

# COMPANION: SOCIAL SUPPORT NETWORKING TECHNOLOGY FOR SURVIVORS OF SUICIDE

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**Keywords:** Mobile phones, Communication, Information dissemination, Survivors of suicide, Social support networks.

**Abstract:** This position paper presents a conceptualization of a model of a survivor of suicide's (SOS) social support network. By knowing the actors in a SOS's social support network, information can be customized and delivered directly to them at the time of their greatest need. This has the potential to improve the current treatment available for survivor's of suicide and positively influence the bereavement process, bereavement-related outcomes, and health-related quality of life for everyone in the social support network. We will briefly describe suicide survivorship, present our model of the social support network, and COMPANION – our location based mobile support system designed to connect social support network members. We believe this will enable use to describe the communication use and patterns of the SOS's social support network and positively impact their health related quality of life.

## 1 INTRODUCTION

In the United States, suicide is the eleventh leading cause of death, accounting for about 30,000 to 32,000 deaths annually (McIntosh, 2008). For each person who completes suicide, there may be, a minimum of 7-10 survivors (persons close to the suicide victim) left to cope with the loss. While there is no need for immediate medical treatment for most of the estimated 300,000 survivors, there is a need for social support for those individuals close to the suicide victim (Mitchell et al., 2004). Without social support, these survivors may be at an increased risk for developing anxiety, depression, complicated grief, and post-traumatic stress symptoms.

The current support services available for survivors of suicide (SOS) include counselling and bereavement support groups. Only those survivors who seek out support services are receiving care. In times of sudden crisis, e.g., suicide, multiple people experience the feeling of losing control and diminished faith. The actual number of people suffering from this type of crisis is unknown.

During the bereavement process and times of sudden crisis the strength of relationships are tested and various people within the network of friends take on roles of support in the relationship (e.g., friend, cousin, therapist, faith leader, etc.). By analyzing the natural social support system that establishes itself to help persons through these difficult times, we will better understand the type of support requested and offered, as well as the timing for social support services available for these vulnerable individuals. This paper will present our proposed model of a SOS's social support network and an overview of COMPANION. COMPANION is a location based mobile support system designed to connect social support network members. It is expected to discover and enhance the flow of communication, recognize the survivor's geographic location when requesting support and requiring information, as well as the dissemination of information among a SOS's social support network. COMPANION will test the validity of the model.

## 2 BACKGROUND

The introduction of mobile technologies is changing and influencing the way society communicates as well as the entire framework of society. The primary determinants of communication, space and time, are quickly disappearing as the introduction of mobile phones into society keeps people available for contact wherever they are at any time of day. Patterns of communication that were shaped by a person's central geographic position in respect to the social network they participated in, as well as their ability to share information, are no longer restricted by human relocation or geographic boundaries (Hossain et al., 2007). They are now configured and arranged by the relevancy of the information one has to give to the network. This shared information is only relevant if it fits the needs of the users within a social network, the available operating system in the technology used to communicate, and the geographic environment of the user at the time of their communication/information needs.

A social network is the structure existing among a set of people and their relationships that act as a source of social support. Social support has been defined as all or part of the following: the act of providing a resource; the outcome of support (such as having a sense of well-being or being cared for); and as a relationship between the recipient and provider. While different from the concept of social support, social networks and social support are inter-related.

Social support networks can occur naturally or can be created by commonality of circumstances. It has been theorized that social support creates an interpersonal environment that alleviates accumulated stress that might overwhelm the individual's ability to cope while also contributing to the adaptive capacity of the individual. It has been argued that the main effects of social support influences health by way of the social network (Cohen, 1991). When a SOS does not utilize a social support network, the likelihood of experiencing complicated grief symptoms is increased.

