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HopeShield: A User-Informed Mobile Application for Reporting Harassment and Domestic Violence in Pakistan

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Abstract

HopeShield a smartphone App is designed to help protect people from domestic violence and gender-based harassment using the power of an anonymous reporting tool and linkages to support services (e.g. crisis centers). It is built on the belief that while there is significant technological potential to improve victims' safety through mobile phones, these technologies have been lacking in terms of being culturally grounded and aware of trauma experienced by many victims. A two-phase process was used to develop HopeShield. First a survey of 74 participants who were primarily women between the ages of 18 to 30 years old was conducted to assess their abuse experiences as well as their needs for technology in this regard. Second, a mobile application and dashboard system were designed using Agile principles based upon the input received from users in Phase One. Data collected during Phase One identified very high levels of both psychological and emotional abuse among the surveyed group; more than 70% of the women surveyed had never reported abuse or violence to anyone. The women surveyed also stated that they would use mobile tools that allowed them to report abuse anonymously, track locations, capture evidence, and link directly to support services. The data collected in Phase One was then used to inform the design of HopeShield's major features including one tap SOS alert buttons, secure audio and video recording, geolocation tagging, and a verifiable administrative dashboard for non-governmental organizations (NGOs) and law enforcement agencies. Testing of HopeShield was done internally to validate its functionality. Informal feedback about HopeShield has indicated that it is usable and relevant to real life situations and that its development represents a participatory design process which incorporates the ability of technology to foster trust and institutional integration. Overall, HopeShield provides a viable and scalable model for a national safety platform and addresses the need to bridge the gap between victim/survivors and response systems in resource-constrained environments.

Keywords: gender-based harassment; mobile safety application; participatory design; digital reporting; trauma-aware technology, Pakistan.

INTRODUCTION

Beginning with the "humanization" of the language, Gender based harassment and domestic violence are rampant in Pakistan and have affected people from every socio-economic level and region. Approximately 47 percent of women in Pakistan have experienced some form of domestic violence during their lifetime; however, because of chronic under-reporting, the true number is likely to be much greater than this number (Dialogue Pakistan, 2024; Nips, 2019). The reason that there is so little reporting is that many women who have been victimized by domestic violence do not feel comfortable coming forward, due to "cultural taboo," the threat of "retaliation", the concern over "family honor," and a lack of faith in the "institutions that

could provide them with help and/or justice" (Human Rights Commission of Pakistan, 2021; Zakar et al., 2016). While existing reporting mechanisms are fragmented and often out of reach to women, especially those who have limited digital or legal literacy, or who live in areas that are very conservative, or who reside in rural settings (Ali et al., 2011; Madhani et al., 2017), even when there are existing reporting mechanisms, women may still face barriers accessing them. For example, even though there may be legal and psychological support mechanisms, such as women's shelters or helplines, many survivors of domestic violence report that they had negative experiences when trying to utilize these mechanisms, citing bureaucratic inefficiency and unsympathetic staff (Ahmed et al., 2016). Therefore, there are systemic gaps in the way that many women who are experiencing abuse can safely disclose that abuse and/or receive the necessary support in a timely manner.

In light of increasing mobile phone use in Pakistan, mobile technology represents an unexplored potential mechanism for bridging the gap between survivors and the services they require. When appropriately designed with respect to privacy, usability, and cultural sensitivity, mobile applications can serve as valuable tools for anonymous reporting, providing users with location-based alerts, educating users regarding legal rights, and facilitating access to trauma-informed services (Humanities Commons, 2024; Information Technologies & Development, 2024). Most existing digital tools in Pakistan, however, focus on the crisis response aspect of digital tools, specifically SOS buttons, while neglecting the full range of user requirements, which include mental health support, education, and building trust.

Therefore, we undertook Designing Against Silence, a two-phased research and development initiative to develop a culturally-grounded, user-informed mobile platform to support victims of harassment and violence in Pakistan. Phase one of Designing Against Silence was a survey of 74 participants, mainly women aged 18-30, that was conducted in early 2023, to better understand the lived experiences of abuse, the emotional effects of abuse, and what type of digital support tools would be useful to survivors. Based upon this input, we created HopeShield, a mobile application featuring elements that were co-created with the users' input, such as anonymous reporting of incidents, GPS-based safety tools, safe communication, legal resources, and integration of support services with NGOs and government agencies.

