to 50,000 fatalities every year globally, suggesting the need for proactive strategies to reduce the risk of mortality (Ritchie et al., 2022). A useful strategy is disaster mitigation, which includes real-time monitoring, hazard identification, and creating an emergency plan (Zhou et al., 2018). Emergency response groups in every community establish preparedness guidelines that incorporate the specific local needs and resources to decrease the impacts of catastrophes (Ma et al., 2023). One important step in creating these guidelines is identifying disasters that may occur (Zhou et al., 2018).

Over the past 40 years, Greece has experienced an increasing number and severity of floods, earthquakes, and wildfires (EM-DAT CRED/UCLouvain, 2025). Recent disasters in Greece illustrate how failures in transportation, utilities, and communication networks complicate evacuation efforts. Fieldworkers navigating affected areas may encounter blocked routes, damaged shelters, and limited access to accurate updates (Diakakis et al., 2025). When information becomes inaccurate, misinterpreted, or inaccessible, the safety of fieldworkers as well as the individuals they are evacuating is at risk (Barrantes et al., 2009).

To address these systematic failures, current solutions take advantage of mobile devices with applications developed to improve communication (Luna & Pennock, 2018). Unfortunately, these kinds of safety communication platforms tend to prioritize government or corporate users

leaving non-profit humanitarian organizations without affordable, accessible, and easy to implement tools.

While humanitarian organizations such as SolidarityNow provide essential support to vulnerable populations, they face critical challenges maintaining reliable communication between personnel during emergency evacuations due to disasters. Rapidly changing conditions on the ground and the large quantity of SolidarityNow members create room for error when real time updates and confirmation of personnel safety are most important. The organization currently uses Microsoft Teams for communication, but it doesn't effectively reach specific groups working in the field in a timely manner. As a result, establishing rapid and reliable communication has become one of the most pressing humanitarian needs for organizations operating in affected areas.

The goal of this project is to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations. By delivering rapid and accurate updates, the app strengthens evacuation effectiveness, promotes safety, and reduces the risk of mortality during emergencies.

**Objectives:**

1. Evaluate the effectiveness and feasibility of existing safety communication applications.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuation scenarios.
3. Develop a communication solution for evacuation messaging.
4. Assess the effectiveness of the proposed communication solution.

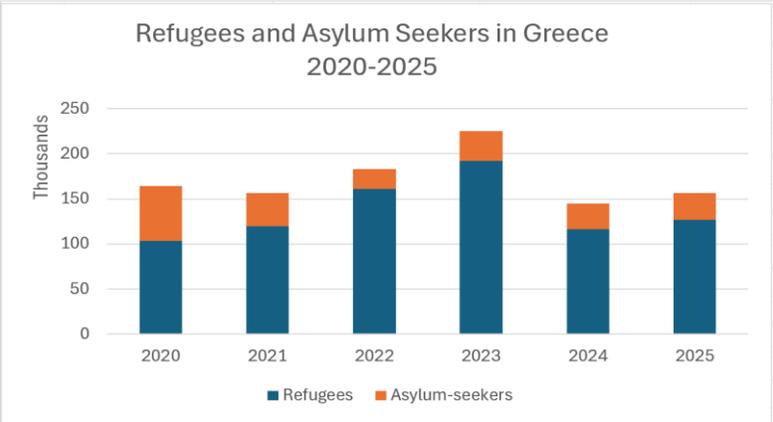
## 2.0 Background

This chapter explores the factors and challenges that shape emergency evacuation communication and examines the technological tools that support these systems. Section 2.1 describes how the number of vulnerable individuals in Greece has risen from approximately 140,000 to 160,000 since 2024, increasing the complexity of evacuation planning. Section 2.2 reviews the major types of natural disasters affecting Greece and the impacts these events have had on critical infrastructure. Section 2.3 examines where and how communication systems fail during disasters and introduces the framework for effective emergency communication. Section 2.4 expands on this framework by examining key features and design principles that improve the effectiveness of emergency communication applications. Section 2.5 outlines SolidarityNow's mission and describes how the organization coordinates communication between office staff and fieldworkers during crisis response.

### 2.1 Vulnerable Populations in Greece

The vulnerable population, many of whom are women and children, include but are not limited to racial and ethnic minorities, individuals experiencing poverty, persons with physical or medical challenges people experiencing homelessness, and migrants (Walton et al., 2021). In Greece, refugees and asylum seekers are among the largest vulnerable groups, often traveling to Greece in search of safety and protection from war zones and natural disasters in their home country. According to the UN Refugee Agency, Figure 2.1 below shows how Greece had an estimated 116,450 refugees and 28,244 asylum seekers in 2024 (UNHCR, 2025a).

Figure 2.1, shows an increase in the number of refugees and asylum seeker in Greece from 2020 to 2023, peaking in 2023. In 2024 these populations declined but there is again a growth in Greece of refugees and asylum seekers from 2024 and 2025. From 2020 to 2025 the population of refugees, in blue, is consistently greater than the population of asylum seekers, in orange and from 2021 to 2025 the ratio of refugees to asylum seekers has been mostly consistent.



*Figure 2.1. Refugees and Asylum Seekers in Greece 2020-2025 (UNHCR, 2025b)*

Most of these individuals originated from Ukraine, Afghanistan, Syrian Arab Republic, and Egypt (UNHCR, 2025c). Specifically, Greece has an estimated 36,268 refugees from Ukraine alone between February 2022 and May 2025 (UNHCR, 2025c) and an estimated 18,046 admitted Syrian refugees in 2024 (UNHCR, 2026).

Many refugees and asylum seekers in Greece reside in organized accommodation facilities distributed across mainland Greece, with a significant number located in northern regions near cities such as Thessaloniki, Serres, and Kavala, as seen in Figure 2.2. These settlements often operate with limited resources while supporting large populations with diverse

linguistic and cultural backgrounds. Residents frequently face challenges such as language barriers, dependence on humanitarian aid, and limited access to transportation and services.

