2005-11-02

ACTABILITY AT A GLANCE

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1 What is actability?

The definition of actability reads: “We define actability as an IS ability to perform actions and to permit, promote and facilitate users to perform their actions both through the system and based on messages from the system, in a work practice context”. An IT-system’s ability to permit, promote and facilitate the execution of user’s actions implies for example that the IT-system should be easy to use and that the action repertoire is easy to identify and to access.

The IT-system could automatically execute actions. This implies that the IT-system should be perceived as an agent on someone’s behalf. An automatic action means that the action is executed according to predefined rules. The IT-system can therefore not be responsible for the executed action. A human actor always has always the final responsibility for the action. According to the definition, the user’s action is performed through the IT-system. This is the case when the system is used as a tool for communication. The users can also act outside the IT-system based on information presented by the IT-system. One example is when users read information on the screen and then perform a task outside the system but based on the information read.

The IT-system’s actability is always related to a specific business context where it is used. The business context embraces the users’ pre-knowledge and skill both concerning the IT-system and the business tasks that should be performed. Actability can therefore not be viewed as a static property of the IT-system; rather it will also be defined by the conditions that the surrounding environment creates. From an actability perspective an IT-system consists of (see Cronholm & Goldkuhl, 2002, p 3)

- An action potential (a predefined repertoire of actions)
- Actions performed interactively by the user and the system and/or automatically by the system.
- Action memory (a memory of earlier actions and including other prerequisites for action)
- Documents (as action conditions, action media, action results)
- A contained structured work practice language (giving frames for actions, action memory and documents)

Designing an IS means suggesting and establishing an action potential. An action potential both enables and delimits actions. It entails a repertoire of actions and a related vocabulary. The vocabulary consists of concepts related to the work practice language. An IS must also offer a record of actions performed. Information about performed actions can normally be found in the IS database. We call it an action memory, which is part of an organisational memory.

The interaction with an IT-system is normally performed through screen documents. The documents have an action potential through the functionality that is offered. Examples of actions performed through screen documents are the registration of order information and reading supplier invoices.

Actability implies that an IT-system can be seen as a part of an organisation. When commercial organisations do business with other organisations (customers, suppliers) it means that business actions such as offering of products, confirmation of orders, product delivery and invoicing are performed (confer Goldkuhl 1996, pp 3-7; Goldkuhl, 1998; pp 4-6). These business actions are performed with support of the IT-system. This action theoretical base stresses that organisations perform actions when they are doing business. The task of the IT-system is

to act as media. The IT-system provides information to the users and it also creates conditions for interaction and communication with other actors.

The concept of actability is inspired by theories about social action (Weber, 1978), language action (Austin, 1962; Searle, 1969) and communicative actions (Habermas, 1995). The theoretical bases are further described in Goldkuhl (2005) and Ågerfalk (2003)

Further readings:

Goldkuhl G (1996) Generic business frameworks and action modelling, Accepted to the International workshop on the Language Action Perspective on Communication Modelling, Oisterwijk, The Netherlands

Goldkuhl G (1998) The six phases of business processes - business communication and the exchange of value, accepted to the twelfth biennial ITS conference (ITS´98), Stockholm

Goldkuhl G (2005) Socio-Instrumental Pragmatism: A Theoretical Synthesis for Pragmatic Conceptualisation in Information Systems, in *Proceedings of the 3rd Intl Conf on Action in Language, Organisations and Information Systems (ALOIS),* University of Limerick

Cronholm S & Goldkuhl G (2002). Actable Information Systems - Quality Ideals Put Into Practice. In proceedings of *the Eleventh Conference On Information Systems (ISD 2002).* 12-14 September, Riga, Latvia

2 Why actability?

Usability is often considered as a quality measurement for IT-systems. One definition that has been generally agreed on is the one by ISO 9241-11 (1998), which reflects the broad concept of usability: “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”. Traditionally, usability focuses on cognitive and data aspects. The concept of usability is interested in how humans interact with computers. Another common view of IT-systems is to perceive them as systems for storing, retrieving and organising data. The concept of actability agrees with these views but the actability concept also challenges them since IT-systems nowadays are an integrated part in our daily work and our work often means cooperation and coordination with other humans. One of the most important aims for IT-systems is support the communication that is going on between:

- Actors within an organisation
- Different organisations
- Consumers and organisations

Working with actability principles means taking a communicative perspective; to analyse and understand the communicative processes going on. Since an IT-system is a tool or medium in a communicative process it is of course important that the system is designed as a communicative support. A common problem in IT-systems is that the information stored is often anonymous. All communication has a sender and a receiver. If information concerning sender, receiver and the time when the information was created is missing, it will be hard to evaluate the status of the information. In a communicative process it is important to visualise actors in order to identify who has said what and when. Designing actable IT-systems means being clear about what actions have been performed and by whom.

Further readings:

Goldkuhl G, Ågerfalk PJ (2000) Actability: A way to understand information systems pragmatics, accepted to the 3rd International Workshop on organisational semiotics, Staffordshire University

Ågerfalk P J, Cronholm S (2001). Usability versus Actability: A Conceptual Comparative Analysis. In Poster Sessions: Abridged Proceedings, pp. 235–237, HCI International 2001, August 5–10, 2001, New Orleans, LA, USA

3 When can an IT-system be considered as actable?

In order to support the design and evaluation of actable IT-systems we have developed a number of principles. An IT-system is actable when a user (confer also Cronholm & Goldkuhl, 2002, pp 5-8):

- Easily understands what he/she can do with the system (clear action repertoire)
- Is able to "say" what he/she wants to say through the system (satisfy communication needs)
- Can easily move to another document (easy to navigate)
- Understands consequences of proposed and performed actions (action transparency)
- Can immediately see if the intended action is executed (clear feed back)
- Can easily can access information of what has been done previously (easy access to action memory)
- Knows who has said what (personalized information)
- Understands used concepts (familiar and understandable vocabulary)
- Understands the communicative intention of different messages
- Is offered a good support for business actions

Easy to understands what can be done with the system (clear action repertoire)

This principle demonstrates to what extent the IT-system shows the offered action potential in a clear and understandable way. That is, which business actions that can be performed in a specific context. To be clear means to support the users' mental model of the IT-system. The system should always inform the user of the type of action offered and whether it is a reading, updating or writing action. An example of how to inform users in a clear way is to label the buttons in such a way that both the name of action and the name of the object that the action is operating on are visible. Examples of this way of labelling are: register order and plan errands. Equally important is that the business language used is followed.