The remainder of this paper will detail our design process of HopeShield, from the needs assessment of the user, to a fully functioning application. This paper will also serve as a model of how technology can be used to enable marginalized voices, and create safer communities through participatory, trauma-informed, and culturally-sensitive methods.
The rest of the paper is outlined as follows; literature review, methodology, findings from the user research, design of the HopeShield application, evaluation and feedback, discussion and conclusion and recommendations for future studies.

LITERATURE REVIEW

Recent studies conducted in Pakistan confirm the widespread nature of sexual harassment in the workplace, as well as the severe psychological impact it has on individuals. A study by (Shafique et al., 2025) reported a strong correlation between workplace harassment and increased levels of stress, anxiety, and depression among all gender categories, with females being subjected to much greater levels of psychological distress than males. Furthermore, (Qureshi et al., 2020) reported that while there is a high incidence of cyber harassment against educated women in

Pakistan, very few cases are reported due to fear of retaliation, damage to reputation, and systemic inefficiency. On the basis of these findings, several studies investigated the organizational and psychological factors that contribute to both harassment and silencing in workplaces in Pakistan. A study by (Farid et al., 2022) reported several deep-rooted barriers to reporting harassment in Pakistan, including; fear of losing employment, social stigma, inadequate complaint procedures and distrust of the ability of institutional bodies to provide redressal. This study noted that the decision to report is influenced by both individual reluctances to do so and structural/cultural impediments in place within organizations.

A study (Jabeen & Malik, 2019) further stated that workplace stress in Pakistan is characterized as being heavily gendered; women experience disproportionate amounts of workplace stress due to role conflict, limited career advancement opportunities, and poor management practices, while men typically report financial and job security related concerns. In addition to this, (Khalid & Ali, 2016), found that workplace harassment has a greater negative effect on the mental health of women, resulting in higher levels of anxiety, depression, and lower self-esteem when compared to their male counterparts. Taken together, these studies highlight the systemic and psychological obstacles that prevent women from feeling safe and protected in the workplace, and thus emphasize the need for effective, trusted, and trauma-sensitive reporting mechanisms.

Several mobile safety apps have been designed to respond to these problems; however, each has numerous limitations. For example, the HearMe app provides panic buttons and emergency messaging options via screen-lock gestures. Although the app may provide some degree of protection for women who work in Bangladesh, it does not take into account the socio-cultural context of Pakistan and has not integrated with any of the trusted local authorities or non-governmental organizations.(Akash et al., 2016)

Mehfoozaurat is a more culturally responsive solution to the problem of sexual harassment at the workplace. Developed specifically for working-class women using public transportation in Pakistan, the app includes a variety of features such as: Urdu-language output, safe routes to destinations, emergency SMS messages and audio recording capabilities.(Sarosh et al., 2016) Despite having incorporated aspects of local culture into its design, usability testing indicated that Mehfoozaurat presented significant barriers for low-literacy users, especially for older women or those without prior knowledge of how to use an Android smartphone. Additionally, Mehfoozaurat has not integrated with any forms of legal or psychosocial support systems.

Another comparative study conducted by Sheikh and Fayyaz,(Sheikh & Fayyaz, 2019) reviewed popular safety apps, including Raksha, VithU, and Hollaback. These apps included various safety-related features, such as GPS tracking and alert messaging. However, none of the studied apps addressed the issue of local trust deficits, provided legal education support, or had a trauma-responsive design philosophy. Therefore, the authors concluded that the currently available solutions were not adapted to meet the daily reality of Pakistani women and were ineffective in reducing their perceived vulnerability.

The FeelSafe (Nizamani et al., 2025) system proposed a woman's safety solution based upon a concealed emergency button that would allow the user to activate the device discreetly. The system focused primarily on sending SOS alerts and transmitting the user's location to emergency services during an incident. Like other similar

solutions, FeelSafe neglected anonymity, psychological support, legal awareness, and cultural sensitivity; all of which are essential in conservative societies such as Pakistan. HopeShield was specifically designed to rectify the previously mentioned shortcomings through a participative, trauma-informed, and culturally sensitive design process. Rather than importing or imposing safety solutions upon Pakistani society, HopeShield employed a bottom-up design methodology based on a survey completed in February/March 2023 involving 74 respondents (primarily young women aged 18-30), which represents the demographic most likely to suffer from public and private harassment in Pakistan.