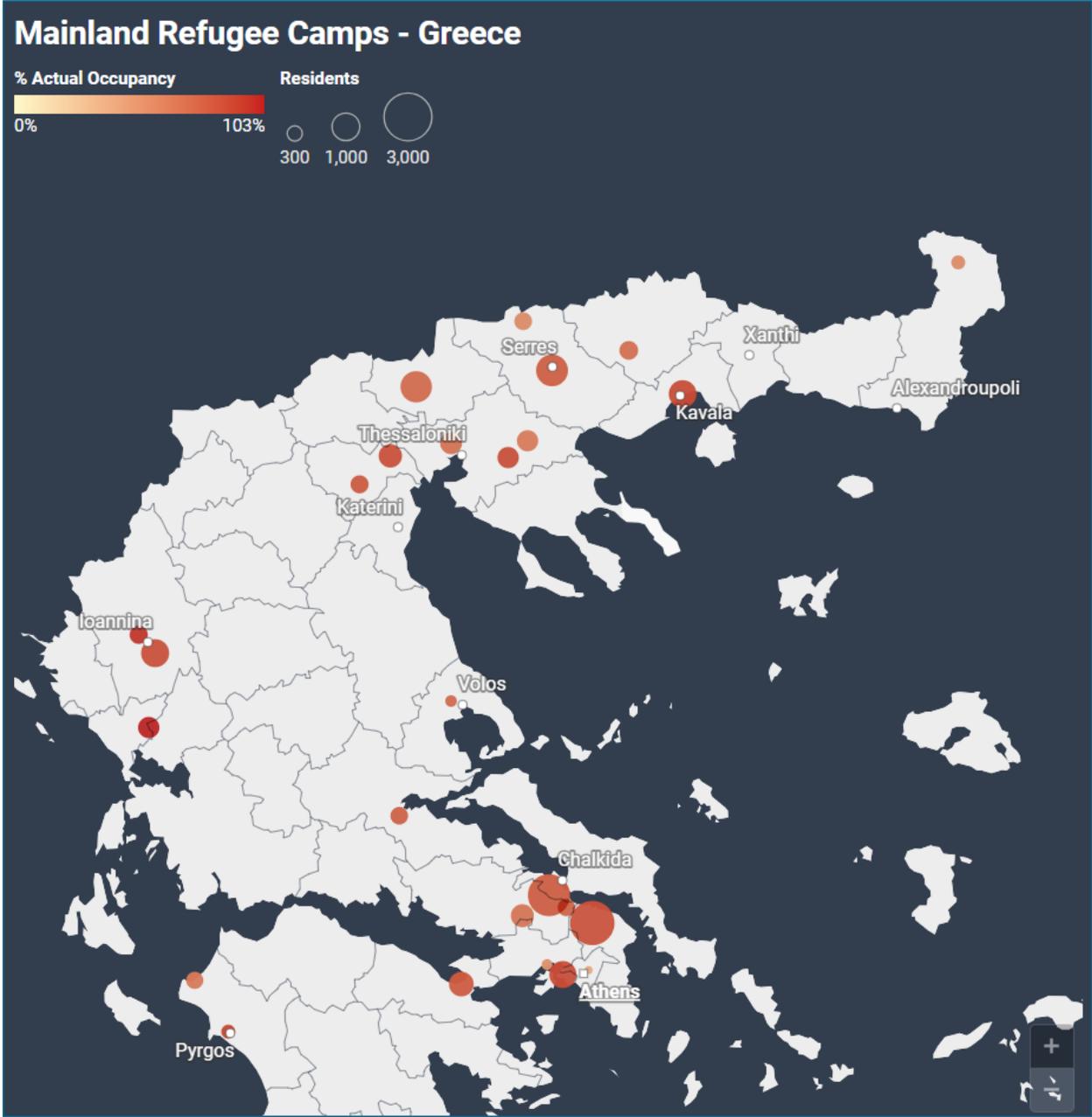


Figure 2.2. Map of Mainland Refugee Camps (Refugee Support Aegean, 2024)

Natural disasters create significant risks for refugees and asylum seekers. During crisis events, displaced populations often face direct exposure to hazards while also lacking the resources and infrastructure needed to adapt to rapidly changing conditions (Walton et al., 2021). Refugee settlements may rely heavily on humanitarian assistance and can have limited

transportation access, emergency resources, and preparedness infrastructure. As a result, natural disasters can disproportionately impact refugees and asylum seekers compared to other populations.

## 2.2 Infrastructure Failures During Natural Disasters

Extreme weather events can function as cascading disasters, in which an initial hazard such as heavy rainfall or flooding spreads its impact through the current social, environmental, and infrastructural systems. Rather than resulting in one type of damage, these events disrupt transportation networks, utilities, public health, and emergency response (Diakakis et al., 2016). This is especially relevant in regions where aging infrastructure and urban expansion in flood-prone areas amplify the consequences of extreme weather events (Lasda et al., 2010). Disruptions to critical systems such as roads, bridges, power, and water supplies not only limit access to essential services but they can also force residents to temporarily or permanently leave affected areas (IPCC Climate Change 2023: Synthesis Report, 2023).

When natural disasters occur, these existing challenges can intensify. Flooding, wildfires, and earthquakes can disrupt transportation networks, utilities, and emergency services, making already remote or resource-limited areas more difficult for response teams to reach. As infrastructure systems fail, fieldworkers supporting vulnerable populations must operate in rapidly changing environments with reduced mobility and limited situational awareness.

### 2.2.1 Storm Daniel (2023)

Storm Daniel hit the Mediterranean region in September 2023 and caused severe flooding and infrastructure collapse across multiple countries. The storm mostly affected Libya. Bulgaria, Greece, and Turkey also experienced significant damage. Catastrophic flooding brought destruction and significant loss of life (World Meteorological Organization, 2023). Within

Greece, the storm produced record-breaking rainfall totals, with “more than a year’s worth of rain on central Greece in just hours” (Stamouli, 2025, "A Region Under Water", para. 11) The scale and severity of the disaster placed strain on national infrastructure and emergency response systems, rendering the Athens-Thessaloniki National Road completely useless as shown in Figure 2.3.



*Figure 2.3. Athens-Thessaloniki National Road flooded after Storm Daniel (Tsinidis & Koutas, 2025)*

Flooding triggered cascading failures across transportation, power, and water systems restricting mobility and delayed access to affected areas. This only complicated evacuation efforts and coordination among responders nationwide (Diakakis et al., 2025).

### 2.2.2 Other Natural Hazards in Modern Greece

Flooding is not the only hazard affecting Greece with the country being within one of the most seismically active regions of Europe. Seismic activity occurs primarily in regions such as Crete, the Ionian Islands, and the Aegean Sea (Earthquakes Today, 2026). Research examining earthquake-related trauma highlights elevated levels of stress, anxiety, and long-term mental health effects among affected populations. This can influence how individuals respond to warnings and evacuation instructions. For refugees and asylum seekers who may have already experienced displacement, conflict, or previous disasters, the psychological impact of a new natural hazard can compound existing trauma and further affect how individuals perceive and respond to emergency warnings. (Madianos & Evi, 2010).

Wildfires are another major hazard that frequently necessitate large-scale evacuation in Greece. Studies of the 2021-2022 fire seasons cited widespread evacuation across dozens of Greek municipalities often at the border where residential development meets forests (Zikeloglou et al., 2024). Evacuation delays have caused civilian fatalities, with “approximately 75% of the fatalities [being] civilians” (Diakakis et al., 2016). Improved preparedness and communication could reduce these outcomes.

### 2.3 Disaster Communication: Framework and Barriers

When supporting safe and efficient evacuations during natural disasters, communication between office workers and fieldworkers in areas where vulnerable populations live is one of the primary challenges for humanitarian organizations coordinating a disaster response. Researchers have identified four properties that are present in all disasters and understanding these characteristics helps to maintain an organized evacuation. Figure 2.4 illustrates these four properties: the warning time and severity of the disaster, where the disaster occurs, and how long the disaster is expected to last, with respective examples.

Warning Time	Severity	Location	Duration
<b>Shorter</b> warning: Fast-moving wildfires or floods <b>Longer</b> warning: Rain or snowstorms	<b>Minor</b> rain storm <b>Major</b> earthquake	<b>Highland</b> or <b>lowland</b> at risk <b>Refugee camps</b> as risk	<b>Varies</b> based on characteristics of the natural disaster
Impacts how much time to prepare 	Impacts urgency of response 	Impacts who to alert 	Impacts response strategies 

*Figure 2.4. Four Properties Present in Natural Disasters (Katie Adiletta, 2026)*

Communicating about these factors to the fieldworkers helps with decision making in critical situations and provides adequate support for the vulnerable populations (Luna &

Pennock, 2018). These four properties determine not only the urgency of response but also the structure and content of communication during evacuation efforts.

Effective communication during a disaster relies on selecting the appropriate method to transmit timely and reliable information. There are a range of approaches to establish communication such as community meetings, word of mouth, newspaper, radio, notice boards, websites, television, mobile phone, and social media, all of which are methods suitable for disaster recovery as they can communicate information quickly and efficiently (Roberts, 2019). Regardless of the communication method, an effective framework is necessary to quickly share information and promote organized evacuation. Figure 2.5 illustrates this communication framework which consists of diagnosing the situation, then identifying the target audience and communication method. The response team also needs to communicate the specifics of the disaster such as strategies, resources, and plans of action to the impacted parties. Finally, the organization must provide feedback to make the appropriate adjustments for recovery (Barrantes et al., 2009).