Able to "say" what he/she wants through the system (satisfy communication needs)

This principle is based on the fact that the IT-system is used for communication. The communication need should be supported by the IT-system. There should be possibilities for registration of information in the system that the user wishes others to read. The information registered should be saved in the system's action memory and later on be communicated to a receiver.

Can easily move to another document (easy to navigate)

This principle supports navigation. Carrying out a business task often means that the user has to access several screen documents. Accessing different documents means navigating. It should be easy to navigate independent of the system's structure. There are different types of

navigation. Hierarchical navigation means to access a document on the immediate higher or lower level in the system structure. Sequential navigation means to access a document at the same level. Direct navigation means to move anywhere in system structure. In order to support the users' ability to orientate, the navigation should be traced and visualized.

Understand consequences of proposed and performed actions (action transparency)

The IT-system reacts to the users' business action by performing a system action. A business action can for example be a request of a change of the action memory. The IT-system's action is a change of the action memory. The IT-system should be designed in a way that users in advance understand the meaning of the business action. The users should also in advance understand the consequences of a business action. Afterwards, the IT-system should confirm that the requested business action has been carried out.

Can immediately see if the intended action is executed (clear feed back)

The IT-system should always present an understandable reply in response to an executed business action. The answer should consist of a description of what the IT-system has done and in that way support the user interpretation. Feedback should always be presented. For example, the IT-system can show a message or change the actual content of the document in a way that the user understands that a change has taken place. Feedback should also be given for navigation actions. A simple way to give feedback on navigation actions is to be careful when labelling documents.

Can easily access information of what has been done previously (easy access to action memory)

Previously stored information should be easy to access. This means that information about previously executed actions should be easy to find. The action memory can consist of historical information (actions that have been done) and expected actions (actions that should be done).

Know who has said what (personalized information)

The IT-system should keep track of "who has said what". This is especially important in communication-intensive business. There is often a need to find out more about something than what is stored in the action memory. Therefore, the reader of the stored information should be able to contact the person who is responsible for the information. The IT-systems should therefore contribute to making actors visible and neutralize anonymity.

Understand used concepts (familiar and understandable vocabulary)

The IT-system's language should correspond to the business language. There should be no hesitation about the meaning of used concepts. The IT-system should offer explanations for each concept and a description of the possible actions that can be executed through the system.

Understand the communicative intention of different messages

The user should understand the intention of different messages (documents) received. Does the message report something that has happened? Is it a recommendation to act? Is it a commitment? In order to use the system as intended and as an instrument for communication there should be no hesitation in the communicative intention.

Offer a good support for business actions

The content of documents should offer good conditions for doing business actions both through the system and outside the system. The information presented should be easy to interpret and the offered actions should be easy to access. The relationships between different ac-

tions should be visualized in a way that the user easily understands if there is a specific order between them.

Below is an example presented that illustrates some of the principles discussed (see Figure 1). The example describes a document consisting of a task schedule in elderly care.

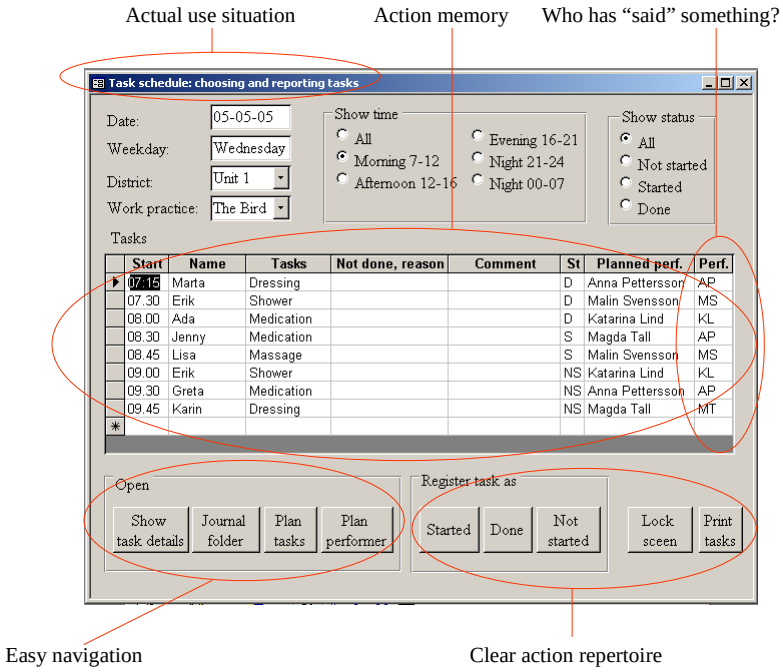

Figure 1 Illustration of actability principles

To conclude an IT-system is not actable when:

- It is hard to understand the offered actions (unclear action repertoire)
- Users cannot express themselves through the system as desired (not communicative)
- It is hard to move to a specific document (difficult to navigate)
- Users don't understand the consequences of suggested and performed actions (not transparent)
- Users don't know if performed actions are executed by the system (lack of feedback)
- Users don't understand presented concepts (unclear system language)

Further readings:

Cronholm S & Goldkuhl G (2002). Actable Information Systems - Quality Ideals Put Into Practice. In proceedings of *the Eleventh Conference On Information Systems (ISD 2002).* 12-14 September, Riga, Latvia

4 Actability and Usability

One definition of usability that has been generally agreed upon is the one by ISO 9241-11 (1998), (see above). One way to compare actability to usability is to take a closer look at this definition and the definition of actability (see above). By use of the term "product" ISO refers to both software and hardware. Such a product can be "used … to achieve specific goals", that

is, to produce intended outcomes. A user is anyone who interacts with the product. By “specified users”, ISO implies that different users might have different needs and comprehend the product differently. The terms ”effectiveness” and “efficiency” imply that the specified goals are to be achieved with accuracy and completeness, and with as little expenditure of resources as possible. Furthermore, the goals should be achieved with ”satisfaction”, that is, without discomfort and with positive attitudes towards the use of the product. The term ”specified context of use” includes users, tasks, equipment and the physical environment where “tasks” are defined as the “activities required to achieve a goal”.

From a usability perspective, the purpose of using an IT-system is to achieve specified goals. Actability, on the other hand, emphasizes the performance of social actions. Since actions are supposed to lead to desired business effects, these two formulations appear to be similar. A problem with focus on goals is that it might lead to an overly instrumental view of human action, and thus the performance of tasks. Actions are multifunctional and an action might lead to several business effects and several actions might lead to the same or a similar business effect. When designing for social understanding, heavy focus on goals might lead to decreased user satisfaction.