As part of the social support network, family members and friends of the deceased may also experience devastating psychological effects when a death by suicide occurs. Affective, behavioral, and cognitive changes may occur during the period of bereavement. If they go untreated, the possibilities for severe psychological changes increase. To illustrate the experience of survivors following a

death by suicide, the theory of social impact can be used. With this theory the affective, behavioral, and cognitive changes in a person occur because of the impact of an information source (e.g., a person, a document, a movie, etc.) with respect to: the number of others recommending the information; who gives the information; the geographic closeness of the person giving the information, and the strength of a particular individual within the network. By building new utilities and manipulating the available functions, short text messages services (SMS), short multi-media messages services (MMS), etc..., on mobile phones and applying the social impact theory, there is the potential to prevent a bereavement-related crisis in survivors of suicide.

Communication establishes structure for society. Methods of communication vary from hand signals, to verbal exchanges, to reading the written word, or viewing pictures. Mobile phones are a tool that increases the ability to communicate with voice, text, and images at any time and in any geographic environment. Following the patterns of information sharing in social networks, a SOS's network will have an inner-network of people in close proximity, either geographically, physically, or emotionally, and an outer-network of people, either geographically, physically, or emotionally. Each person within the network may be conceptualized as being an actor, playing a role within the support system. The relationships established by the actors in the network are built on the amount of time spent communicating, the emotional intensity among the actors, mutual confiding, and the offering of reciprocal services. Figure 1 illustrates our proposed model of a SOS's social support network. Depicted are the possible actors in the social support network. The actors have been divided into two resource groups, personal and clinical, revealing the role they play within the social network and their role within the support system (throughout the bereavement process).

At this time, there is no published literature defining a survivors' of suicide social support network, their communication patterns, or their information needs. We propose that by using COMPANION and providing appropriately tailored information, it will be possible to enhance the health-related quality of life (QOL) for survivors, and inhibit severe psychological changes in survivors of suicide as they live through the bereavement process.

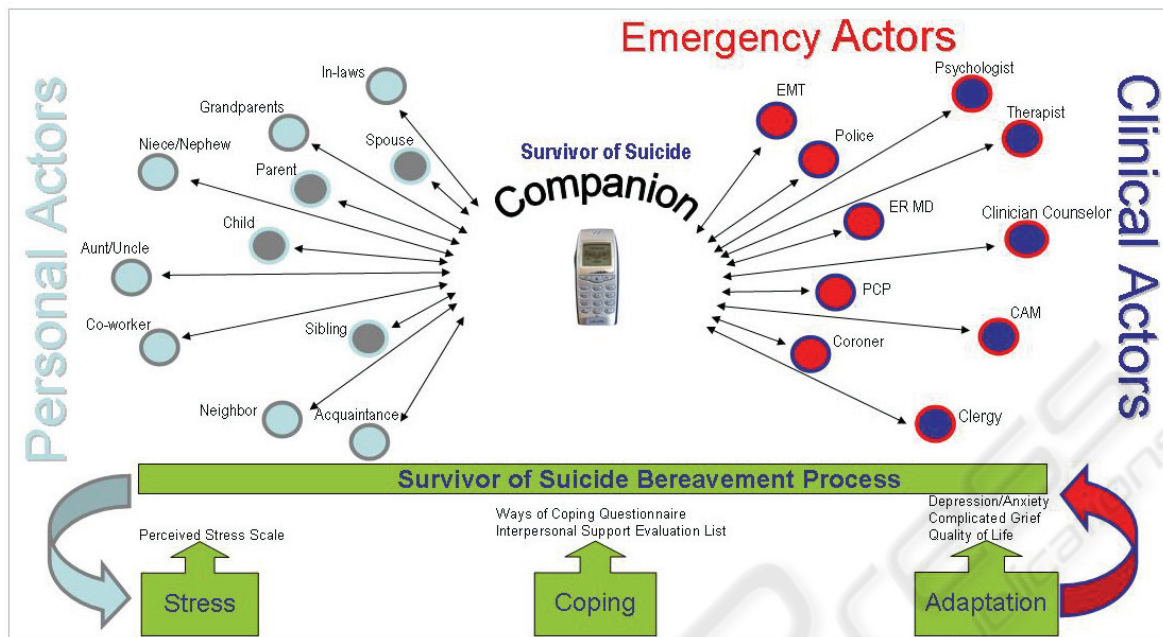


Figure 1: Survivor of Suicide Social Support Network.

