

Digital Signage for Disaster Resilience

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Abstract – The two major disasters that occur most frequently in Turkey are floods (34% of recorded disasters) and earthquakes (33%). In Turkey, especially the 17 August 1999 Earthquake, the floods in the Northern Black Sea region in 2021 and the 6-7 February 2023 Earthquakes made the importance of pre-disaster studies more prominent. Due to the digitization megatrend, we are accustomed to looking at digital screens for information, entertainment, and education. Our brains process graphics faster than text and motion naturally attract our eyes. These three factors make digital signage for emergency messaging one of the best communication tools available. College campuses and city halls are perhaps the earliest adopters of digital signage for emergency messaging. A strategically placed digital sign can alert the campus and the city hall to danger. A carefully crafted message can assist students, staff and citizens get to safety. The municipalities and state institutions in Turkey still use text/email alerts, intercoms, sirens etc. These are inexpensive solutions that can reach off-site constituents. However, some methods are not very reliable. After all, not everyone checks their emails or messages regularly. Those emergency alert systems may also fail to address the visual component of mass communication. Digital signage filled this gap. Our brains are visually oriented and respond rapidly to images and motion. Emergency messages displayed on digital signage reach more people than an intercom announcement. However, the institutions in Turkey still lack the capacity and practice to use digital channels as emergency tools. Further, people are not adequately aware of how to behave in an emergency. This project aims to offer an effective disaster management system that can serve as a model for other districts.

Keywords – Disaster Resilience, Digital Signage, Disaster Management System, Emergency Tools, Emergency Awareness

I. INTRODUCTION

In Turkey, colleges and city halls still lack informative and directive implementations for disaster management. During an emergency, time is of the essence. Communication during a crisis needs to be fast and accurate so that people can react quickly and appropriately. While the advent of text message alerts has increased the ability to reach individuals directly, texts and traditional audio announcements do not allow for any visual components in mass communications. Unlike text messages and emails – which can take several minutes to show up on a device, and require someone to be checking their phone regularly and/or have the sound turned on – emergency alerts on

digital signage appear within seconds. Additionally, our brains process graphics faster than text and motion catches the eye, so bright messages with moving HD graphics reach more people faster. Innovation does not mean spontaneous and unplanned. On the contrary, innovation most often deploys considerable thought and planning. Utilizing digital signage in an emergency will require advance planning and documentation. There is a need of a thorough understanding of who owns the devices, how they are managed, access, permission levels and more. In addition, this experience requires not only the active collaboration of the officials and visitors, but also the cooperation of the whole district administrative structure.

For better disaster preparedness and resilience, we offer digital signage emergency alert systems as a solution. Digital signage is traditionally used for marketing and general information. Yet do not undervalue its vital role in relaying potentially life-saving information during an emergency. Digital signage messaging can change instantly to make crowd communication and rescue efforts more efficient. Digital emergency signage can use eye-catching graphics to display information such as descriptions of emergency situations, instructions on emergency response (e.g. exit routes, where to go, what to do and who to call), information about local emergency shelter centers, including phone numbers, addresses and capacities, ambulance/hospital contact info and basic first aid information. Digital signage can also be easily and instantly updated. Most digital signage solutions are cloud-based. This lets operators make updates as the emergency situation changes from any internet-enabled computer. The technology also offers centralized control which expedites message consistency and timeliness. Information that can potentially save lives needs to be on time and accurate. Additionally, centralized control ensures that only authorized personnel access emergency messages. With this solution, we aim to enable safety and security officials to follow four steps when using digital signage for emergency messaging: 1. Prevention: Create prevention campaigns that detail how to respond to specific emergencies. Run these campaigns on digital messaging signage during regular hours. 2. Preparedness: Create a plan of action for different emergency situations. Include a library of pre-built alerts and templates of safety zones. Store these in the software to trigger and display instantly. 3. Response: Make alert integration part of your overall digital messaging plan. 4. Recovery: For every emergency situation, plan a notification that the danger has passed and the alert is over.