The term “specified” is used throughout the definition of usability. “Specified users” indicates that usability emphasizes user differences while actability assumes a typical user category. From this angle it is clear that usability is more strongly rooted in cognitive science than actability is. Even though actability is partly based on usability, the main focus of actability is not on cognitive aspects and user differences. Rather, actability tends to stress the importance of balance between the organisational and the individual aspects of IT-system usage.

In general, the connotations of “user” are different with respect to usability and actability. The usability focus is primarily on humans who directly and physically interact with an IT-system. In the context of actability, a user is basically anyone affected by the actions preformed through or by the system.

It seems that the usability phrase ”effectiveness, efficiency and satisfaction” and the actability phrase “permit, promote and facilitate” reflect the same aims. If a system permits and facilitates actions, it is probably effective and efficient as well. If it promotes action, it can probably be used with satisfaction. From an actability perspective it is important to interpret the usability terms from a social orientation. Even if a system is effective and efficient it may still not permit, promote and facilitate actions from a social action perspective. That is if those actions cannot be performed as successful communicative actions.

According to ISO 9241-11 (1998), usability should be understood within a ”specified context of use” – which tends towards the view of “one user using one computer”. This narrow human-computer view excludes other users who benefit from the IT-system. This restriction has also by criticised by Schmidt & Bannon (1992). Their criticism is made from the perspective of Computer Supported Cooperative Work (CSCW), and Bannon (1991) claims that usability must widen the focus to “encompass groups of people and machines”. The actability concept of business context suggests a “specific context of use” which is a social context wherein people cooperate to do business by the use of IT-systems.

Another way to illustrate the differences between usability and actability is to use Shackel‘s model (1984), (see Figure 2). Shackel’s simple model demonstrates a use situation from a usability perspective. The model consists of four components: user, tool, task and environment. The components user, tool and task are pictured as three binary relationships.

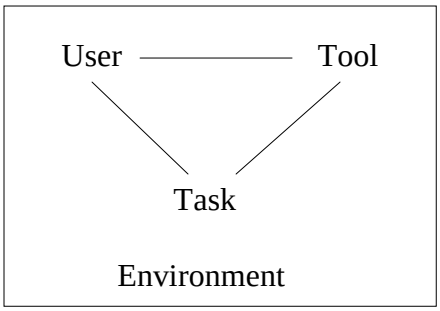

Figure 2 Four components in a use situation (Shackel, 1984)

The definition of usability focuses the components user and tool and the relation between them. Norman (1998) claims that: ”I don’t want to use a computer, I want to accomplish something”. Humans and organisations are doing business by carrying out business actions. Humans use computers as tools in order to perform and coordinate actions. Winograd & Flores (1986) claims that computers are ”essentially for communication, not for computation”. These claims are two important ones for actability. The concepts of business actions and communication are pillars in the actability concept. One actor performs an action that can be directed to another actor with support from an artefact (IT-system). The concept actor, action and artefact are parts of a business context. This changed terminology (compared to the terminology in Shackel’s model) reflects a shift of perspective. The actability perspective encourages viewing actors as performers of business actors instead of passive information receivers. Another change compared to Shackel’s model is that the actability perspective views the components actor, action and artefact as one ternary relation (Figure 3).

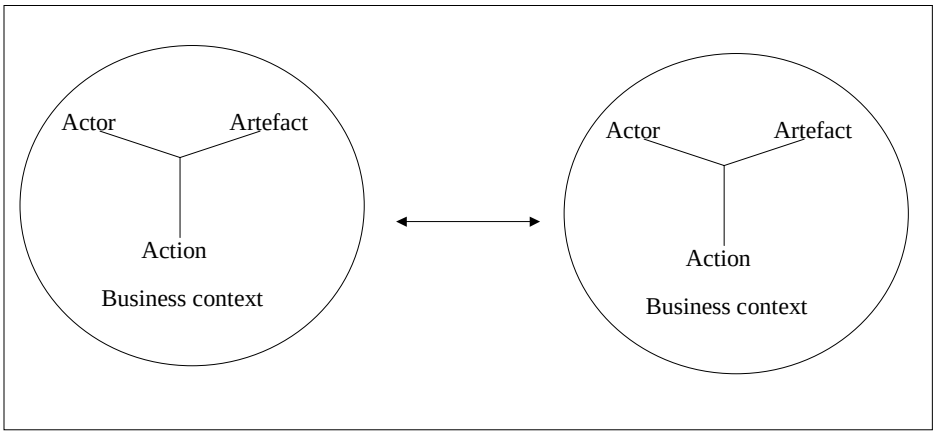

Figure 3 The A3 – model (Ågerfalk, 2001)

A general observation is that the usability definition reflects more concern with measurability and has more of an engineering flavour compared to the more qualitative and social oriented actability.

So does actability reinforce or reinvent usability? The answer is that “it depends”. It depends on what you mean with usability. If usability is understood in the narrow sense, as in dealing only with user interface design and ease of use then yes, actability reinforces usability. The reinforcement consists of a solid grounding of the concept outside the realm of the individuals’ interaction with the computer; of taking the business context rather than the taking the IT-system as a point of departure for understanding the IT-system in use. If, on the other hand,

usability is understood in a broad sense the answer could be both yes and no. Usability in the broad sense and actability reflect the same aims. However, actability brings another perspective to IT-systems and their use within a business context. Actability points at issues not obviously brought to the foreground if usability principles used are unreflective.

Further readings:

Ågerfalk P J (2001). Who's the user in User-Centred Design?. In Poster Sessions: Abridged Proceedings, pp. 102–104, HCI International 2001, August 5–10, 2001, New Orleans, LA, USA

Ågerfalk P J, Cronholm S (2001). Usability versus Actability: A Conceptual Comparative Analysis. In Poster Sessions: Abridged Proceedings, pp. 235–237, HCI International 2001, August 5–10, 2001, New Orleans, LA, USA.

5 User interfaces as action and communication media

Sjöström & Goldkuhl (2003) present a socio-pragmatic view on user interfaces (see Figure 4). They argue that this communicative view is important not only not only when we discuss groupware applications, but at all times when we wish to understand the socio-pragmatic aspects of IT system use. Information systems are regarded as systems for technology mediated business communication.