Key differences of HopeShield include a culturally relevant user interface featuring a Save Our Souls (SOS) alert system with GPS tracking and secure, encrypted audio and video recording functions that continue to function regardless of connectivity. In comparison to other solutions, HopeShield integrates a real-time institutional dashboard to facilitate coordination among NGOs, mental health professionals, and law enforcement agencies to respond to incidents. Additionally, HopeShield contains educational modules providing legal awareness and guidance to users about their rights and reporting options. Most importantly, unlike many previous apps, HopeShield was co-designed with direct user input through iterative Agile development methodology, rather than applying pre-developed, one-size-fits-all solutions from external developers.

METHODOLOGY

The project adopted a two-phased approach that captured user need and translated it into a practical, functional digital tool to report harassment and domestic violence in Pakistan. In Phase One, data collection occurred through a structured survey. In Phase Two, a system was developed utilizing an Agile methodology that included input from participants. An example of the methodological process can be seen in Figure 1.

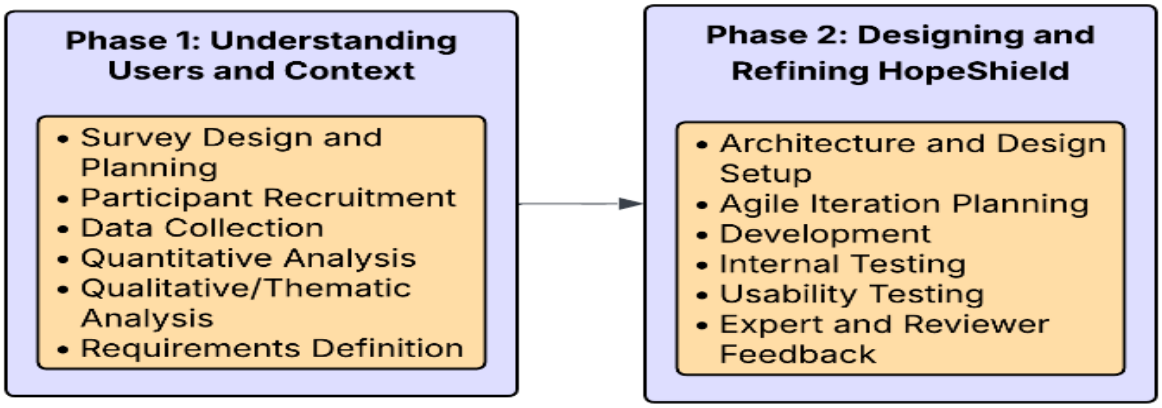

Figure 1.
Methodology

A survey design was employed in order to collect quantitative data regarding participants' previous experiences with harassment and their expected characteristics of digital support tools. The survey was conducted during January-February 2023 and targeted residents of Pakistan with an emphasis on young adults (ages 18-30) due to their increased exposure to public spaces and digital technologies and, therefore, a higher risk of experiencing gender based-violence. 74 participants were collected through convenience sampling methods in which recruitment occurred via digital platforms such as online university networks, social

media and informal digital communities. The survey instrument contained both open and closed questions. The closed portion of the survey instrument covered topics such as demographics, type of violence experienced (i.e. verbal / emotional / physical), knowledge of institutional support options and participants' perspectives regarding digital interventions. The open-ended section of the survey instrument allowed participants to describe emotional impact associated with harassment and propose desired features for reporting app. Quantitative survey data were analyzed using descriptive statistical methods (i.e. frequencies and percentages). Qualitative data were analyzed using a thematic analysis approach to identify common themes among participants' written comments. Some examples of recurring themes include fear, legal literacy, location tracking and digital accessibility. Findings from Phase 1 were used to develop functional and nonfunctional requirements for the proposed reporting app.

Phase 2 utilized findings from Phase 1 to develop a mobile application called HopeShield, specifically designed to meet the safety and privacy concerns of Pakistani users. The application was developed using an Agile methodology which provided an opportunity to iterate and refine the application in response to feedback from testing participants (see Figure. 2).