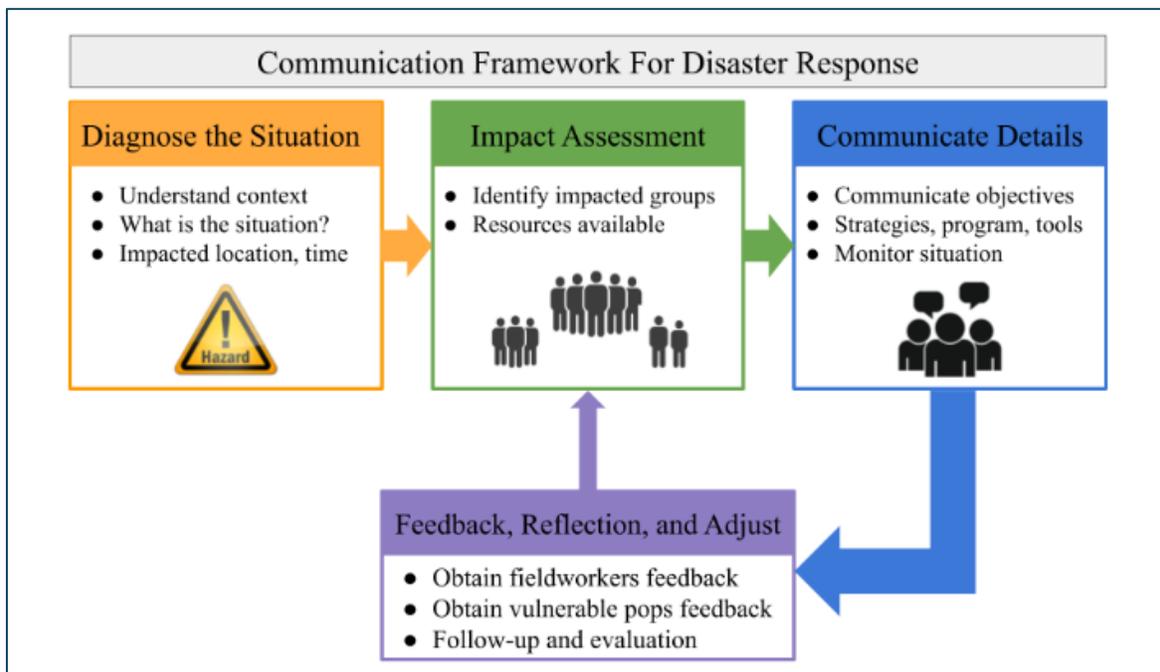


Figure 2.5. Disaster Communication Framework (Katie Adiletta, 2026)

The ability to communicate updates on evacuation strategies, plans, or disaster duration is vital during an organized emergency. Although this framework provides a structured approach to coordinated communication, disruptions frequently occur during implementation. These disruptions fall into three categories: technological, sociological, and organizational (Manoj and Baker, 2007).

### 2.3.1 Technological Communication Challenges

During a disaster, there must be real-time communication between office workers and first responders and between first responders. Emergency response organizations consider mobile telecommunication as an optimal communication system as it helps first responders from different locations stay connected (Natarajan & Hooks, 2023). Organizations must understand the availability of network connectivity, as disasters can severely damage or destroy fixed telecommunication infrastructure. Damaged or unavailable network infrastructure can challenge emergency telecommunication and can prevent responders from communicating with each other, causing a major technological challenge for emergency response. These scenarios require specialized technologies to maintain telecommunication. Table 2.1 below illustrates these current technologies: MANET, Bluetooth Mesh, and Satellite Systems.

*Table 2.1. Communication Technologies Assuming No Fixed Infrastructure*

<b>Technology</b>	<b>Description</b>	<b>Key Features</b>	<b>Disaster Application</b>	<b>Source</b>
MANET (Mobile Ad-Hoc Network)	Network of mobile nodes connected by wireless links	Flexible; works indoors and outdoors; line-of-sight not required	Emergency applications without fixed infrastructure	Luglio (2006)
Bluetooth Mesh	Device-to-device mesh network	Supports up to 32,767 devices; no single point of failure; ideal for small, vital information exchange	Post-disaster scenarios without fixed infrastructure	Álvarez (2019)

Satellite Systems	Satellite-based communication network	Robust communication; large area coverage; long range; connects multiple ad-hoc networks	Long-distance communication in disaster scenarios	Luglio (2006)
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### 2.3.2 Sociological Communication Challenges

The social challenges during a disaster involve understanding the emotional volatility of the vulnerable populations and building trust between them and the fieldworkers during an emergency. Maintaining consistent and updated communication with the fieldworkers who can then relay information to vulnerable populations, aids in reducing fear and stress associated with disaster response (Manoj & Baker, 2007). Other factors that affect the response of vulnerable populations during emergencies include age, language, length of residency, perception of risk, community interaction. Younger ages and older adults may not receive and respond to alerts. Foreign speaking individuals including refugees and asylum seekers may not understand the warnings that are not in their primary language. Refugees and asylum seekers recently arriving in Greece may not know the natural disasters that can occur and may react differently to warnings (FEMA, 2014). Individuals’ previous experiences and observations influence how they react to alerts, and these varied reactions can impact evacuation efficiency; some people may become overwhelmed by stress and have trouble listening to instructions, while others may be more relaxed and easily follow directions (FEMA, 2014). Finally, individuals with more contacts in the community will receive warnings before those who are more isolated and they are more likely trust the alerts by the emergency directors. Being aware of these factors is important to provide accurate, precise, consistent, and timely warning messages about the disaster (Bangi, 2012).

### 2.3.3 Organizational Communication Challenges

Individuals such as educators and social workers may need to take on a new role in the evacuation to support the vulnerable populations. For example, a teacher might change roles to help lead students through evacuation routes or provide first aid. As the roles of the fieldworkers change, there must be clear and accurate communication to assist in the re-organization during a disaster (Manoj & Baker, 2007). Addressing the technological, sociological, and organizational challenges strengthens disaster communication systems and facilitates delivering accurate and vital information.

## 2.4 The Role of Apps in Supporting Emergency Evacuation

Effective emergency communication depends on having a single, centralized platform that connects all employees. During critical situations, organizations must distribute information quickly and reliably across multiple groups, and they can only achieve this when everyone participates in the same communication system. To meet these demands, emergency communication apps must be intuitive and support two-way communication (Jan et al., 2025).

### 2.4.1 Communication Features in Emergencies

During evacuations it is difficult to understand what those who are amid an emergency are experiencing. To mitigate these barriers, emergency communication should enable both user parties (the directors and the fieldworkers) to send and receive. Several researchers highlight the ability to report a disaster and the inclusion of an early warning system as two of the most important features of a safety app (see Figure 2.6). The graph visualizes the findings that users felt the least important features in emergencies are news reports and quick links to external sites.

Jan et al. (2025) conducted a study in Pakistan to determine the best features of an emergency communication app. This study also concluded that an integral part of effective communication was the participation of civilians and volunteers. When this research surveyed participants about the disaster reporting option in the app, 19 of the 30 users in the test population strongly supported it, while another 5 users moderately supported it. These results demonstrate the effectiveness of enhancing disaster reporting efficiency and response (Jan et al., 2025).



Figure 2.6. Features of Safety App (Jan et al., 2025)

Another research study effort that attempted to identify successes and gaps in public risk communication and disaster risk management came to a similar conclusion (Agyepong and Liang, 2023). Effective risk communication incorporates the systematic and purposeful exchange of information about disasters among medical professionals, emergency services, and the public (Agyepong and Liang, 2023). Both studies concluded that meaningful communication during emergencies requires two-way information exchange. This requirement becomes clear when considering the information mismatch that occurs during disasters. Support staff and volunteers

on the ground often lack awareness of the broader scope of the event, while those removed from the situation do not have direct knowledge of rapidly changing local conditions where fieldworkers are present. Research on Hurricane Katrina highlights how communication failures can disrupt disaster response coordination. Garnett and Kouzmin (2007) describe Katrina as “as much a communication disaster as it was a natural and bureaucratic disaster,” noting that communication gaps and information failures delayed recognition of the crisis and hindered response efforts. These information gaps prevented agencies from sharing critical information, resulting in delayed and poorly coordinated decision-making. Without two-way communication, these gaps prevent coordinated decision making. It is critical that as their situation changes the people on the ground can update the emergency directors who then can adjust evacuation plans for their safety.

## 2.5 SolidarityNow

SolidarityNow, is a Greek non-profit humanitarian organization that responds to the needs of vulnerable and marginalized groups without discrimination (*SolidarityNow*, 2026). There are two main Solidarity centers, located in Athens and Thessaloniki, that offer a variety of services free of charge, such as legal aid and counseling, psychosocial support, employability services and support programs for parents and children (*SolidarityNow*, 2026). In its 13 years of operation, SolidarityNow has supported 350,000 beneficiaries, provided 595,000 free services and delivered 20,000 non-formal education activities. These statistics demonstrate the dedication, effort, and impact the organization has achieved (*SolidarityNow*, 2026). The people who make up the SolidarityNow team include 190 employees and 140 volunteers who work in the office as well as those in the field assisting communities (*SolidarityNow*, 2026).