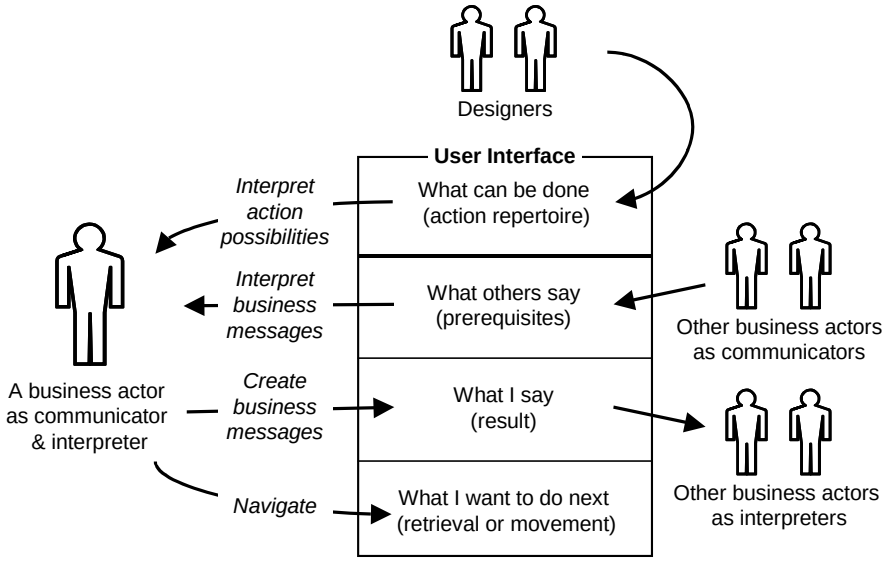

Figure 4 An actability perspective on user interfaces (based on Sjöström & Goldkuhl, 2003)

A user interface is divided into four parts dependent on its communicative functions. (1) The action repertoire is considered as communication from designers to users. The user interprets different action possibilities of the IT-system. The user (as a business actor) communicates through the IT-system with other business actors based on the action repertoire. (2) The user may interpret messages from other business actors. (3) The user may also formulate messages intended for other business actors. (4) The user can also navigate in the document space afforded by the IT-system. This is not seen as a communication with other actors, but is part of the user's management of the system and depending on what he/she wants to do next. This view on user interfaces has proven to be a useful tool when discussing socio-pragmatic aspects of IS use (confer Sjöström & Goldkuhl, 2003; Sjöström & Ågerfalk, 2004). It has helped to emphasize two dimensions of IS use – both human-artefact interaction and the tech-

nology mediated business communication that is taking place between human actors in an organization.

The user interface model presented above divides the user interface into four parts dependent on its semiotic function (interpretation of action repertoire, formulation of business messages, interpretation of business messages, navigation). The interpretation of the action repertoire is however to be seen as a necessary preparatory part of every interaction. Due to this, the interpretation of the action repertoire does not give rise to any particular type of interaction. The other three communication modes give rise to interaction loops of different characters. Formulation mode, reading mode and navigation mode will be performed rather differently. Three different Elementary InterAction Loops (EIAL) dependent on these three communicative modes derived from the user interface model are derived:

- Reading mode
- Formulation mode
- Navigation mode

An example to illustrate the different interaction loops is given at the end of the section.

5.1 Reading mode

The reading mode means the interpretation of business messages emanating from other business actors. An IT-system may have a programmed capability to derive new messages from other provided messages. This means that the focused user may not read messages directly produced by other business actors. The IT-system may have transformed other actors' messages, and it is these new messages that are exposed to the user. Nevertheless, the origins of the exposed messages come from other business actors.

We follow the four phases of the EIAL loop: Informing, execution, (IS) reaction and interpretation. The EIAL for reading is presented in Figure 5. In the first phase of informing, the user finds out what to read. The user's interest is towards the reading repertoire of the IT-systems action repertoire. What reading possibilities does the IT-system afford to its users? The informing phase (pre-assessment) is ended by a decision by the user of which messages to select for reading. In order to do this he needs to manipulate the system in some way, for example input some parameters in order to get what he wants. This is done in the second phase (execution).

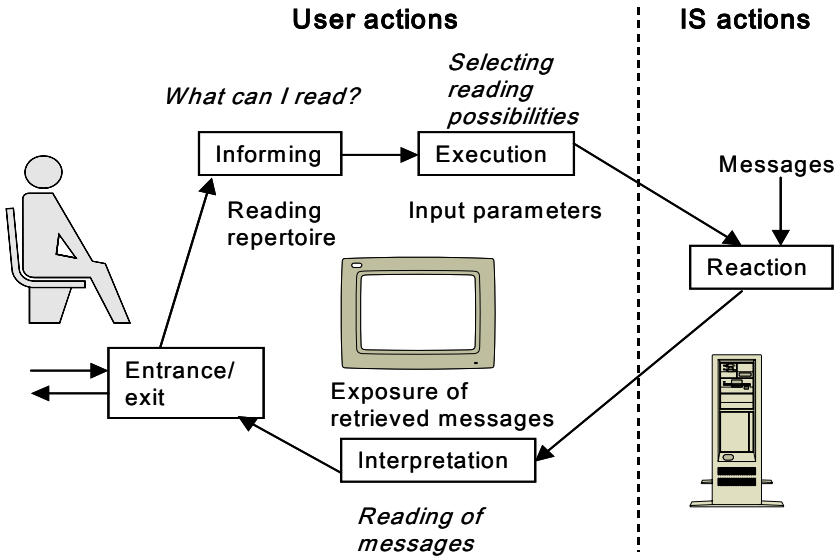

Figure 5 EIAL – reading mode

In the third phase the system reacts. It exposes the requested messages. The IS action may involve different types of actions. It consists of the retrieval of messages from the system's action memory. It may consist of derivation of new messages in accordance with the retrieval parameters of the user (from phase 2). The third phase is ended by the exposure of retrieved messages on the screen. In the fourth phase (interpretation) the user reads the displayed messages. After this is done the user may proceed with another loop or the user may end his system interaction session. Between interpretation and informing we have a general entrance/exit point.

5.2 Formulation mode

A formulation interaction loop is depicted in Figure 6. In this situation, the user communicates some messages to other business actors through the interface and the system. These messages can be transferred as they are to other actors or they can be put in the action memory for derivation of other messages or some later message transfer. In the first phase (informing), the user finds out what formulation possibilities are afforded by the system. "What can I say through the system?" The formulation repertoire of the system's action repertoire is investigated (a pre-assessment). In the second phase (execution), the user inputs the message. The user enters the data and may also select some data on the screen. The user's formulation action is ended by a mouse click on a screen button or pressing the enter key (or some other requested operation). This is the performance of a communicative action (an intervention).

The third phase is the IS (re)action. The captured data is taken care of in accordance with the programmed action repertoire. These actions may involve storage, calculation and transfer of messages. The action memory of the system may be affected. Feedback to the user may be delivered, i.e. a message on the screen about the success of the performed action. In the fourth phase (interpretation) the user reads the feedback message in order to find out if the input data (from the second phase) was successfully handled by the system (a post-assessment). After the fourth phase the user can move on to another interaction loop or he may end his system session (exit).

