

Applying ActAD - home care case

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Abstract. ActAD (Activity Analysis and Design) is a model that links together individual actions, cooperative activities and activity networks, identifying three categories of means, respectively – means of work, means of cooperation and coordination, and means of networking. The model is illustrated by describing the activity network of home care services in Finland and by identifying the needs for improved computer support for cooperation therein.

Introduction

Information systems should offer the right information at the right time in the right place so that available information meets the needs of stakeholders. In the social and health services the realization of information systems does not always meet what is really needed. In home care several actors from different professions and organizations strive to take care of the same client's health at client's home. It is not self-evident, what information different professionals need for helping and nursing clients, and how they get the required information. It is worth to study how new technology and component-based systems can facilitate information flows in efficient and secure ways.

In our research the objective is to find and *develop methods for analysis and design of component-based systems* or components, the introduction of which support realization of goals and activities of organizations and individuals working in network of these organizations. This means that it is not sufficient to consider the user requirements of single monolithic software system, but improving utility and usability includes consideration of collective work groups and granular components. For doing this, we need descriptions to show collective actors, coordination and communication as well as the goals of work processes. In software systems point of view *interoperability* means that a system is capable to execute services to other systems and to utilize services from other systems (Herzum and Sims, 2000).

In order to support development of working activities in organizations, we selected *Activity Analysis and Development* (ActAD) (presented by Korpela et al., 2000; Korpela et al., 2002, Korpela & Mursu 2003) as a starting point of our method. ActAD is based on activity theory (AT) in general (see Hedegaard et al., 1999, for an introduction) and specifically on Engeström's well-known model of the systemic structure of work activity (Engeström, 1987; Engeström et al., 1999; Engeström, 1999).

In this paper we consider our *home care* pilot project and discuss results and experiences we have got thus far from applying ActAD. The home care case is one of the pilot projects in PlugIT-project, and its objective is to derive the requirements for information system of the home care. PlugIT focuses on software integration and its aim is to increase interoperability and lower the introduction threshold of health information systems in Finland by using open interfaces and component-based approach.

Illustration by a case: Home care services in Finland

Public provision of health and social services is characteristic to all Nordic countries, as opposed to other countries where they are mainly provided by e.g. the citizen's family, private sector or non-governmental organisations like the church. In Finland the local authority, municipality, is legally responsible for organising primary health care and social welfare services for its inhabitants. Services are provided individually by each municipality or in joint service centres with other municipalities. In some cases, municipalities purchase part of their services from non-governmental organisations or private sector actors. For specialist health care, each municipality belongs to a hospital district that owns and controls a central hospital.

The services are funded from municipal taxation revenue, central government grants and minor customer charges. The Social Insurance Institution, which is a governmental actor, is a close partner in cooperation granting various subsidies for citizens (e.g. sickness allowance, national pension and disability pension).

Municipal social and health services have traditionally been two separate administrative units, although in some municipalities they have become united. Also primary health care (health centre) and specialist health care (hospital) are separate organisations. The fragmentation of the system can be an obstacle in circumstances where the various actors should be able to work together for the benefit of a mutual client. A good example case of this is the delivery of home care after a surgical procedure. In this paper we present a generalised description of standard practice in a Finnish municipality.

The activity network and organizations involved in home care services

A client's needs for health care and his or her ability to cope with basic domestic work and the expenses caused by hospital stay and convalescence are assessed by a team from the social and health care centre. The team usually

consists of a physician, home health care nurse (health visitor), physiotherapist, occupational therapist, social services coordinator (social worker), home helper and practical nurse. Although they work together with each other, the client and his or her family, they may not all be present at the same time.

The team needs the discharge information from hospital to accomplish the assessment. Information may come in various forms and be transferred in various ways: on paper, x-ray film, over telephone, fax, e-mail, and, in less urgent cases, by traditional mail. Although the health centre and hospital both have their electronic information systems, they are not necessarily linked to each other. Due to this, overlapping data are often collected, e.g. duplicated laboratory tests on the day of hospital discharge.

In case of postoperative care, the **object** of home care activity is naturally the operated person, the client. The desired **outcome** is that the client manages to take care of his or her needs by oneself and live an independent life. Among the means to achieve this outcome are e.g. physiotherapy, medication, wound care, the wide field of home help (shopping of groceries, cooking, cleaning, assistance in maintaining personal hygiene, keeping company), provision of aiding devices (crutches and wheelchairs) and training the client how to use them, economic aid, medical check-ups, transportation service, home renovation etc.

The client's physical, social and economical status, his or her needs and wishes, the desired outcome and the means to achieve the outcome are documented. Together they form a service plan. Within the scope of home care, the service plan can be considered both as an instrument for communication and as a collective instrument of action.

The service providing activity in detail

Figure 1 zooms into one of the activities identified in a birds-eye analysis of a home care service chain. The activity in focus is the provision of the home care itself, by several professionals who visit the client but seldom in the same time. Our analysis is biased on the means of cooperation and communication among the actors, instead of the individual actions.

