Supporting a Virtual Community for the Elderly

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TECHNOLOGY IN ELDERLY CARE

An important application context for virtual communities is elderly care. One of the key challenges facing modern societies is the increasing speed at which the population is aging. In Europe, for example, during the last three decades the number of people aged 60 years or more has risen by about 50%. Traditional approaches to care provision are based on support from either the relatives or the elderly care centers. Nevertheless, these two solutions have become increasingly insufficient due to (1) the impractical responsibility onto relatives—given the fact that more and more family members have to work to secure steady incomes; (2) the costs of providing sufficient care centers, which leads to a relocation of the elderly people, often beyond their home communities; and (3) the fact that many elderly people preserve enough robustness to be in their homes, a situation that is often preferable to them, and as such, better for their welfare (Castolo, Ferrada, & Camarinha-Matos, 2004). This will inevitably place a considerable strain on resources and finances. To deal with this challenge, new ways of providing elderly assistance and care must be found, including the creation of a new technological infrastructure. An integrated elderly care system comprises a number of organizations, such as social security institutions, care centers/day centers, health care institutions and so forth, and involves the cooperation of a number of different human actors; for example, social care assistants, health care professionals, the elderly people and their relatives. If supported by computer networks and adequate assistance tools, such systems may evolve towards operating as a long-term virtual organization, and the various involved actors become part of a virtual community. Furthermore, virtual communities can bring the sense of community and of recognition, respect and belonging, which gives the elderly a strong feeling of usefulness along with better support for their own needs.

In this context, the IST TeleCARE project (Camarinha-Matos & Afsarmanesh, 2002, 2004) was launched with the aim of designing and developing a configurable framework, based on mobile (software) agents, focused on the establishment of virtual communities for elderly support. In this article, the TeleCARE Time Bank virtual community concept is presented and the developed supporting infrastructure is discussed.

WHAT IS A TIME BANK?

The basic idea behind the Time Bank concept is that people help each other by exchanging the performance of simple, though useful, tasks among them. Examples include gardening, cooking, simple home repairs, teaching languages and so forth. According to this model, services are paid with an alternative currency—time, not money. A relationship exists between time and credits—each credit corresponds to a time unit. Whenever a member performs some service to another member, the giver accumulates credits that are deducted from the account of the receiver. Therefore, a Time Bank is a mechanism for collaborative community building, resorting to trust, social capital and sense of community. Participants do support each other and develop new skills and confidence. It helps in creating reciprocal relationships between people and institutions, as well as between people and people, which ordinary volunteering finds it harder to achieve.

The Time Bank idea was originated in the United States (U.S.) in the mid 1980s by Edgar Cahn (Cahn, 2000), motivated by the need to not feel useless, as he stated: "I did not like feeling useless—in the 1980s society was declaring a lot of people useless, the unemployed, the elderly and the young." The first Time Bank movement became known in the U.S. as the Time Dollar communities.

Therefore, this idea generated a new response to social needs by focusing on:

1. Constructing a solidarity culture by endorsing a structure of crossed interchanges instead of interpersonal nets.

2. Promoting the sense of community, sociability, collaboration among diverse generations of the population, social integration and the coming across of people that coexist in the same geographical areas.
3. Promoting the construction of human social relations, diminishing the effect of problems related to isolation, solitude and absence of social contacts.
4. Valorizing the time and the care of people, giving value to the time that they spend in activities that, although not being specifically professional or financially remunerated, have a social function.
5. Promoting family support in terms of conciliation between professional and familiar life for men and women, through the offer of solutions for practical necessities of daily life, some of them linked with problems of time coordination.
6. Stimulating talents and promoting recognition of people's capabilities independently of the market rules, returning this way usable liable resources, principally from excluded or retired people.
7. Promoting cooperation among several institutions, creating reliable structures between private and public institutions, familiar associations and other associations.

Time Bank has the potential to allow almost everybody in society, including the elderly and housebound, to give something back (London Time Bank) via involving people on the basis of what they enjoy and can do, providing the ingredient in public services—people's participation—by encouraging time givers of all ages and abilities to deposit their time and get that time back when they want some help themselves.

This is the basic principle of Time Bank: For every hour a member spends helping someone, that member is entitled to an hour's help in return. There are no more valuable services than others; that is, the offered service does not have to be equal to the received one. The core values of time banking (NEF, 2003) are:

- **"Can do":** Everyone has something of value to give and we need their contribution
- **"Equality":** Everyone's time is worth the same
- **"Reciprocity":** Everyone is a giver as well as a receiver

Each person's time credits are recorded in their "account" in the Time Bank. People can then withdraw time from their account when they would like to get help. These transactions are done via Administrator/Coordinator, who keeps record of the accounts and helps match people who want help with someone who can provide the requested service. When the task is complete, the accounts of the receiver and the giver are updated with the corresponding number of hours.

THE TELECARE TIME BANK

The goal of the Time Bank in TeleCARE (TTB) is to apply this concept to the elderly care domain; that is, to make elderly feel useful to society, share their experiences with others and have their days fulfilled. At the same time, by being integrated in this community, they can obtain better support for their own needs.

The mechanisms of the Time Bank community are particularly adequate to support the "active aging" concept. It is now commonly accepted that while there is no magic formula for successfully living a long life, in a healthy manner, remaining active and engaged in society is a critical component for maintaining quality of life. In fact, the current paradigms of aging as a "dependent" stage of life do not mach up with current realities of elderly people or with the expected socio-economic scenarios for the 21st century. Aging is less and less synonymous of dependency. Not all elderly people suffer from chronic illness, and even those who suffer from functional limitations retain other significant capabilities (Castolo, Ferrada, & Camarinha-Matos, 2004).

From the technology point of view, the TTB is one of the vertical (application) services that run on top of the TeleCARE platform (Figure 1). This platform provides an infrastructure for the implementation of distributed, Internet-based systems in elderly care (Camarinha-Matos, Castolo, & Rosas, 2003). The infrastructure is based on multi-agent technology (mobile and stationary agents), federated information management and safe communications. The TeleCARE multi-agent system (MAS) platform is installed in each site (elderly homes, care centers, etc.), creating a flexible infrastructure that supports the idea of plug-and-play vertical services (which can be progressively added on top of the system).

Figure 1. Examples of services in the TeleCARE framework