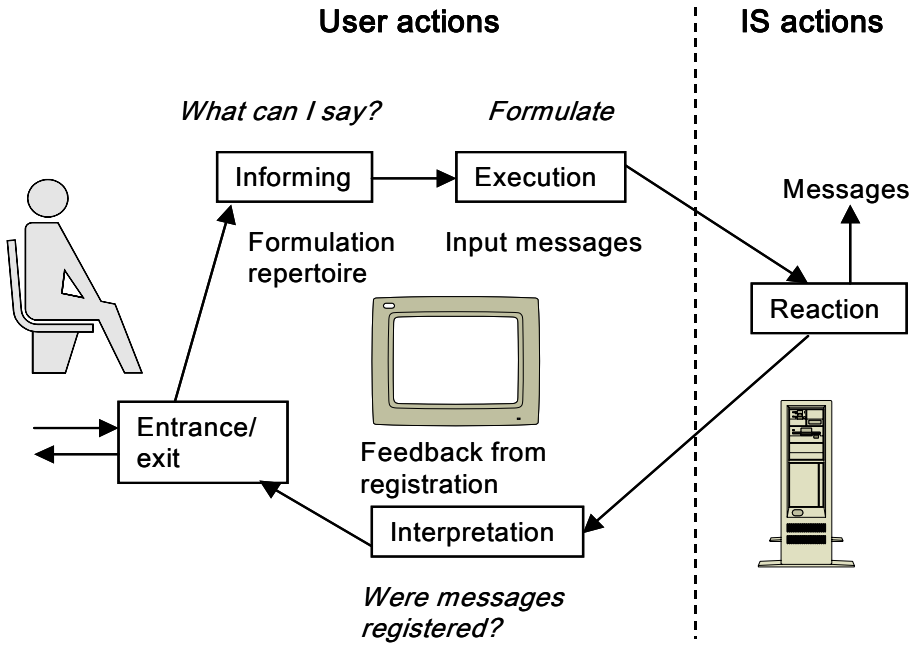

Figure 6 EIAL – formulation mode

5.3 Navigation mode

An IT-system usually consists of several screen documents. There is not room for everything that can be done with the system on one screen document. The system is therefore a space of several documents that can be called by the user dependent on what tasks to perform. A screen document represents different action possibilities. To move between different documents is called to navigate in the system. A navigation interaction loop is depicted in Figure 7.

In the first phase (informing) the user tries to find out what navigation possibilities there are in the system. "What screen documents are there to visit?" Where can I move next?" After deciding where to move, the user (in the execution phase) makes the desired move in the system. Clicking on some item probably does this. Another screen document is requested. The IS (re)action is to perform the requested navigation action. Another screen document is displayed. In the interpretation phase, the user investigates whether the exposed document corresponds to his action needs. "Have I come to the right place"? Can I perform the desired tasks through the support of this document?" If the user is content in this post-assessment, the navigation loop is followed by a formulation or a reading loop dependent on the purpose. If the user was not content with the action repertoire of the screen document, another navigation loop may be performed in order to find the appropriate place. If no such place (i.e. a document with a requested action repertoire) is found, the user may end the system interaction session (exit).

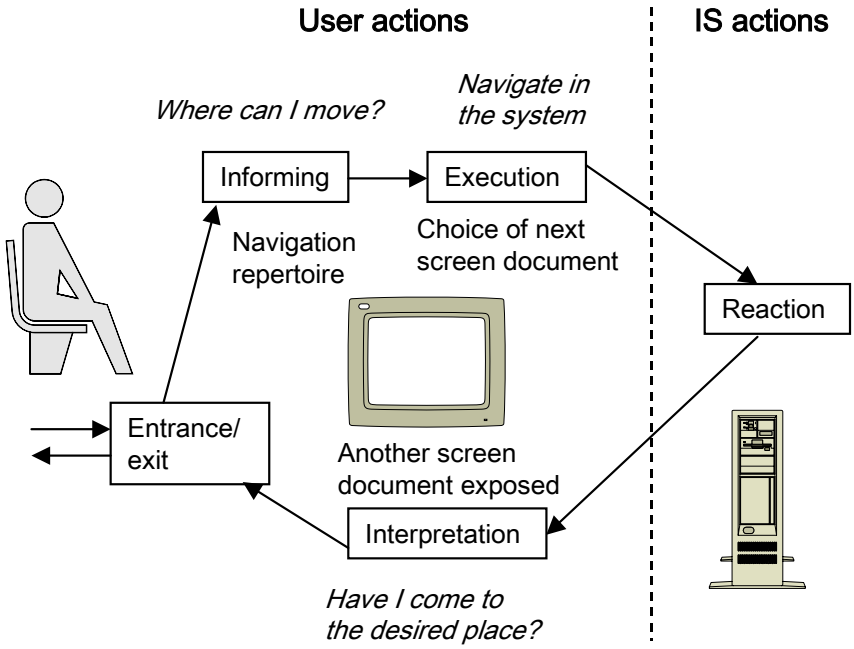

Figure 7 EIAL – navigation mode

5.4 Relations between the different interaction modes

The three elementary interaction loops have been described as pure types (ideal types). We have not mixed elements from the different interaction modes. In real interactions there will probably be some mixture of these types. A navigation interaction can include some display of messages, i.e. it involves reading possibilities. These two interaction types can be integrated in other ways. A reading interaction (a request for messages) can involve an exposure of a new screen document with the displayed messages. A formulation interaction may in-

volve some reading. In the informing phase, the user may not only investigate formulation possibilities. He can as a basis for his formulation read some business messages as a basis for his formulation of new messages. This is a way to make his communicative action an informed action! In Sjöström & Goldkuhl (2003) an example of this is discussed. To make a formulation interaction more effective, it should include the display of relevant business messages.

5.5 An example

As an illustration of the three types of interaction we have used the same example from the home care unit as discussed above (see Figure 8). The primary work of the home care unit is to help elderly people in their daily life. The example used is about choosing tasks to be performed for the elderly and reporting tasks that had been performed.