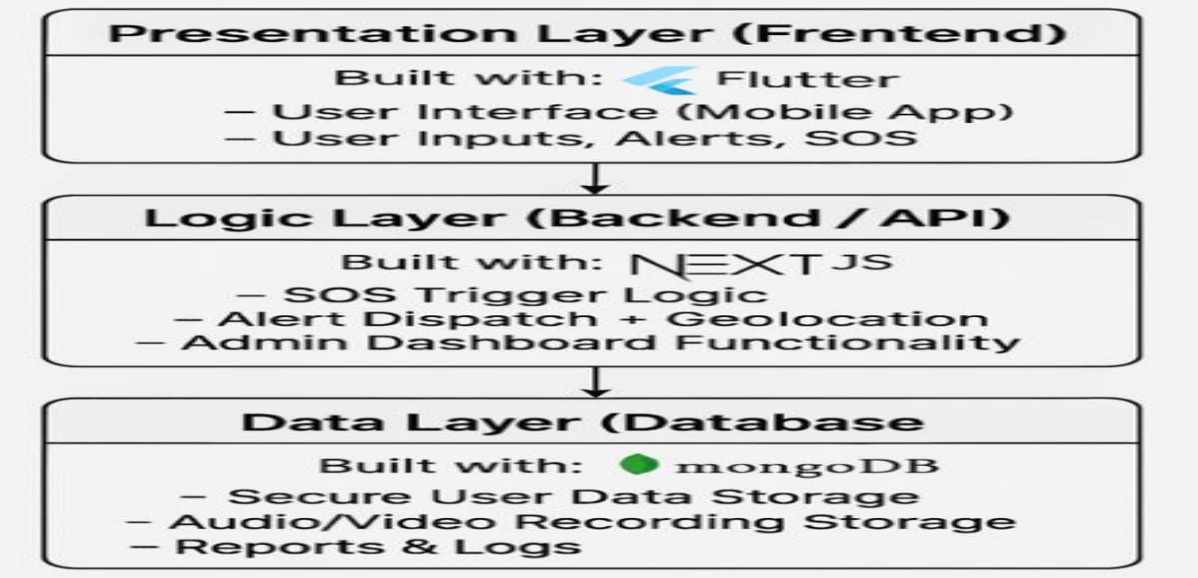

Figure. 2.

Application Architecture

Some key features of the application include:

- **SOS Alert System** – Provides real-time GPS tracking and sends automatic notification to emergency contact list, NGOs and local law enforcement.
- **A/V Recording** – Upon activation of SOS feature, begins audio and/or video recording of user environment, stores safely for potential future legal use.
- **Service Directory** – Includes directory of available support services (mental health professionals, legal advisors, etc.) as well as information related to NGOs.
- **Safe Zone Mapping** – Allows user to indicate "safe" and "unsafe" zones. Education – Includes educational material to educate users on safety training modules and awareness materials.

As a result of the sensitive nature of this research, strict ethical considerations were applied. Survey respondents were assured anonymity; no names, IP addresses or

geolocation data were collected. Prior to completion of the survey, each respondent received an informed consent statement that explained the purpose of the research, the voluntary nature of participation and the ability to skip any question(s) or withdraw at any time during the survey. Following completion of the survey, respondents were presented with national helpline and mental health support service information to provide additional support if they needed it emotionally. The design and implementation of the application adhered to guidelines related to protecting vulnerable populations and utilizing principles of trauma-informed technology design (World Health Organization, 2001).

FINDINGS FROM USER RESEARCH

The major results of this survey, which was carried out at the start of 2023, will be set out in thematic sections below as they relate to the themes of experience, perception, the emotional impact of the abuse and/or harassment and design preference of people who have been victims of domestic abuse and/or harassment in Pakistan.

A. Participant Demographics

The overall response rate was 74 participants. Women formed the largest portion of the sample group (78.4%), with the majority of respondents being between 18-30 years old (50%), followed by those aged between 31-40 years (29.7%). The large percentage of respondents having a higher level of education than others (over 64%), and that a substantial number of the respondents were employed (41.9%) or students (39.2%) in universities provided a good representation of a digitally literate, urban leaning segment of the population that has access to mobile technology and can engage in public digital discourse which would need to be considered when designing apps.

B. Types and Patterns of Abuse

Participants reported experiencing many different kinds of abuse. The most common kinds of abuse participants reported experiencing were fear (n = 37), verbal abuse (n = 24), harassment (n = 23), psychological abuse (n = 23), and emotional abuse (n = 22). Abuse by using money to control a person was experienced less often (n = 16), but similarly, abuse based on spiritual beliefs (n = 8) was also experienced less often than other types of abuse. Overall these findings show emotional/psychological abuse is at least as common as physical or verbal forms of abuse.