In 2023, the four main disasters that SolidarityNow responded to were floods Daniel and Elias, and wildfires Rodopi and Rhodes. SolidarityNow created its Emergency Response Action Plan before these events occurred and maintains a pool of qualified team members who form its Emergency Response Team (Zavvos & Polena, 2023). Their action during a crisis consists of administering first aid, setting up bases near highly affected areas to provide essentials, and sending trained personnel on rescue missions to save trapped residents (Zavvos & Polena, 2023). They also deliver resources to other organizations providing aid when SolidarityNow cannot distribute them directly during a disaster (Zavvos & Polena, 2023).

An essential part of SolidarityNow's evacuation plan involves moving their own members out of harm's way. In this plan, an office employee serves as the lead emergency response coordinator and directly communicates with all active staff and volunteers, guiding them to predetermined safe locations based on the type of disaster outlined in the emergency plan. The active fieldworkers shift into emergency response roles and lead themselves and the individuals they are supporting to that safe location. SolidarityNow currently uses Microsoft Teams as its primary communication platform. Although it supports everyday coordination, it is not optimized for emergency alerts. During a disaster, emergency directors must manually compose messages and determine the appropriate recipients, which slows the rapid distribution of critical information to fieldworkers. A dedicated emergency communication tool integrated into Teams could streamline alerts, enable standardized message templates, and ensure that critical updates reach fieldworkers quickly.

## 2.6 Summary

Due to its geographical location, Greece experiences natural disasters on a regular basis. Effective evacuation during natural disasters requires more than access to communication tools; it demands a coordinated system that accounts for the characteristics of disasters, the needs of

vulnerable populations, and the realities of field implementation. Warning time, severity, geographic scope, and duration shape how organizations design and deliver emergency messaging, while technological reliability, social dynamics, and shifting organizational roles influence how that messaging functions in practice. Without deliberate planning across these dimensions, communication gaps can delay response efforts and increase risk.

As humanitarian organizations continue to respond to increasingly complex emergencies, they must prioritize structured, two-way communication systems that connect decision makers and fieldworkers in real time. By integrating adaptable technologies with clear operational frameworks, organizations can strengthen coordination, support informed decision making, and protect both staff and the communities they serve during evacuations. This research will guide the design of an emergency communication app tailored to SolidarityNow's operational needs and equips fieldworkers and emergency directions with the tools necessary to coordinate evacuations effectively.

## 3.0 Methods

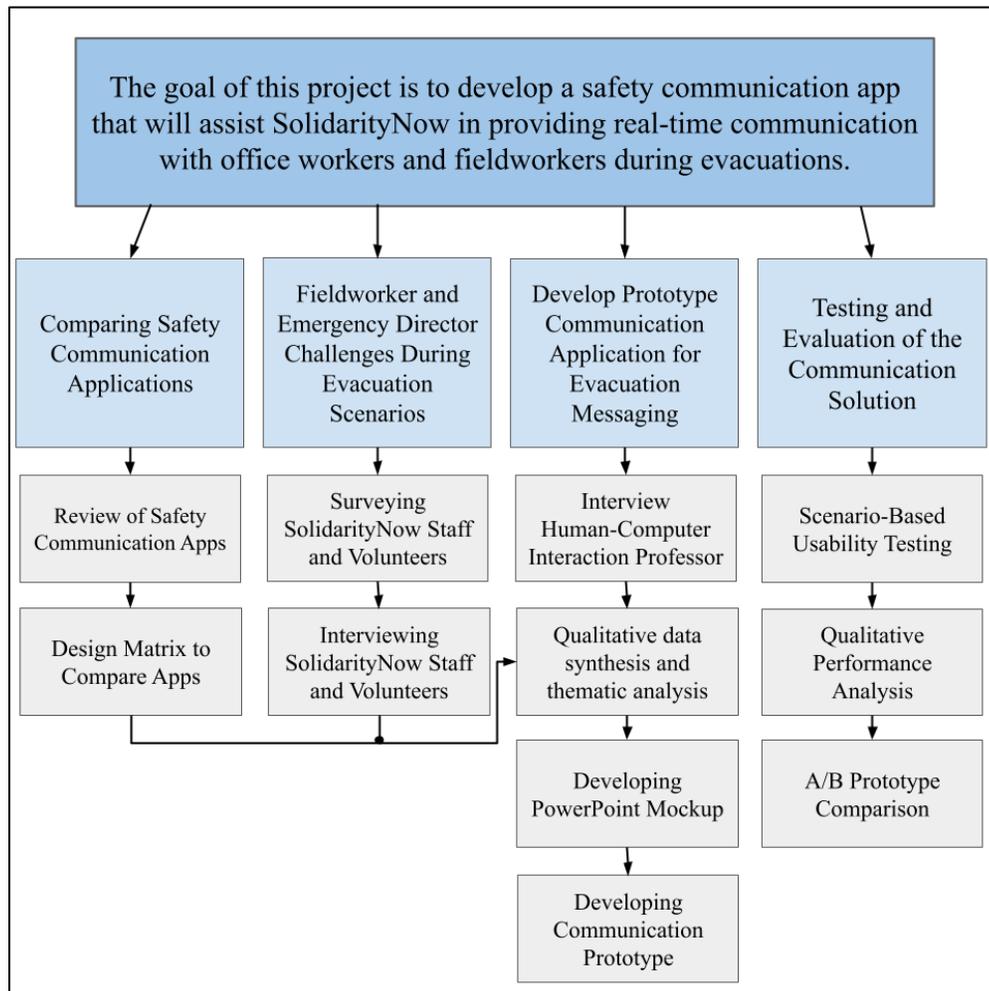
The goal of this project is to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations.

### **Objectives:**

1. Evaluate the effectiveness and feasibility of existing safety communication applications.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuation scenarios.
3. Develop a communication solution for evacuation messaging.
4. Validate the effectiveness of the communication solution.

Our team will conduct on-site research from March 16<sup>th</sup> to May 13<sup>th</sup> at the SolidarityNow center in Thessaloniki, Greece, but will also travel to their Athens office to conduct research. Conducting interviews (shown in Figure 3.1) at several centers will provide us with a better understanding of who the app benefits and what needs the app must fulfill. Since SolidarityNow is asking our team to create an app that will help evacuate vulnerable populations, it is important that our methodology does not interfere with the organization's internal operations. We have kept this in mind throughout the development of our plan. Our focus will be on developing a communication app that allows fieldworkers and staff to communicate by phone using existing network services. The team assumes that all devices using the application will have access to reliable Wi-Fi or cellular connectivity during operation. The project is limited to communication between mobile devices and desktop platforms and does not evaluate alternative communication

technologies such as radios, satellite systems, or Bluetooth mesh networks. This project focuses on the design and testing of an emergency communication application that integrates with Microsoft Teams. SolidarityNow bases much of their communication through Microsoft Teams, so integrating an application into Microsoft Teams aids in a low learning curve for SolidarityNow members. Although SolidarityNow supports refugee camps, the actual interaction with these camps is not in the scope of this project since SolidarityNow staff are the primary users.



**Figure 3.1. Methods Flow Diagram**

## 3.1 Comparing Safety Communication Applications

Our team's first objective was to compare features of existing safety communications apps to evaluate what features provide an effective method of communication during emergencies. Our evaluation of existing apps focused on usability, robustness, and limitations of existing apps to determine the baseline for the app we will develop. To meet this objective, our team performed a literature review of similar apps and built a design matrix on features of existing apps.

### 3.1.1 Review of Safety Communication Apps

To achieve our first objective the team identified peer-reviewed case studies, academic journal articles, government or nonprofit evaluation reports, and usability studies that focused specifically on emergency alert systems, personal safety apps, crisis communication platforms, and disaster response communication tools for review. The purpose of this research is to identify those features, design strategies, and implementation approaches that prior researchers view as most effective in emergency-focused communication apps. By comparing similar applications, we identified the features users valued most, determined which design elements developers implemented consistently, and examined the strengths and weaknesses researchers repeatedly reported. Investigating best practices will enable our team to create a baseline framework for our own application design and to incorporate components of these evidence-based best practices into app design rather than relying solely on assumptions.