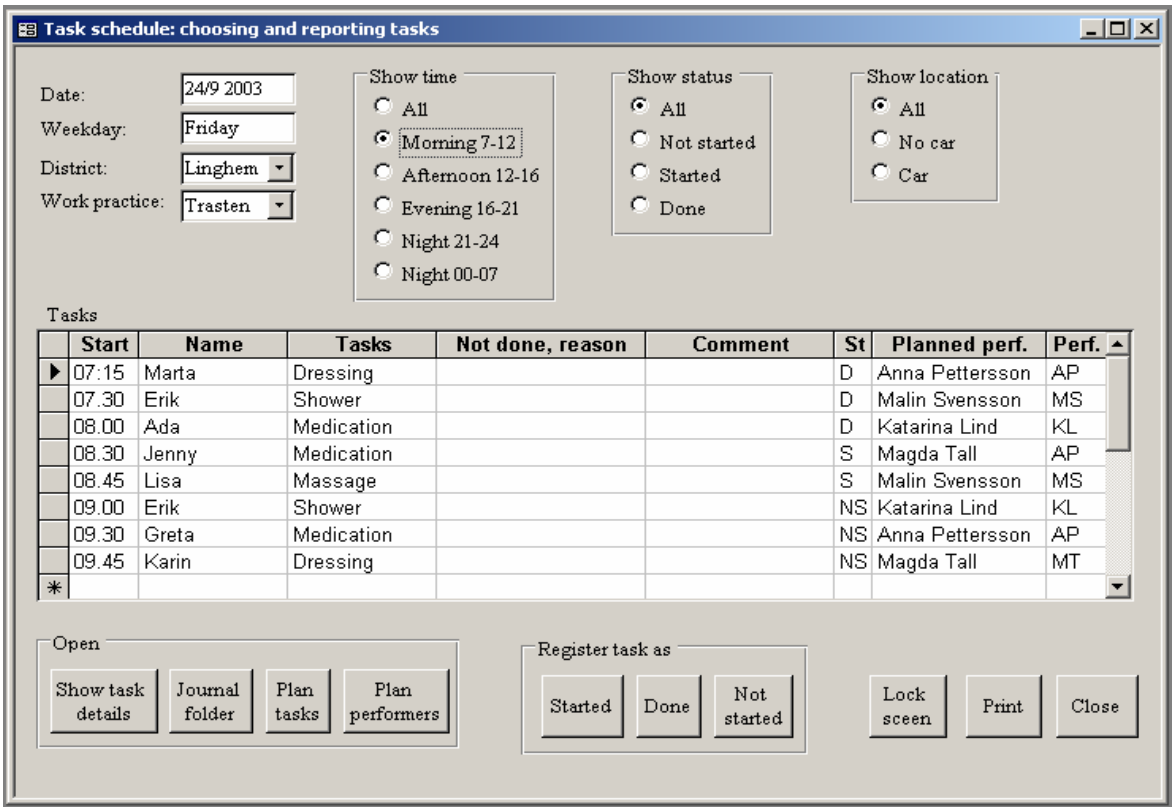

Figure 8 Example of a screen document in an elderly care setting

An example of a read-situation exists when the nursing assistant selects a view from the action memory. First the assistant has to *inform* herself about the actual view (what information is represented on the screen). The actual view represents all tasks for the morning of 24/9 2003. If the assistant wants to see all tasks for the afternoon he/she has to perform an *execution* (a click on the radio button "afternoon 12-16"). The *IS action* is a change of the view of the action memory that corresponds to the user execution. Messages about the afternoon tasks are displayed. The user *interprets* the IS action through confirming that the desired view is exposed. He/she reads the content of the newly displayed messages as an interpretation of business messages.

An example of a write-situation (formulation mode) exists when the nursing assistant chooses a task to perform for an elderly client. First the assistant has to *inform* him/herself about which tasks that have been carried out and hence are not possible to choose. Completed tasks

are marked with the letter “D” (short for done) in the “St” (short for status) column. Choosing a task translates an *execution*. The execution is done by selecting a task and registering it as started. The *IS-action* includes a response that is visualised by a change of the value for the selected task to the value “S” (short for started). Finally, the user *interprets* the IS-action by checking that the status has changed.

An example of a navigation-situation exists when a nursing assistant wants to move to another screen document. First he/she has to *inform* him/herself about which screen documents are accessible. In the actual document there are explicit options to open four other documents. There is a frame in the lower left corner with the text “open” together with four buttons (show task details, journal folder, plan tasks, plan performer). To *execute* the navigation, the assistants clicks on one of the “open-buttons”. The *IS action* consists of an opening of the desired screen document. The users *interprets* the IS action by perceiving that the desired document has been opened.

Further readings:

Goldkuhl G, Cronholm S, Sjöström J (2004) User Interfaces as Organisational Action Media, Accepted to *the 7th International Workshop on Organisational Semiotics*, Setúbal,

Sjöström J, Ågerfalk P (2004) Analysis of communicative features of user interfaces, in *Proceedings of the 2nd Intl Conference on Action in Language, Organisations and Information Systems (ALOIS-2004)*, Linköping University

Sjöström J, Goldkuhl G (2003) The semiotics of user interfaces – a socio-pragmatic perspective, accepted to *the 6th International Workshop on Organisational Semiotics*, Reading

6 Actability evaluation

6.1 Strategies for how and what to evaluate

All around the world there is a huge amount of money invested in IT (e.g. Seddon, 2001). It is therefore important to evaluate the return on the investment. Evaluation is complicated and consequently there are a lot of proposals for how to evaluate IT-systems.

Much of the literature on evaluation takes a formal-rational stand and sees evaluation as a largely quantitative process of calculating the likely cost/benefit on the basis of defined criteria (Walsham, 1993). These approaches are often developed from a management perspective and contain different measures that often are of harder economical character. One common criticism of the formal-rational view is that such evaluations concentrate on technical and economical aspects rather than human and social aspects (Hirschheim & Smithson, 1988). Further Hirschheim & Smithson maintain that this can have major negative consequences in terms of decreased user satisfaction but also broader organizational consequences in terms of system value.

There are also other evaluation approaches such as interpretative (e.g. Remenyi & Sherwood-Smith, 1999; Walsham, 1993) and criteria-based. Interpretative approaches often view IT-systems as social systems that have information technology embedded into them (Goldkuhl & Lyytinen, 1982). Criteria-based approaches are concerned with identifying and assessing the worth of programme outcomes in the light of initially specified success criteria (Walsham, 1993). The criteria used are often derived from one specific perspective or theory. Actability can be seen as one specific perspective.