There were some gender differences found. For example, 21 women reported they had been physically abused during their life time, and 27 women reported experiencing emotional abuse, while 3 men reported being emotionally abused, and 4 men reported being physically abused. However, chi square tests did not find statistical significance between males and females with regard to experiencing or seeing domestic violence (all $p > .05$).

C. Help-Seeking Behaviors and Beliefs

While many people are abused, only 27.3% of those who said they had been abused, reported being abused. The most common reasons for not reporting would be fear of revenge, distrust in authority or institutions, or embarrassment. However, the overwhelming majority (78.4%) of participants felt strongly that domestic abuse is not a private matter, and therefore should be reported. Younger participants were even more emphatic about this than older participants. When asked what participants

knew about where they could go to get information or assistance with respect to their abuse, only a few participants were able to identify organizations that provided such services. The organizations most commonly identified by participants included the police (n = 9) and government helplines (n = 4). Participants rarely mentioned NGOs (n = 2), online forums (n = 2), or legal resources (n = 1). Thus, it appears that there is limited knowledge as to how to access support services.

D. Experiences with Harassment

Gender based harassment existed at a high rate among both genders with an estimated 51.7 % of the women surveyed reporting they had experienced harassment and an estimated 43.8 % of the men surveyed reporting they had experienced harassment. The most prevalent types of harassment included; Suggestive comments and/or sexual innuendos, Staring and/or leering (each n=8), Unwanted contact and/or Invasion of personal space. Most of the women who reported experiencing harassment described their reactions as being Nervous (n=9), Fearful (n=8), Angry (n=7) and Discomforted (n=6). Some participants indicated that the behavior was normalized and they had "gotten used to" this type of behavior.
The primary locations where harassment occurred were Public Transport, Streets, and Shops. Most of the harassers were Strangers, although some participants indicated that their harasser was a colleague or acquaintance. In addition, approximately half of the women who reported harassment did not receive emotional or institutional support after the incident, and only one woman indicated that she received assistance from Public Services.

E. Institutional and Social Support Gaps

Many people surveyed knew very little about the institutional systems of support. Some institutions have established support groups for sexual harassment. Of the survey respondents who reported on this matter (n = 74), 39 responded affirmatively when questioned if they could name a support group in their institution and 35 responded negatively; 18 participants expressed uncertainty. More than 61 percent of all survey participants (n = 45) did not know how to officially report harassment.

The lack of institutional communication and visibility regarding reporting and support is not only indicative of a lack of service to survivors but is also illustrative of the fact that many survivors are uninformed and therefore vulnerable in environments claiming to be supportive and safe.

F. User Preferences for Technology Solutions

Most participants believed that a number of options could be used to prevent and address bullying. These included apps to allow individuals to report incidents of bullying, programs to teach students how to prevent bullying from happening in the first place and programs to educate children in schools about what constitutes bullying behaviors. The least preferred option was behavioral change as an intervention. In fact, when it came to mobile reporting platforms (n=47) participants showed the greatest support; followed by early prevention programs (n=44); then educational programs at schools regarding what is considered bullying (n=41); and finally, behavioral change (n=15) and crisis accommodations (n=17).

Participants also showed a great deal of enthusiasm for using a digital app to report their experience of being bullied. In fact, 75.7% of all respondents reported that they would use such an app to report a problem to authorities or to a non-profit

organization that helps victims of bullying. 12.2% of respondents indicated "maybe", while 12.2% rejected the idea completely. As a result, there appears to be a high demand for digital methods to address and prevent bullying.

G. Design Implications from Open-Ended Feedback

User input informed a thorough framework that identifies what a harassment reporting application should contain by way of qualitative information. The thematic analysis of the participants identified eight key categories that represent the user expectations contained within Table 1.