II. MATERIALS AND METHOD

The innovation project was conducted at the Faculty of Söke Business Management at Aydin Adnan Menderes University and the Municipality of Söke during the academic years 2022-2023 (Spring) and 2023-2024 (Fall). The subject that incorporated the innovation project was Content Management and Behavioral Guidance and counted with the participation of the administrators, staff and

citizens. It is important that any ICT project for communities use a systematic methodological approach centered on communities. [1] described a five-phase development methodology labeled "community centered development (CCD)." She emphasized the need to involve the community in a "participatory design process with the developers," similar to the notion advanced by [2]. We use this five-phase framework in analyzing the system, designing the signs, and implementing it. Phase 1 refers to assessing needs and analyzing tasks. In this phase, project team and community members determine the unique information and communication needs in terms of emergency management. The researchers will gain a better understanding of the respective staffs', students' and citizens' work routines and interactions with each other. They will spend two weeks in both locations to gather information and prepare the needs report. Phase 2 involves making decisions about how users will work with the site and how it will be managed. In Phase 3, an initial digital signage solution is designed and prototypes developed, including having members of the community test these and give feedback. Based on feedback in Phase 3, Phase 4 involves refining and re-testing and continuing this process until users display behavior as required for the crisis management. The final phase is to publicize the online services, encourage their use, and obtain commitment from key members of the community to use the site.

III. RESULTS

Modern display technology can also help inform emergency communication protocols through analytics. Vendor-provided programs can provide new, interesting information for administrators and disaster planners. Discrete cameras gather non-identifying information about those who engage with the signage and gather valuable analytics that the campus and the City Hall officials can use to see which displays receive the most engagement. This is useful for determining what messages are effective day-to-day by tracking data like impressions and engagement time. In emergencies, this information becomes even more important. Through this type of platform, administrators can learn which areas have the highest foot traffic and at what times throughout the day, as well as advanced, non-identifying data analytics about the demographics of the individuals. This information

can be cross-referenced with existing data like class schedules to allow officers and personnel to make data-driven decisions while responding to emergencies. No disaster or emergency affects everyone the same, and the versatility of a digital signage notification system counters the chaos that comes with crises. It takes time to design a plan with all of the bases covered. But, once it is done, the “set-it-and-forget-it” nature of digital signage allows personnel to focus on helping citizens get to safety, rather than the notifications at the moment. Regarding the students, the educational innovation in this project is to move certain skills outside the classroom in order to develop them in a professional environment, in this case, in an educational institution.

IV. DISCUSSION

Digital signage on campus is the most efficient way to communicate safety messages to shareholders. A safety-first digital signage program will be a priority for all schools and institutions, especially since many screen software can be combined with emergency alerting systems. The main objective of this innovation project is to create a flexible training method that will encourage the implementation of essential key concepts in terms of flexibility, interoperability, integrity, responsiveness, effective communication and crisis management in order to enable learning of emergency aspects. This project is expected to provide an example of implementing a cost-effective ICT for emergency management. The project required hands-on activities in the community will help students combine theoretical rigor with real-world relevance. They are expected to learn significantly since they had to come up with innovative solutions that fit within the limited budget and technical manpower available to the community.

Interviews reflect personal opinions and views and can result in various biases. For example, an interviewee may choose to respond in a socially desirable manner or might be unable to recall all facets of a situation. Further, the sampling method itself was based on a sample of convenience or opportunity. Although both of these are true for this study, the value of conclusions drawn herein cannot be overlooked. Future research needs to develop and use validated questionnaires and structured interviews. Second, the limited funding available

for conducting the research precluded the use of other display and computing technologies. Although we could have facilitated the display of signage information on tablets and smartphones, the budget limited us to using large-screen TVs for maximum visibility at the two locations. It would have been interesting to examine any differences in responses to deployments using multiple display technologies. This is a topic for future research.

V. CONCLUSION

No disaster or emergency affects everyone the same. The versatility of a digital signage system counters the chaos that comes with crises. Once a crisis plan is done, the “set-it-and-forget-it” nature of digital signage allows personnel to help citizens get to safety, rather than the notifications at the moment. The main objective of this innovation project is to create a flexible training method that will encourage flexibility, interoperability, integrity, responsiveness, effective communication and crisis management in order to enable learning of emergency aspects. This project is expected to provide an example of implementing a cost-effective ICT for emergency management.

REFERENCES

- [1] J. Preece, “Online Communities: Designing Usability, Supporting Sociability”, *Industrial Management & Data Systems*, vol. 100, no. 9, pp. 459-460, 2000.
- [2] A., de Moor & F. de Cindio, “Beyond users to communities—designing systems as though communities matter—an introduction to the special issue”, *The Journal of Community Informatics*, vol. 3, no. 1, pp. 1–3, 2007.