### 3 COMPANION ENVIRONMENT

Human communication has changed substantially in recent years due to rapid technological developments such as the Internet and wireless networks. Both of these tools have promoted a change in social networks. Technology has played a primary role in changing the way society communicates through the development of a social network services. This type of service is a web-based technology providing a virtual community for people with similar interests or activities to communicate and share information. Figure 2 shows an overview of our proposed location-based social networking by highlighting the relationships between the three categories of social networks. Presently, the majority of existing social network applications falls under the first category, social network sites. Boyd and Ellison (2007) define social network sites as “web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site.”

The second type of social network is mobility. These are social networks that permit interaction with another person that has similar interests or

activities using mobile devices (e.g., cellular phones). The inclusion of this technology has been slowly incorporated and only included in a few social network applications since 2006 (Boyd and Ellison, 2007). Even since then, the modes of communications are limited within the network.

The third type of social network is location based. This category provides users the ability to use mobile devices equipped with geo-positioning technologies (e.g., GPS) to find locations of places and social network members

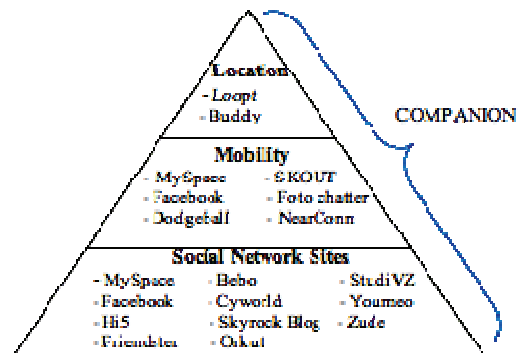


Figure 2: Location-Based Social Networks.

COMPANION, as a social network environment, combines all three categories of the social network technologies by using such services as SMS, and MMS, e-mail, photos, video, maps, and the Internet on GPS-based cellular phones. COMPANION will

have the capability to connect information resources, personal resources, and clinical resources, through location-based features. This will provide survivors of suicide with various options for obtaining information such as searching for points of interests and route directions – either walking or driving in real-time

### 3.1 Architecture and Components

We will develop COMPANION in two versions to test this model. The first version of COMPANION\_v1, will be capable of performing generic and basic functions to facilitate common social, clinical, and professional tasks. This specific information will allow COMPANION to gain knowledge about survivor's behavior as well as to understand specific needs of each survivor. The second version of COMPANION\_v2, will utilize knowledge gained from the first version in order to personalize, learn, and predict survivors' behaviors and interests and information needs. Figure 3 illustrates the high-level concept of COMPANION.

COMPANION is based on a three-tier architecture: client, middle tier server, and database server. There are two components: COMPANION social network and the COMPANION center.

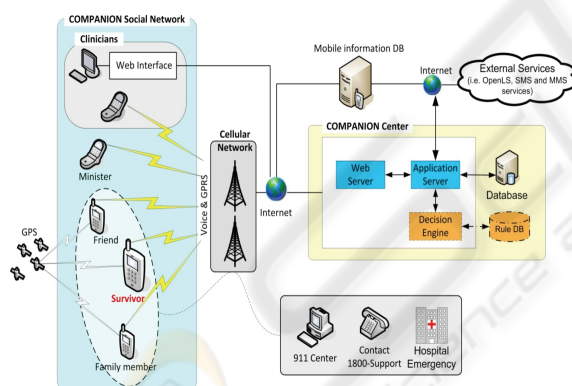


Figure 3: COMPANION Architecture.

#### 3.1.1 COMPANION Social Network

The COMPANION social network consists of clients, which are mobile units and stationary units (workstations), in the three-tier design as depicted in Figure 3. The mobile units are cellular phones equipped with GPS and be capable of such functionalities as: voice, SMS, and MMS. By providing professional members (such as spiritual leaders or clinicians) with these cellular phones, they can provide medical and spiritual support via a voice call before or after the system communicates with them through SMS and MMS messages.