We located documents for review using academic databases such as Google Scholar, IEEE Xplore, and university library resources. Our team selected materials based on their relevance to emergency communication, the presence of evaluative findings such as user feedback or performance analysis, and publication within the past 10–15 years to maintain

technological relevance. Our team will analyze this data using thematic analysis, during which we will systematically record frequently mentioned features, commonly reported user preferences, and repeated technical or usability challenges.

### 3.1.2 Design Matrix to Compare Apps

The second method for achieving this objective builds a design matrix, featured below in Figure 3.2, to compare and evaluate features in current emergency communication applications. The project team conducted this comparative analysis to inform the development of an initial app prototype. The matrix examines four existing platforms: Zello, Red Flag, Are You Safe, and Microsoft Teams. These four platforms, as well as the features used to assess them, were determined from the app review previously described. This project drew on customer reviews, developer documentation, and structured in-house testing to construct the comparison.

The team first focused on in-house testing of the AreYouSafe plug-in. Creating a group within the application enables participants to send and receive emergency alerts and generate incident reports. This simple scenario test provided direct insight into the platform's core functionality. Our team found the AreYouSafe dashboard to be simplistic, and easy to navigate with minimal windows to transverse through to report and incident or respond to an SOS. However, the application had no confirmation or safeguard against accidentally SOS notifications and each team member needed to be added individually to the group (no location grouping), which are drawbacks. For the rest of the design matrix, we relied on information gathered through the literature review of each application as Zello and RedFlag have paywalls. Previous user experience and design choices documented in case studies and applications' websites. A study performed by Kangana et al. (2025) identifies Zello as being a strong communication app during floods due to its simple, easy to navigate interface, and instant auto translating voice

messaging system. However, from the Zello website we identified the lack of location-based grouping, as each individual would need to be explicitly invited to the group or channel dedicated to a specific site. Additionally, Zello is a standalone app which all SolidarityNow staff would need to download onto their personal phones, rather than building off their current communication network in Microsoft Teams. This lack of Microsoft compatibility is a major barrier for our sponsor. SolidarityNow currently uses Microsoft Teams as their main method of communication. Our team added Microsoft Teams to the matrix as a reference for what our sponsor currently has to work with, for easy comparison. We have access to Teams through our school accounts which allowed us to test its use as an emergency communication device. The testing of Teams revealed that the application is not fit for emergency communication, it is a daily organizational communication tool. There is no SOS reporting, location grouping, or translation. The application is limited to sending a message to a group chat and receiving responses from the users at the other end. To add users to specific locations the Emergency Director must be invited individually, which he has explicitly stated to be a problem. The completed matrix presents, in a clear and accessible format, the results of our evaluation of the four apps which include determining which applications support features such as translation, location-based messaging, and push notifications (i.e., all the entries in the first column of the matrix).

The scoring framework (namely, the final row in the matrix of Figure 3.2) follows a simple binary structure. When an application supports a feature, the team indicated this by placing green into the corresponding box in the matrix and then added one to the overall score for that app. If an app does not support a feature, the team put red into the corresponding box and the overall score for that app remains unchanged. This analysis does not weigh features differently, because no single component inherently contributes more to safety than another.

Instead, our measure of effectiveness depends on how these features function together within a given emergency context.

	Zello	Red Flag	Are You Safe	M365 Teams
Location Grouping	Red	Green	Red	Red
Push Notification	Green	Green	Green	Grey
Auto Translation	Green	Red	Red	Red
Automation Capability	Red	Green	Green	Red
Microsoft Compatible	Red	Red	Green	Green
Free Use	Red	Red	Red	Green
Two-way communication	Green	Green	Green	Green
Templated Notifications	Red	Grey	Green	Red
Score	3	4	5	3

Design Matrix Legend	
Feature Exists	Green
Feature Missing	Red
Unknown	Grey

*Figure 3.2. Completed Design Matrix*

This structured comparison of the four existing apps reveals patterns across platforms and clarifies which capabilities appear most frequently in tools designed for crisis communication. Considering these patterns alongside the sponsor’s requested features (location-based messaging and Microsoft Teams compatibility) establishes a clear foundation for prototype development and subsequent testing.

## 3.2 Fieldworker and Emergency Director Challenges During Evacuation Scenarios

The second objective is to understand the challenges SolidarityNow members face during their training for emergency evacuation scenarios. We will focus on how the evacuation process occurs, examining communication, decision making process, and breakdown points. In addition, our team will learn the everyday roles of both fieldworkers and office staff to determine their normal responsibilities before they shift into a position where they must guide people to safety. To achieve this goal, our team will survey and interview the members of SolidarityNow.

### 3.2.1 Surveying SolidarityNow Staff and Volunteers

To appreciate the experiences of emergency situations and assess the effectiveness of current safety procedures, our team will survey current employees and volunteers. As the core participants, these individuals can provide essential information this project needs to develop the evacuation communication solution.

Our team will utilize a survey in WPI Qualtrics (see Appendix A) that will gather information about the participants' roles and the current evacuation procedures at SolidarityNow. We will ask questions about how responsibilities change during evacuations, what the current communication strategies are, what features are desired in a communication app (see Appendix A). The survey will also ask participants if they are willing to take part in an interview and to provide contact information if interested.

Our team will write the survey questions in English and translate the survey into Greek using Qualtrics's bilingual features. Our two main representatives from SolidarityNow sponsors will review and complete the survey before distributing it to confirm that it works properly and determine whether we need to remove or add any questions. We will ask our sponsors to

distribute the survey by emailing the survey link to all current volunteers and staff and we will request to display a survey QR code around the office. Our sponsors will include a deadline to complete the survey in the email, set for one week after the survey is initially sent out to volunteers and staff. We will also ask our sponsors to send a follow-up email four days after the initial one to encourage anyone who hasn't completed the survey to do so, helping us gather as many responses as possible.

### 3.2.2 Interviewing SolidarityNow Staff and Volunteers

To identify the key communication challenges and understand how an app can address them, our team will interview survey respondents who indicated interest in a follow-up conversation, as well as other interested individuals, including staff in additional offices. We will use a semi-structured interview guide (see Appendix B) because we cannot anticipate every important question in advance, and it allows us to combine regularly structured questions with additional questions that emerge spontaneously from the interviewee (Lune & Berg, 2021, p.70). Some examples of our premade questions include “Have you experienced miscommunication during an evacuation (practice or actual)?” and “What information is most critical to communicate quickly?” (Appendix B).

We will conduct these interviews in groups of two, where one person will lead the interview, and the other will transcribe and take field notes. If the interviewee does not consent to audio recording, the transcriber must accurately and quickly write down what the interviewee says. If a participant chooses or is only able to communicate in Greek, we will bring in a translator and ask the participant to allow extra time for the interview since the conversation may take longer. Conducting interviews in pairs allows our team to work more efficiently within our limited time in Greece. Each interview will last between 40 minutes to an hour. We will conduct the interviews either in person or on Zoom, depending on each interviewee's location and site

availability, and we will ask participants to set aside at least an hour since the questions may take some time. We will hold the interviews in an office or, if the participant prefers, at a nearby café where the conversation can feel more relaxed. We will record each interview through Microsoft's transcription tool, available on laptops, and on a secondary platform, such as the basic recording app on our phones, to ensure we gather all information accurately. After conducting all the surveys and interviews, our team will evaluate the qualitative data using thematic analysis.

### 3.3 Develop Prototype Communication Application for Evacuation

#### Messaging

The third objective is to develop a prototype communication application that supports evacuation messaging in the field. The application aims to provide real-time communication between office workers and fieldworkers during a natural disaster. The app will implement design criteria necessary for time-critical situations and key features for emergency response. To meet this objective, our team interviewed a WPI UI/UX Design Professional, and we will conduct a thematic analysis of the data from previous objectives. After identifying the necessary components our team will develop a PowerPoint mockup to finally develop a prototype application.