Actability evaluation starts with two questions: how should we evaluate? and what should be evaluated? According to the literature there are three types of “how-strategies”:

- Goal-based evaluation
- Goal-free evaluation
- Criteria-based evaluation

The differentiation is made in relation to what drives the evaluation. Goal-based evaluation means that explicit goals from the organisational context drive the evaluation of the IT-system. The basic strategy of this approach is to measure whether predefined goals are fulfilled or not, to what extent and in what ways. Goal-free evaluation means that no such explicit goals are used. Goal-free evaluation is an inductive and situationally driven strategy. This approach is a more interpretative approach (e.g. Remenyi, 1999; Walsham, 1993). The aim of interpretive evaluation is to gain a deeper understanding of the nature of what is to be evaluated and to generate motivation and commitment (Hirschheim & Smithson, 1988).

Criteria-based evaluation signifies that some explicitly general criteria or principles are used as an evaluation yardstick. The difference to goal-based evaluation is that the criteria are general and not restricted to a specific organisational context. That means that they are more generally applicable. Besides the actability principles presented above there are a lot of criteria-based approaches around such as checklists, heuristics, principles or quality ideals. In the area of Human-Computer Interaction different checklists or heuristics can be found (e.g. Nielsen, 1994; Nielsen, 1993, Shneiderman, 1998). Doing an actability evaluation means choosing a reflected evaluation strategy. If a criteria-based strategy is chosen then the actability principles should be used.

All of the approaches goal-based, goal-free and criteria based are different methods and their primary message is *how* the evaluator should act in order to perform an evaluation. Besides this "how message" it is also important to decide about *what* to evaluate. When evaluating IT-systems we can think of at least two different situations that can be evaluated. We make a distinction between evaluation of "IT-systems as such" and "evaluation of IT-systems in use".

Evaluating "IT-systems as such" involves no users. In this situation there are only the evaluator and the IT-system involved. The data sources that could be used for this strategy are the IT-system itself and possible documentation of the IT-system. How the evaluation is performed depends on the "how-strategy" chosen. The outcome of the evaluation is based on the evaluator's understanding of how the IT-system supports the organisation. This strategy is free/lack from the user's perceptions of how the IT-system benefits to their work. The other strategy of "what to evaluate" is "IT-systems in use". Evaluating IT-systems in use means to study a use situation where a user interacts with an IT-system. This analysis situation is more complex than the situation "IT-systems as such" since it also includes a user. This strategy has of course an ability to give a richer picture than "IT-systems as such".

The data sources for this situation could be interviews with the users about their perceptions and understanding of the IT-system's quality, observations of users interacting with IT-systems, the IT-system itself and the possible documentation of the IT-system. When there are requirements for a higher data quality the evaluator can choose to combine all the data sources in order to achieve a high degree of triangulation. If there are fewer resources at hand the evaluator can choose one or two of the possible data sources.

An argument for choosing the strategy "IT-systems in use" is presented by Whiteside & Wixon (1987). They claim "… usability becomes a purely subjective property of the interaction between a specific user and the computer at a specific moment in time". There are always subjective perceptions such as the user's attitude towards an IT-system that are harder to measure. How the evaluation of "IT-systems in use" is performed depends on the "how-strategy" chosen. The outcome of this evaluation is not only based on the evaluator's own

understanding of how the IT-system supports the organisation. It is also based on the user's perceptions of how the IT-system supports their work.

To summarize, we derive a matrix consisting of the two dimensions of "how" and "what". The combination results in six different evaluation types (see Table 1). The aim of the matrix is to support different choices of how to perform an evaluation depending on the evaluation situation. In Goldkuhl & Cronholm (2003) each type is characterized. The characterization is done according to the criteria: main perspective, what to achieve knowledge about, data sources, deductive or inductive, who will participate and when to choose this type.

Table 1. Six different evaluation types

	IT-systems as such	IT-systems in use
Goal-free evaluation	Type 1	Type 2
Goal-based evaluation	Type 3	Type 4
Criteria-based evaluation	Type 5	Type 6

Further readings:

Cronholm S & Goldkuhl G (2003). Strategies for Information Systems Evaluation - Six Generic Types. *Electronic Journal of Information Systems Evaluation, Vol 6, Issue 2*.

6.2 Knowledge sources and gathering methods

The choice of how the evaluation should be performed is among other things dependent on available knowledge objects/subjects. A knowledge object/subject is something that we want to know more about. Examples of objects/subjects are business processes, business goals, users and IT-systems. For each knowledge object/subject there are one or several knowledge sources. A knowledge source is something where we can find information. Possible knowledge sources are proposed in Table 2. For each knowledge source there is also one or several information gathering methods proposed. One of the proposed information gathering methods is an interview with users. To interview users means that it is the users' subjective understanding of the IT-system that is gathered. Subjective understandings are important but must be evaluated against the users' pre-knowledge (business knowledge and IT-system knowledge), education and attitudes. Often, users have opposite understandings. A possible way to explain differences in understandings is to analyse the users' experiences. If a criteria-based evaluation is chosen then the evaluator is not encouraged to slavishly follow the chosen criteria. The evaluator should have a sensitive attitude in order to discover other strengths or problems that not are covered by the criteria.

Table 2. Objects/subjects, knowledge sources and information gathering methods

Object/subject	**Knowledge source**	**Gathering methods**
Business processes	Business Manager User	Interview, observation
	Business documentation	Reading
Business goals	Business Manager	Interview
	Strategy document Goal descriptions	Reading
IT-system	IT-system	Observation (explore)
	IT-system documentation	Reading
	System owner	Interview
IT-system in use	Users' interaction	Observation, Interview
User	User	Interview, observation
	User document	Reading
Criteria	Criteria descriptions	Reading
	The specific evaluation situation	Sensitivity, an open mind

6.3 Process description

The processes of each evaluation type are depicted in Figure 9. If you follow the arrows you can see some of the activities are general for all the evaluation types and some are not. For example all evaluation types start with *plan the conditions* and continue with *describe the functionality* and *describe the users*. All evaluation types end with *draw conclusions*. The evaluation process consists of three phases: preparation, valuation and conclusion. Each phase consist of one or several activities. Each activity is described below together with documentation proposals. The documentation proposals consist of examples from elderly care concerning "task schedule – choosing and reporting". The aim of the elderly care is to offer maximum individualized care to senior citizens. The project is described in Cronholm & Goldkuhl (2002, p 4) and Goldkuhl (2004, p 6).

Furthermore, the different elementary interaction loops discussed in section 5 are used for supporting the evaluation process. If a criteria based evaluation is chosen then the principles presented in section 3 should be used. The evaluation processes are described in a sequential way. Whenever needed, iterations can and should be undertaken.