The COMPANION phones will exchange information with the COMPANION center via the Internet. The COMPANION phones will feature speed dials to local emergency services, contact services 1-800-support (local suicide hotlines), emergency numbers for local hospitals, include sensors allowing the COMPANION center to monitor and query specific information, such as the users reported emotional status, URL access, and call history. When utilizing the GPS unit on the social support member's phone, COMPANION will assist the user in locating other members and geographically direct the user to predetermined activities or spontaneous activities.

By collecting personal information on each survivor through COMPANION and transferring it to the COMPANION center, the system will construct knowledge for the next generation of COMPANION (i.e., COMPANION\_v2).

The stationary units in the COMPANION social support network, provide authorized clinicians access to review a survivor's information through a secure web page. COMPANION\_v1 will provide only a high-level summary of the survivor's reported emotional state, frequency of cell phone use, and utilization of location data. COMPANION\_v2 will be able to provide combined information to reveal spatial patterns that are found to impact a survivor's emotional state and suggest locations that the survivor should avoid because of psychological effects (e.g., bridges). Moreover, COMPANION\_v2 will feature a set of rules that the system should respond to for each individual's actions – such as a text alert to the survivor's social support network if the survivor does not communicate in anyway with COMPANION over a period of time.

#### 3.1.2 COMPANION Center

The COMPANION center consists of two main components: middle tier server and database server. The middle tier server includes a web server and an application server. The web server provides HTTP portal services for web clients. This server is responsible for data integrity and the conversion of data into a format that can be viewed on a client screen. The application server provides the core functionalities of COMPANION, the logic, and the data access. This server also will be capable of requesting additional services from external providers such as mapping services, and pre-programmed support text messages (push technology). The application server will be able to retrieve communication transactions (such as call history, SMS and MMS messages, and URL access)

located in a mobile information database from each survivor's COMPANION phone. This mobile information could be accessed through a service provided by the designated network provider or a third-party software provider that is able to handle the personal information of cellular phone usage confidentially and securely.

The second component of the COMPANION center is the database server. The database server is responsible for data storage and management. Two types of data will be contained in this database, spatial and non-spatial data. Spatial data include historical trajectories of each survivor, locations of the social network members, and tagged locations. Non-spatial data include user profiles (i.e., personal notes, emotional status), a list of website information for support materials, and a list of book recommendations. All information in the database server will be kept confidential and revealed only to authorized users. The application server will grant permission to access data in accordance to each user's role. Data will be de-identified as necessary for confidentiality and security.

### 3.2 Functions

As shown in Figure 4, social support network members provide a different type of support than those clinical members who rely mostly on their specialized skills. Three support actions composed of social, clinical, and emergency actions are considered so survivor's of suicide can receive support from each of these categories of people, in order to assist them in coping with their loss. Each action is a form of tangible support, confidant support, and validation support. For example, the validation support that both personal members and clinical members can provide is companionship, social interaction, and positive information. These forms of support can occur as a SMS, MMS or voice messages.

It is true that COMPANION cannot offer all supporting functions for suicide survivors however, COMPANION can provide a means for human communication with respect to location, context, and time, which can then lead to more face-to-face tangible support.

To enhance the health-related QOL, COMPANION will feature a reminder system and six unique functions to facilitate communication or interactions between suicide survivors and their caregivers, family and friends. These functions mainly utilize spatial data, temporal data, and preference information for each user.

*Find People-* A group member can use this function to search for a location and personal information

(i.e., availability) for finding people with some criteria. Example queries are: Where is Lyn? Who is within 1 mile of me and able to meet? Is anyone with Sue? The query results could be presented as a point on a map with a description.

*Find Place-* A member in the group can use this function to search for a place that meets a specific set of desired criteria. For example, are there support group meetings near? What are the top three restaurants visited by Sue? In addition, when two or more members are involved in the search process COMPANION can provide an optimal solution to satisfy the users while maximizing the criteria. For example, what library is located between Sue and Lyn's current locations?