#### 3.3.1 Interviewing WPI UI/UX Design Professional

Our team interviewed a Human-Computer Interaction Professor at WPI who researches and teaches graphic design, UI/UX design and application development. The goal of this interview was to gain a stronger understanding of customized features and interface designs for emergency scenarios. Additionally, the Professor provided a critical analysis of the current safety communication application that SolidarityNow recommended our team investigate. He provided

suggestions and adjustments to implement in our team's communication solution. Our questions involved asking about UI/UX designs that work well in time-critical systems, features that improve quick decision making, and strong testing methods (see Appendix C). The Professor recommended timing how long users take to complete tasks on the application which incorporates the response time of the application processing the message to updating the interface. He also suggested conducting a 'think aloud' session where users describe their thoughts while using the application (see Appendix C). Our team will implement these design choices in the PowerPoint mockup and use the testing methods for improvements prior to developing the final prototype application.

### 3.3.2 Qualitative Research Synthesis and Thematic Analysis

Our team will synthesize data from all previous methods into a structured format and use thematic analysis to identify the key components that the app must include to improve emergency communication. Our team will extract and graph the quantitative results and analyze qualitative results from the surveys. It will also reveal common phrases or information that SolidarityNow workers and volunteers frequently share, which our team will incorporate into the app interface. The design matrix was created to compare applications determined that 'Are You Safe' has the greatest score and uses features such as push notifications, automation capability, Microsoft compatibility, and two-way communication that we will implement in our application. The design matrix shows other applications such as Zello, Red Flag, and Microsoft 365 Teams incorporate features such as location grouping, auto translation, and templated notifications which we will implement in our design. We will draw data from application comparison review notes, Qualtrics surveys, and interview transcripts. Our team will compile the data from these different methods into one location, such as Excel. This analysis will guide the interface layout

and help our team prioritize features so users can efficiently and effectively use the application during emergencies.

### 3.3.3 Developing PowerPoint Mockup

Drawing from the thematic analysis of qualitative research and our interview with the Professor, our team will create a paper mockup incorporating the UI/UX design features users value based on our findings. We will develop the mockup in PowerPoint in a mobile phone application format with a phone and Microsoft Teams App interface. The first image in Figure 3.3 below shows the mockup dashboard with options to send an SOS message, report an incident, manage teams, or view past information. The Professor recommended the placement of the SOS and incident button in the top right and add a confirmation screen after pressing the SOS button, as the second screen of Figure 3.3 shows. The preliminary mockup in Figure 3.3 is likely to change with the collected and analyzed data from previous methods but acts as a starting point to improve on. Our team will use animations in PowerPoint to emulate the transitions of the real prototype application.

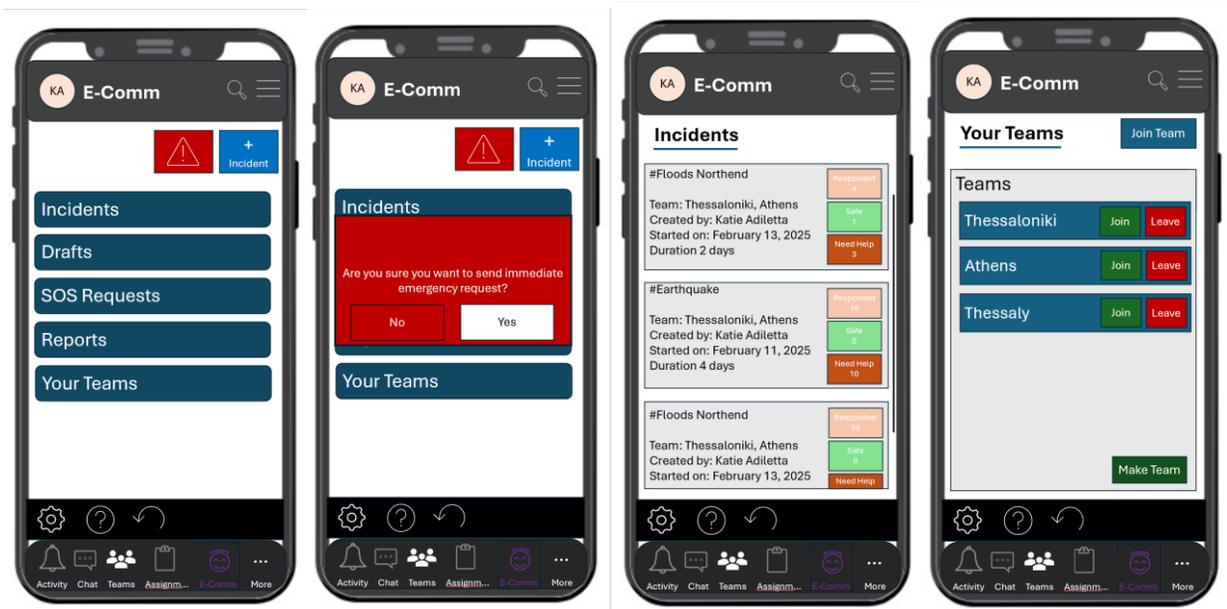


Figure 3.3. PowerPoint Mockup Interface Examples

The PowerPoint mockup will give our team an initial visual model for our application. This low-fidelity mockup will also allow our team to adjust and improve the user interface after analyzing the thematic analysis results. Following this, we will get approval from our Sponsors to build the prototype application, using the PowerPoint mockup as a starting point and ask them to assist us to converting the text to Greek. We will also meet with our sponsor to get approval for our mockup

### 3.3.4 Designing the Communication Prototype

Using information our team gathered from the previous sections, our team will develop a prototype using Microsoft Developer which will connect to Visual Studio Code for the design of the front end and backend of the app. Microsoft Developer Program is designed for developers to design and build applications for Microsoft 365 and Visual Studio Code is an integrated development environment used to code the application. This integration will align the application with the organization's existing infrastructure rather than forcing SolidarityNow to adapt to a new system. Two members of our team will work on designing and developing the mockup application and two members will spend their time on the thematic analysis and transcribing audio interviews.

The following ideas reflect our team's brainstorming process, and nothing is finalized at this stage. One possibility for the frontend is to focus on user interface design, alert prioritization, and navigation structure. The backend would support tagging different regions to group users, confirmation of messages, and the routing of messages. Our team will manage version control in Visual Studio Code and assess the app in virtual environments.

Our team will base design decisions for the application on qualitative data and surveys from the first and second objectives. We will also consider the information gathered from the interview with the Human and Computer Interaction Professor who emphasized minimizing the

searching time for navigating, creating message templates for emergencies, and providing feedback about sent messages like SOS. Our team will use the information from the Professor alongside the interviews and surveys with members of SolidarityNow to decide on key features to implement. Additionally, the team will use feedback gathered from the PowerPoint mockups and early concepts to guide the layout of the front end to prioritize emergency features and simplify the design testing before implementing it in code. Our team plans on having a detailed full scale review with our Sponsors on our application prior to testing to ensure our Sponsors approve of the prototype.

### 3.4. Testing and Evaluation of the Communication Solution

The fourth objective of this project is to test and evaluate the effectiveness, usability, and reliability of the proposed communication solution to determine whether the prototype improves clarity, reduces response time, and supports coordinated decision-making during evacuation scenarios. These characteristics were identified as key functionalities based on the team's background research on emergency communication systems. However, as the project progresses and additional insights are gathered through interviews and prototype development, the specific characteristics evaluated during final testing may be refined to reflect the most relevant needs of the application's users.

#### 3.4.1 Scenario-Based Usability Testing

Our team will develop disaster-response scenarios and ask SolidarityNow fieldworkers and office staff to participate in scenario-based usability testing. Participants will be given short crisis prompts that require coordination between field and office roles, and they will choose how to use the prototype application to respond. The scenarios will be informed by the communication needs and breakdown points identified in Objective 2.

### Example Tasks:

- Reporting an emergency from the field
- Sending evacuation instructions to only one region
- Confirming the safety of all personnel
- SOS reporting
- Reporting issues while evacuating

During scenario testing, participants will be given simulated crisis scenarios and asked to use the prototype application to respond to the situation. After completing the scenario, participants will complete a short survey designed by the research team to evaluate the usability, clarity, and effectiveness of the application. The survey responses will allow the team to identify aspects of the interface that are confusing, require unnecessary steps, or limit the speed of communication during emergency situations.