Table 1
User-Informed Design Themes and Corresponding Feature Requirements for the HopeShield App

Theme	Key Expectations	Suggested Features
Incident Reporting & Anonymity	Safe, easy reporting without fear of retaliation	One-tap SOS, anonymity toggle, integration with police APIs
Location Mapping	Real-time safety identification	GPS-based alerts, "mark location" feature, risk zone heatmaps
Victim Support	Access to legal and psychological help	Live chat, NGO directory, complaint progress tracker
Education & Awareness	Preventive learning through community and school programs	Quizzes, scenario training, curriculum integration
Trust & Practicality	Transparency, actionability, and measurable outcomes	Verified badges, SLAs, public reporting of impact
Legal Literacy & Justice	Understanding rights and procedures	Legal chatbot, evidence vault, access to law enforcement
Privacy & Confidentiality	Strong data protection and control	Encrypted storage, auto-delete, anonymous browsing
General Satisfaction	Simplicity, continuous improvement, and user control	Feedback channels, multilingual UI, visible updates

Participants also noted that there needs to be inclusive aspects (i.e., support for men who are victims of sexual violence, low literacy individuals) as well as culturally sensitive elements (i.e., non-judgmental, culturally relevant content) in addition to the requirement for multiple stakeholder partnership (i.e., NGO's, law enforcement, educator etc.). Users' comments further emphasized the importance of both function and trust, as well as a sense of community ownership when designing an application.

THE HOPESHIELD SYSTEM

Developed utilizing Agile methodologies, HopeShield went through successive phases of feedback and testing to develop its functionality. The front-end of HopeShield utilized Flutter to provide cross-platform capabilities, while Node.js provided back-end logic and MongoDB provided data storage. HopeShield utilized a three-tiered approach for its architectural structure (Presentation Tier, Application Tier, Data Tier), which provided both modular design and scalable capability. A selection of the app's screens can be seen in Figure 3. Figma was used for wire-framing as part of the overall design process and the user interface (UI) is publically accessible. The final code for the mobile app and dashboard is available via open-source repository (Rehman, 2025a, 2025c, 2025b).

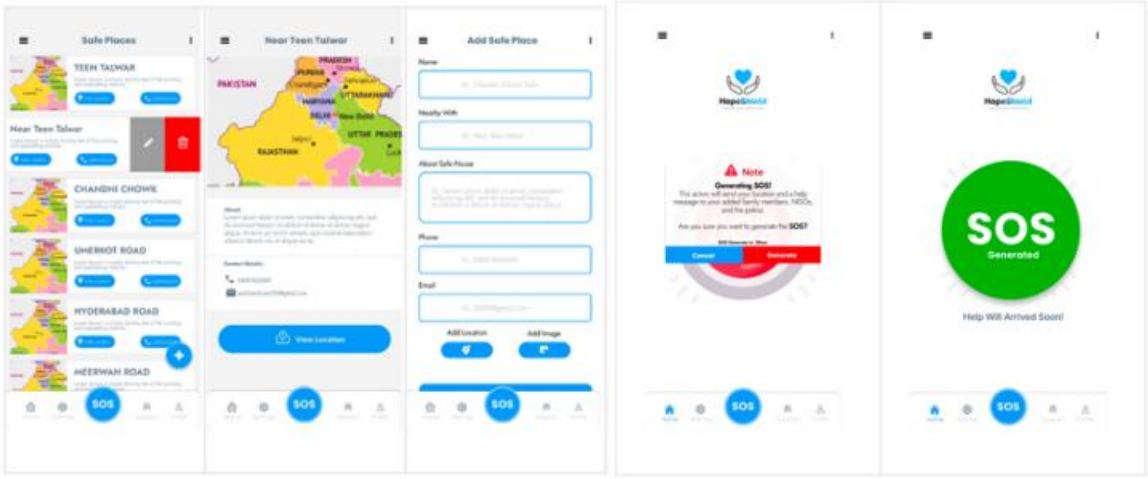

Figure 3.
HopeShield App user interface

Features of the system for HopeShield were developed based on user feedback that was collected during the first phase of research. Key components of the HopeShield system include:

A. SOS Alert

The app features a central safety mechanism to send an emergency alert with one click of the button. If the user doesn't cancel the 30 second countdown timer, an alert will be sent to the user's designated emergency contacts and support services; additionally, the user's GPS location will be captured and shared.

B. Audio/Video Capture

When SOS is activated, the app will begin capturing audio/video from the device's microphone and/or camera as soon as possible after the button has been pressed. These captures are secured and can be accessed at a later date for evidence purposes.

C. Safe Location Mapping

Using the app, users have the ability to designate safe areas that they can use GPS navigation to travel to when they feel threatened. Safe Location Mapping is especially important for those that don't feel safe while traveling through public places.

D. Support Directory

The Support Directory contains a categorized list of organizations such as non-governmental organizations (NGOs), police stations, and friends/family that the user may want to call upon in case of an emergency. The Support Directory can be configured by the user through the app's settings menu and the user can also add/edit their own entries into the directory.