*Navigation-* This function provides step-by-step directions, estimated travel time and arrival time from a requesting user's current location to a specific destination (static) or to another user's current location (dynamic). The route and instruction will be calculated according to a method of travel defined by the user. In this research, transportation is limited only to ground transportation, i.e., driving, walking, or taking public transportation.

*Geofence-* This function triggers an event whenever someone enters or leaves a pre-defined geographical region. For example, Sue sets COMPANION to send a SMS to notify her that Ann is within 0.5 mile of her location, and Lyn sets COMPANION to notify her spouse when she leaves the support group meeting.

*Geotag-* This function allows members to post messages at a particular location. For example, Lyn wants to describe her feelings and express anxiety to her sister when shopping. She can accomplish this by entering a score into the phone representing her emotional state. The posted geotag could be set as a personal or sharable piece of information.

*Information Service-* This function provides information resources including websites, books and services related to coping with suicide. It also provides information about specific interests for each user.

## 4 CONCLUSIONS

Through the development, testing and application of the COMPANION system, the model for a SOS's social support network will be modified if necessary, retested until correct, and then validated. By knowing the actors and the roles that they play in a survivor's social support network, information can be customized and made readily available to support

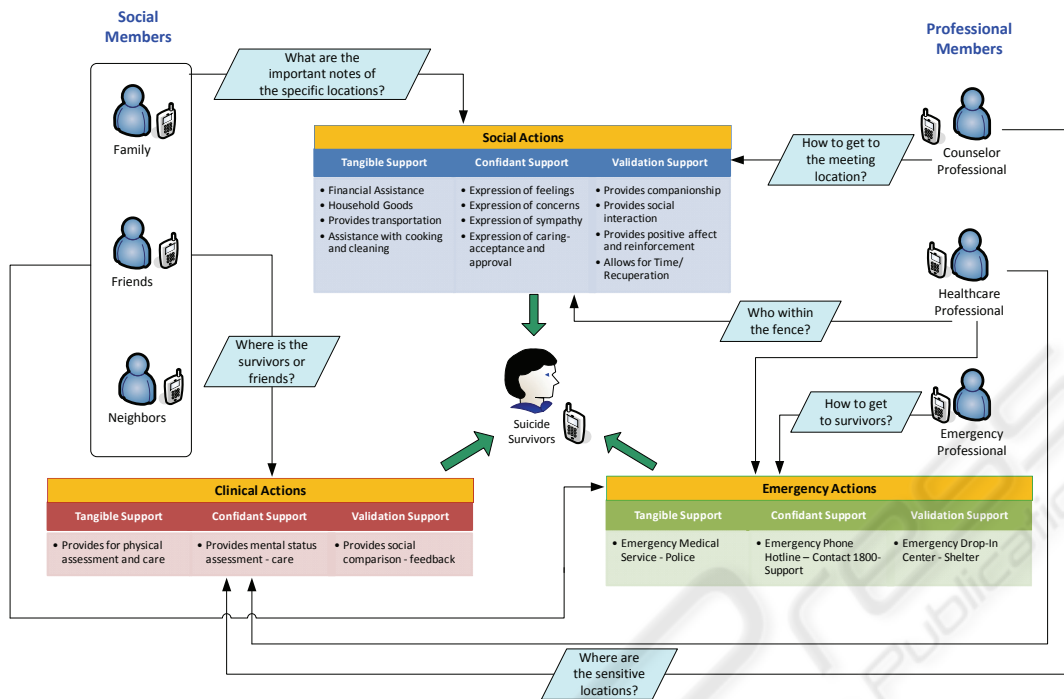


Figure 4: Social Support Network of COMPANION.

individuals in times of crisis. Through the discoveries made with COMPANION and its utilization within a survivor’s social support network there is potential to positively affect the bereavement processes and impact the health-related QOL of many individuals currently not treated.

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