### 3.4.2 Quantitative Performance Analysis

Our team will collect quantitative data analysis to evaluate the effectiveness of the communication solution by using measurement hooks. These will record information like time on tasks and how long the user is searching for the next steps; metrics suggested by the WPI UI/UX Design Professional. These metrics will allow our team to identify areas where the app creates confusion. If time allows, we will use the metrics to create two versions of the app as detailed in section 3.4.3.

- Time on task: The time required to complete any assigned communication tasks
- Task completion rate: How many users successfully completed the tasks without our team's intervention
- Navigation Steps: How many page changes to get to the goal

- Error Rate: The frequency of incorrect navigation or user inputs
- Search vs Navigation: Number of pauses or hesitations from the user

Using the hooks our team coded into the app, we will determine and analyze the metrics above to identify what changes need to be made before moving to section 3.4.3.

### 3.4.3 A/B Prototype Comparison

As time permits, after collecting and analyzing the data, our team will develop revised versions of the communication solution our team tweaked to solve confusion and delays revealed from the metrics above. Our team will only make small adjustments between versions to ensure that we can see the impact of a revision. The team will evaluate each updated version using the same scenario testing described in section 3.4.1. By having participants complete the exact test with small modifications, our team can easily compare how the changes improved or worsened the experience. The team will make this using the same metrics from each testing to find differences.

In addition to performance metrics, participants will complete a brief survey (Appendix D) after testing the prototype application to provide feedback on the clarity, ease of use, and their confidence when using the app. The survey responses will provide the research team with data to identify usability challenges and inform potential improvements to the final deliverable.

## 3.5 Ethics

In accordance with WPI IRB guidelines, we will begin each survey with a consent statement, and we will obtain verbal or written consent before conducting any interviews, observations or testing groups. In these consent statements, we explain why this method is being conducted, how long it will take, the participation is completely anonymous, and that

participants may stop at any time. We include all consent statements and forms at the beginning of all necessary appendices.

### 3.6 Summary

This chapter outlined the methodology used to develop and evaluate a communication application to support SolidarityNow during emergency evacuations. The project first evaluates existing safety communication applications through a literature review and design matrix comparison to identify effective features and limitations. Next, surveys and interviews with SolidarityNow staff and volunteers provide insight into current evacuation procedures, communication challenges, and desired application features. This will inform the development of a prototype communication solution, beginning with a PowerPoint mockup and progressing to a functional Microsoft Teams integrated application. The prototype will then be evaluated through scenario-based usability testing, quantitative performance analysis, and participant surveys to assess its effectiveness and usability. Final testing will be conducted with our sponsors using the consent form found in Appendix E. Figure 3.4 presents the timeline for completing these methods during the project period in Thessaloniki.

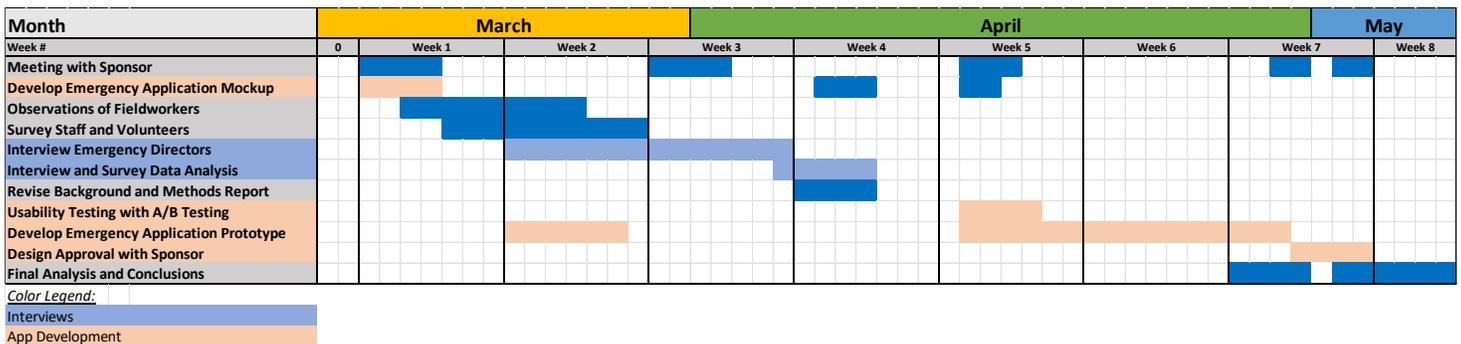


Figure 3.4. Team Gantt Chart Showing Project Timeline

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# Appendix A: SolidarityNow Staff and Volunteer Survey

## Survey Consent

We are a group of students from Worcester Polytechnic Institute, Massachusetts, USA, working on a collaborative project with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations. The purpose of this survey is to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

We will be asking questions pertaining to one or more of the objectives listed above. This survey will take approximately 5 minutes to complete. Your participation is completely voluntary, and you may withdraw or skip questions at any time. Please remember that your answers will remain anonymous. No names or identifying information will appear on the questionnaires or in any of the project reports or publications. Your participation is greatly appreciated. Should you have any questions or concerns, we can be reached at [gr-solidaritynow-d26@wpi.edu](mailto:gr-solidaritynow-d26@wpi.edu) or through our advisors Melissa Butler ([mbutler@wpi.edu](mailto:mbutler@wpi.edu)) and Robert Kinicki ([rek@wpi.edu](mailto:rek@wpi.edu)). For more information about this research or about the rights of research participants, please contact [irb@wpi.edu](mailto:irb@wpi.edu).

**Survey: Current Volunteers and Staff of SolidarityNow**

*Questions numbered A1-A10 in Qualtrics for organization:*



What is your role at SolidarityNow?

Fieldworker

Office Staff

Emergency Director

Other

How long have you worked with SolidarityNow?

Have you participated in an evacuation (practice or actual) during your time at SolidarityNow?

Yes

No



If Yes:



Briefly describe what role you played during the evacuation (practice or actual).

How do your responsibilities change during an emergency or evacuation (practice or actual)?

During an emergency, who would you primarily communicate with?

Fieldworkers

Office Staff

Emergency Directors

Local Authorities

Other

On a scale of 1-5, how effective is the current communication system during evacuations (practice or actual)?

Not effective at all      Slightly effective      Moderately effective      Very effective      Extremely Effective

Scale



What are the biggest communication challenges you have experienced?

What features would be the most helpful in an emergency communication app?

Would you be interested in participating in an interview? If so, please include your email address.



We thank you for your time spent taking this survey.  
Your response has been recorded.

If No:



What features would be the most helpful in an emergency communication app?



We thank you for your time spent taking this survey.  
Your response has been recorded.

# Appendix B: Semi-Structured Interview Questions

## **Interview Consent**

We are students from Worcester Polytechnic Institute, Massachusetts, USA, working with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations.

We are conducting interviews to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

This interview will take approximately 45 minutes. Your participation is completely voluntary, and you may stop the interview at any time or refuse to answer any questions that we ask. This interview is confidential—no names or identifying information will appear in any project reports or publications *unless* you have explicitly agreed to have your name published.

With your permission, we will be audio recording this interview and using the recording for transcription purposes.

Should you have any questions or concerns upon completion of this interview, we can be reached at [gr-solidaritynow-d26@wpi.edu](mailto:gr-solidaritynow-d26@wpi.edu) or through our advisors Melissa Butler ([mbutler@wpi.edu](mailto:mbutler@wpi.edu))

and Robert Kinicki ([rek@wpi.edu](mailto:rek@wpi.edu)). For more information about this research or about the rights of research participants, please contact Ruth McKeogh [irb@wpi.edu](mailto:irb@wpi.edu).

**Verbal Consent**

Do you consent to this interview?

Do you consent to having this interview recorded?

**Written Consent**

By typing your name below, this will be an electronic signature stating that you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure you answer all questions to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

\_\_\_\_\_

Date: \_\_\_\_\_

Study Participant Signature

\_\_\_\_\_

Date: \_\_\_\_\_

Signature of Person who explained this study.

## **Interview Questions**

B1. Can you describe your role at SolidarityNow?