E. Training Module: Safety Education

The app provides training modules for users on harassment awareness, safety protocols, and user rights.

F. Admin Dashboard

Authorized personnel such as employees of NGOs and law enforcement agencies, have access to a secure Admin Dashboard where they can view and respond to SOS alerts in real-time. Authorized personnel must first register an account and verify it prior

to gaining access to the Admin Dashboard.

G. Privacy Controls

The user retains total control of their personal information and can configure their profile details, toggle between light/dark mode, edit notification preferences, and access a Privacy Policy from within the app.

The application has 3 layers in its tiered architecture to allow for scalability as well as modularity that will allow for the separation of the application into different layers of functionality. The first layer is the presentation layer, which contains a flutter based client side UI. The presentation layer allows users to interact with the application in real time and provides a clean and simple design. The second layer is the application layer, which was developed using node.js. The application layer handles the business logic of the system. This includes the processing of sos alerts, real time notifications, and API calls. The third layer is the data layer. The data layer uses mongoDB to securely store all of the user's information. The user can store their profile information, location data, contact list information, and the media recording they create. By having a layered structure, it will make it easier to develop, maintain, and expand the application.

EVALUATION AND USER FEEDBACK

The evaluation of the HopeShield application combined internal validation, informal expert review, and a small-scale end-user usability study. This multi-pronged approach helped ensure functional reliability, alignment with user needs, and early design refinement. By combining internal validation, in-formal expert review, and small-scale end user usability studies for evaluation of the HopeShield application provided a multi-faceted approach to ensure design reliability, alignment with user needs, and early design refinements.

A. Internal Functional Testing

Structured internal testing by the development team was conducted to validate core modules of the application across simulated scenarios and devices. Functional testing included: SOS Alert Triggers, GPS Tracking, Secure Audio/Video Recording, Safe Zone Mapping, Account Operations, and Dashboard Monitoring.

B. Usability Testing Using the Think Aloud Method

A small-scale usability test using the think aloud method was conducted with 5 participants (3 women and 2 men) to determine how well the app functioned in the real world. Participants were asked to voice their thoughts while they interacted with the app which helped identify usability issues experienced by the participants. Some of the areas identified as problematic include button placement, clarity of forms and notification behavior. As a result of the participants' observations many improvements were made to the navigation, layout, and confirmation flow for alerts within the app.

C. Feedback From Advisors and Reviewers

In addition to collecting data from test participants, project supervisors and academic reviewers who participated at multiple stages were also given the opportunity to provide informal feedback on the HopeShield application. The reviewers praised the cleanness of the app's user interface (UI), the practicality of the feature set, and the integration of tools that respond to emergencies in real time. The dashboard designed for verified responders was highlighted as a valuable component of the app for institutional use.

D. Planned Future Testing of the System

The system is ready to be tested with a broader group of users including students, staff members of non-government organizations (NGO), and emergency responders. Planned activities include usability sessions, post-use surveys, and focus groups to assess safety, trust, and readiness of adoption.

DISCUSSION

The results of this research show how using a participatory approach, with user input, can assist researchers in creating a variety of digital interventions which are applicable within a specific cultural setting, such as gender based violence in Pakistan. HopeShield was developed by utilizing empirical data collected from a wide range of participants who were largely comprised of young women whose life experiences informed both the frame of reference used to define the problem and the functions of the app. In doing so, the project has addressed long-standing limitations to access, privacy/anonymous use and trust inherent in many of the traditional forms of support available to survivors.

A. Responding to an Underserved Problem Space

The study found that, as many studies have shown recently, gender-based violence in Pakistan is still under-reported; it is also psychologically damaging and further complicated by societal and institutional barriers to seeking support (Ahmed et al., 2016; Qureshi et al., 2020; Zakar et al., 2016)(3). Thus, the fact that over 70% of the participants had never formally reported their experience is consistent with national trends and demonstrates the necessity for private, trauma-sensitive alternatives. Unlike traditional reporting systems that require in-person disclosure, HopeShield provides digital, anonymous reporting capabilities and uses GPS and media documentation to send alerts, lowering barriers to taking action.