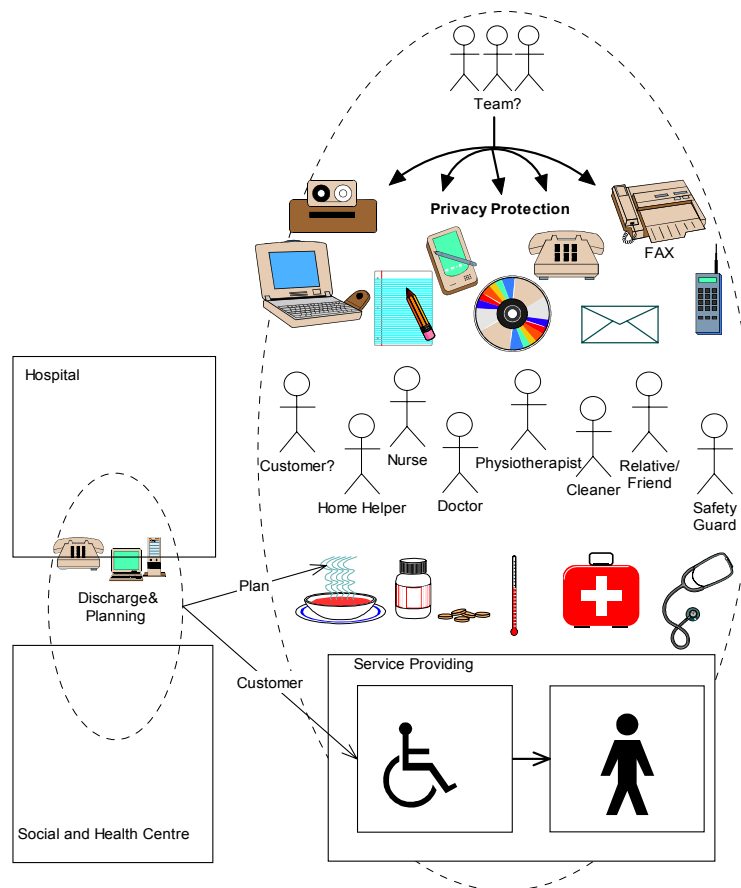


Figure 1. The service providing activity in more detail, with emphasis on cooperation.

Mode of Operation: Home care as an activity is multidisciplinary project work with a clearly stated objective, based on collaborative decisions and actions documented in the service plan and evaluated in the end of project. The project comes to an end when the mutual goal has been achieved. If the goal is not achieved, the project team has to analyse if the chosen means of action were incorrect or insufficient or whether the client's needs or environment have changed somehow. The outcome is evaluated and if need be, a new needs assessment and service plan can be created.

Collective actor consists of all the governmental, regional and local organisations' workers who attend the client. Although they do not necessarily operate in the same place or in the same time, they should be aware of each other's actions.

Means of coordination and communication, Division of work, Rules: The communication usually consists of means both informal (discussions in meetings or over the phone) and formal (service plan, medical documents). Information is collected in many formats, too. There may be a notebook at the client's home where the actors, including the client's family, write short messages to each other. Medical and nursing notes may be first recorded with tape recorder and then typed to either paper forms or entered to an electronic health record (EHR). During their visits, nurses may use a portable computer or a palmtop device to access the EHR. However, home helpers do not have access to the system. The division of work and communication between the actors is strongly regulated by

legislation: the professions' qualifications, responsibilities and scope of actions can be found from the law. Also data protection and security issues are legally prescribed.

Actors in Service Providing: Home helpers do the shopping of groceries and other consumables, prepare food and feed the client. Cleaning services may be obtained from a private company. Nurses execute wound care and medication therapy according to the physician's orders. If need be, they can also ask for physician's consultation. Physiotherapists instruct other home care actors and the client of the recommendations and limitations related to his or her condition. Occupational therapist supervises the renovation work that may be needed in stairways, bathroom or kitchen. In case the client falls down or has some other acute problem, he or she can call the 24-hour safety service. Friends, family or volunteers from Red Cross or other non-governmental organisations may occasionally come to visit.

Means of work, instruments, facilities: As all individual actors have their own specific role, their tasks are usually rather well-defined and they bring their own instruments to the client's home. In this paper we do not go into further detail.

The needs for computer-based means of cooperation, communication and networking

High quality home care requires good communication and cooperation. For instance, a home helper may observe that the client's condition has clearly deteriorated since his previous visit. If information about the nurse's scheduled visit in half an hour were available in some kind of a shared database, the home helper did not necessarily have to call an ambulance. While keeping company to the client and waiting for the nurse, he could document his observations to the database. He could also cancel the next day's home helper visits and meal orders if it was evident that the client needs hospitalisation.

The joint database would contain the schedules and contact information of all collaborating actors, as well as client information, operating as shared whiteboard. Each actor or actor group should have their own level of access rights, according to their legal responsibilities and limitations. The joint database would be accessible with various devices and terminals: mobile phones, palmtop, laptop and desktop computers.

Discussion and conclusion

Most Software Engineering methods rush to design software, for example, to describe use cases, class diagrams, and architectures. Thus they give insufficient support for describing goals of organizations and for developing underlain working practices.

Rich pictures give us a lot of information needed while developing work practices and technological solutions including hardware and software. From diagrams we can see division of responsibilities and work, data flows and control flows, and means of coordination and communication.

Selecting right architectural styles and patterns for an information system is critical while improving the quality of future information systems (Bosch, 2000). The rich pictures, described by applying ActAD, facilitate architecture design, for example:

- We get a tool for communication, negotiation, and understanding about properties of future information systems and their integration between different stakeholders, including service providers and customers, software providers, and software integrators. Further descriptions work as an overview picture which helps analysis, design and implementation of the software.
- Actors and organizations may need a common repository containing for example, phone numbers, responsible actors, nurse's scheduled visits in each customer's home.

We will continue our home care case forward more detail descriptions of the needed information system and forward component-based software requirements.

Acknowledgments

We would like to thank Kuopio Social and Health Center for giving us insight into interesting problem. Further, we thank whole PlugIT-research group for comments and collaboration. This work is part of PlugIT project, which is funded by the National Technology Agency of Finland, TEKES together with a consortium of software companies and hospitals.

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