B2. Can you describe your experience (practice or actual) during a past evacuation or emergency?

B2.1. What worked well, what did not?

B2.2. What was the disaster?

B2.3. Were you currently assisting people while this occurred? If yes, how did you manage their needs and what steps did you take to guide them to safety?

B3. Can you provide your impression of how communication typically works (practice or actual) during an emergency?

B3.1. How do you receive updates?

B3.2. How do you confirm others are safe?

B4. Have you experienced miscommunication during an evacuation (practice or actual)?

B4.1. Explain the circumstances

B4.2. How did this affect you and impact your role?

B5. Are there delays in relaying information between fieldworkers and office staff? If so, what kinds of delays have you experienced? How often would you say these kinds of delays occur?

B6. Can you describe a time when you ever felt you did not have enough information to make a decision related to an evacuation or evacuation practice?

B6.1. What would have helped you be more confident?

B7. What information is most critical to communicate quickly?

B8. Are there specific features you would look for in an emergency communication app?

# Appendix C: Interview Questions – UI/UX and Emergency Communication Design

*Transcriptions were unavailable at the time, interview summarized using bullet points. Questions denoted by italicized font.*

**Interviewee:** WPI Human-Computer Interaction Professor

**Interviewers:** Katie Adiletta, Matt Di Giovanni

**Notetakers:** Sean Follis, Angelina Popp

**Date:** February 6, 2026

*C1. Experience with UI/UX design in emergency communication applications*

- Focus on minimizing round trip times of using the apps
- Make things standard so that there are templates into free form text
- Full restrictions make it much worse since we can never predict all the cases

*C2. Are there UI/UX patterns that work well in time-critical systems?*

- UX log (Robustness principle) being able to accept input from user in multiple value forms
- We don't want the user to have to conform to it
  - Multiple ways to send an SOS or incidents
- Be very consistent and restrictive in what we output
  - Standard for color danger levels, sorting of messages – should be consistent to let users more easily understand what's going on
  - Don't want to cause cognitive overload

- High consequences choices should have confirmations
  - Make sure the information they are validating is still visible

*C3. How would you recommend designing interfaces to support quick decision making?*

- Templating (such as fill in the blank)
- Free form textboxes that fills in the box (mini programming language – i.e., auto complete) - Makes it easier to get quick at it
- Figure out the norms of the messages
  - People will tend to fit into the norms of the apps

*C4. Are there any resources, case studies, or tools you would recommend we investigate as we continue this project?*

- 2016 Hawaii missile false positive
  - Links to decide what each was, tests and real issues are combined, so the alert went to everyone when someone clicked real issue
  - No confirm or cancel page
  - Good case study for what not to do
- Fire rescue (walkie talkie phone app)
- Participatory design (qualitative research methods)
  - Interaction/design.org
  - Nielson Norman group, UX design site

*C5. What are your opinions on the “Are You Safe” application?*

- Popup isn't needed, you should use a drop down box
- Filter the people out for the “who send to”
  - Typing name should automatically do it and add it to top and keep typing to add more
  - Only use checkboxes if less than 7 options
- Meta data for sorting categories of emergencies
  - Need a tagging system (for example, tags for different disasters to quickly select them)
  - Users can make their own tags

*C6. Where should the placement of SOS and Incident*

- Hard to click if you're left-handed (on the “Are You Safe” application)
  - Make it easier to click accessibility options
  - Might not want to make the SOS easy to hit to avoid false positives
  - If you only have one hand to use (holding something with the other hand) you should still be able to use the app
- Panel in the bottom right/left that expands when clicked on
- SOS in top right means you need to use two hands which makes it harder to accidentally click
- Is accidental press a realistic risk (experimentally validate this)
  - Force them to put their phone in the pocket unlocked to see if it sends something
  - Could compare to emergency phone call on our phones

*C7. What testing strategies are there for evaluating applications?*

- Timing how long it takes to report an incident (Key performance indicator KPI)
  - Time on task
- Think aloud
  - Instances or Time (some count) of searching vs navigating vs doing
  - You want to eliminate searching, minimize navigating, and decide what can't be optimized
  - Searching: I know what I want to do but don't know how to do it
  - Navigating: I know what I want to do and I know where it is and I'm doing the necessary work to get there
    - Minimize time by providing macros that combine steps
  - Doing: Minimal amount of work that you can't optimize (writing the message to send to people)
- Make several paper mockups first here while in ID2050 (A B testing) to try with people
- Trade and Grade (Did they get stuck at any points on the app)
- Look at the categories

# Appendix D: A/B Testing Survey

## Survey Consent

We are a group of students from Worcester Polytechnic Institute, Massachusetts, USA, working on a collaborative project with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations. The purpose of this survey is to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

We will be asking questions pertaining to one or more of the objectives listed above. This survey will take approximately 5 minutes to complete. Your participation is completely voluntary, and you may withdraw at any time. Please remember that your answers will remain anonymous. No names or identifying information will appear on the questionnaires or in any of the project reports or publications. Your participation is greatly appreciated. Should you have any questions or concerns, we can be reached at [gr-solidaritynow-d26@wpi.edu](mailto:gr-solidaritynow-d26@wpi.edu) or through our advisors Melissa Butler ([mbutler@wpi.edu](mailto:mbutler@wpi.edu)) and Robert Kinicki ([rek@wpi.edu](mailto:rek@wpi.edu)). For more information about this research or about the rights of research participants, please contact [irb@wpi.edu](mailto:irb@wpi.edu).

## Survey Example

*Questions numbered D1-D4 in Qualtrics for organization:*



Which version do you prefer overall?

Version A

Version B

Briefly explain the differences between the versions.





VERSION A - Rate each statement from 1-5 (1 strongly disagree, 5 strongly agree)

	1	2	3	4	5
The interface was easy to understand	<input type="radio"/>				
I was able to complete tasks quickly	<input type="radio"/>				
The navigation felt intuitive	<input type="radio"/>				
I always knew what step to take next	<input type="radio"/>				
It was easy to locate important features	<input type="radio"/>				
I would feel confident using this version during a real emergency	<input type="radio"/>				

VERSION B - Rate each statement from 1-5 (1 strongly disagree, 5 strongly agree)

	1	2	3	4	5
The interface was easy to understand	<input type="radio"/>				
I was able to complete tasks quickly	<input type="radio"/>				
The navigation felt intuitive	<input type="radio"/>				
I always knew what step to take next	<input type="radio"/>				
It was easy to locate important features	<input type="radio"/>				
I would feel confident using this version during a real emergency	<input type="radio"/>				



# Appendix E: Usability Testing Consent Form

## **App Testing Consent**

We are students from Worcester Polytechnic Institute, Massachusetts, USA working with SolidarityNow to develop a safety communication app that will assist SolidarityNow in providing real-time communication with office workers and fieldworkers during evacuations. We are conducting tests to help us gather information related to one or more of the following project objectives:

1. Compare existing safety communication applications to evaluate their effectiveness and feasibility.
2. Investigate past experiences and challenges of fieldworkers and emergency directors during evacuations.
3. Design a communication solution for evacuation messaging.
4. Test and evaluate the communication solution.

This test will take approximately 20 minutes. Your participation is completely voluntary, and you may stop the study at any time or refuse to answer any questions that we ask. This study is confidential—no names or identifying information will appear in any project reports or publications *unless* you have explicitly agreed to have your name published.

Should you have any questions or concerns upon completion of this study, we can be reached at [gr-solidaritynow-d26@wpi.edu](mailto:gr-solidaritynow-d26@wpi.edu) or through our advisors Melissa Butler ([mbutler@wpi.edu](mailto:mbutler@wpi.edu)) and Robert Kinicki ([rek@wpi.edu](mailto:rek@wpi.edu)). For more information about this research or about the rights of research participants, please contact Ruth McKeogh [irb@wpi.edu](mailto:irb@wpi.edu).

**Written Consent**

By typing your name below, this will be an electronic signature stating that you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure you answer all questions to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

\_\_\_\_\_

Date: \_\_\_\_\_

Study Participant Signature

\_\_\_\_\_

Date: \_\_\_\_\_

Signature of Person who explain the study.