B. From Insight to Implementation

The main difference maker of this project is the way that users' input directly translated into the tech aspects of the project. The students were asked about their need for safety tools based on their locations which allowed them to develop safe zones as well as the support directory and training modules based on their requests for legal and emotional assistance. These are great examples of how important it is to be using a user centered approach when looking at what your users will find actionable and culturally relevant, especially when there are many assumptions being made about a population and those assumptions may have negative impacts. Using Agile and Modular Development Practices, the Student Team Was Able To Build A Scalable Cross Platform Prototype In A Short Amount Of Time With Limited Resources That Can Be Easily Built Upon In The Future And Deployed Across Platforms.

C. Addressing Trust, Safety, and Cultural Sensitivity

In addition to all the other ways, users emphasized over and over again the importance of trust, data protection and the right culture. To fulfill these needs, HopeShield introduced encryption and storage options where the user is able to control what he/she wants to see; an easy-to-use interface (UI) with minimal elements and available in many languages to meet the low literacy of potential users. The application's functions (e.g., anonymity during navigation on the internet; language support at the local level; integration of educational content) reflect the principles of

equity in development technology (Humanities Commons, 2024; Information Technologies & Development, 2024). Importantly, this application was not only developed for the user, but it was also created by the user. Importantly, the app was not only built for users but conceptually shaped with them. This participatory approach helped avoid the pitfalls of generic safety apps that neglect local power dynamics, honor-based norms, or mistrust in authority, challenges especially present in patriarchal societies (Sarosh et al., 2016; Sheikh & Fayyaz, 2019).

D. Limitations and Reflections

The project has produced an operational minimum viable product however there is still a need for evaluation of some remaining constraints. There were significant limitations in terms of how much could be evaluated during this project, particularly since the evaluation was limited to internal testing (i.e., within the University) and a small-scale usability study. It would be necessary to conduct larger-scale trials that include survivors, NGOs, and law enforcement in order to obtain a better understanding of the potential for real world use of the system in terms of both emotional safety, reliability, and social impact. Furthermore, features such as real-time chat capabilities, AI-based threat detection capabilities, and national helpline integration have not been implemented. Also, low-connectivity performance has not been tested. Additionally, the long-term viability of the project (as a student-led initiative) will be contingent upon the availability of resources from institutions, funding, and ethical oversight.

E. Contributions to Research and Practice

Although the parameters on which it was developed were limited, HopeShield provides an operational prototype, a framework for student and community-informed development, and an ethical template for developing replicable digital safety interventions. Additionally, it adds to an emerging body of research focused on feminist HCI and safety through localization. Moreover, HopeShield is a case study for how students using participatory design can develop practical, socially-relevant innovations that address the shortcomings of institutional or state tools to support community well-being.

CONCLUSION

This study created HopeShield – a mobile safety application co-created by users in Pakistan to address the significant and often unreported issues of domestic violence and gender based harassment. Empirically grounded in the results of a nationwide survey of survivors of domestic violence, HopeShield transforms the expressed needs of survivors into viable functions such as; SOS alerts, GPS tracking, audio/video recorders, links to support organizations and educational content. While many other safety applications provide similar features, HopeShield has been developed to meet the specific cultural and societal needs of Pakistan. Additionally, it has been designed using trauma aware and user centered design principles including but not limited to anonymity, trustworthiness and usability.

The creation of HopeShield as a working prototype has proven the potential of the participation of end-users as part of the design process to develop culturally sensitive and ethically sound digital interventions. However, meaningful impact is dependent upon partnerships between government entities, non-governmental organizations (NGOs), law enforcement agencies, digital rights advocacy groups and mental

health service providers. With collaborative efforts to integrate HopeShield into existing emergency response systems and social support networks, HopeShield can transition from a local innovation into a national level response system. In future research efforts, we plan to enhance the technical and operational capacity of HopeShield to include; live chat functionality between users and verified responders, artificial intelligence (AI) assisted incident classification and triage, offline alert functionality to support low connectivity regions, expanded multi-lingual support and transparent audit trail functionality for accountability. One of our highest priorities will be to establish formal outreach relationships with NGOs, crisis centers, legal aid services and mental health service providers to foster an ongoing support network of individuals providing verified assistance to users who send an alert via HopeShield.

By fostering relationships across sectors, and enhancing the technical robustness of HopeShield, it is our hope that HopeShield can evolve from a working prototype at the University of Washington into a scalable, survivor centered infrastructure that provides improved safety, access to justice, and empowerment throughout Pakistan.

DECLARATIONS

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