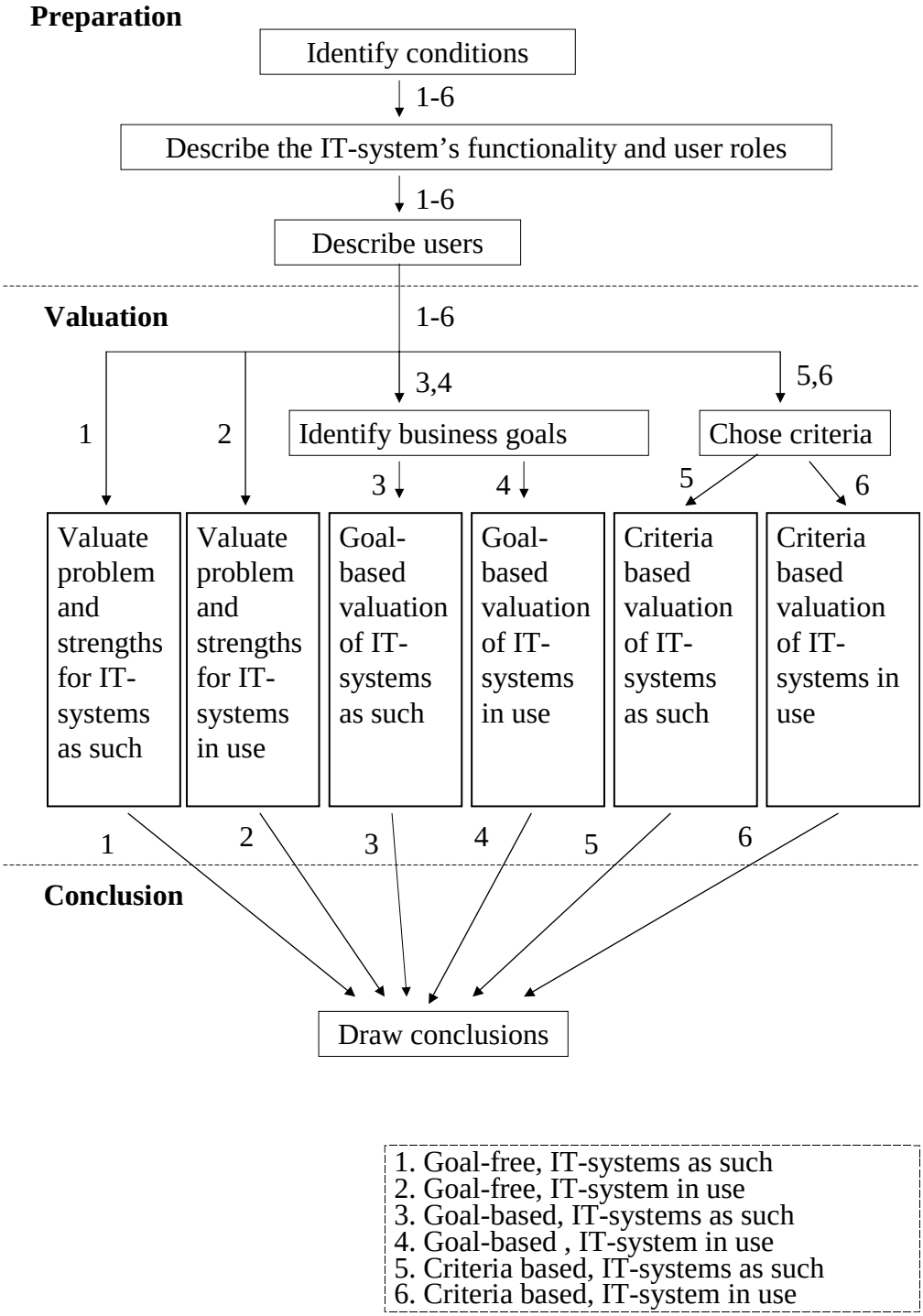

Figure 9 Process description

6.3.1 The preparation phase

The activities in the preparation are: identify conditions; describe the IT-system's functionality and user roles; and describe users. The relation between the activities is depicted in Figure 10.

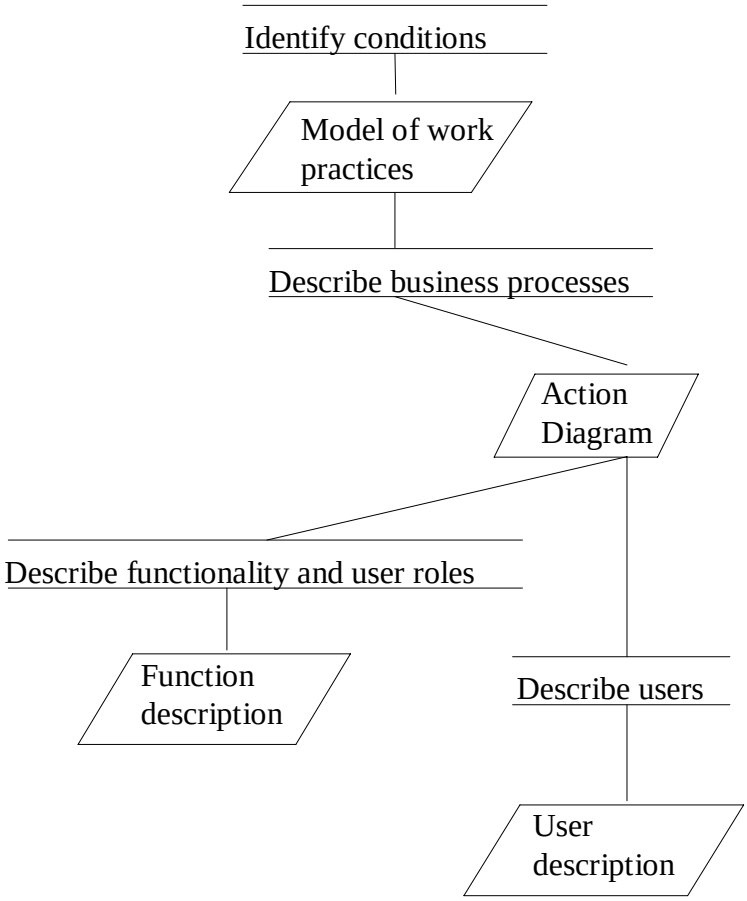

Figure 10 The preparation phase

Identify conditions (type 1-6)

We recommend that the evaluation start with identifying the conditions that exist in the specific evaluation situation. That means deciding on the scope of the evaluation, the ambition level, time, costs and resources. It also includes identifying the assigner, performer, possible knowledge sources and the client. In order to identify the conditions, we recommend the use of the generic model of work practices[1] (Goldkuhl & Röstlinger, 1999, p 6; 2002 pp 9-11). A discussion about what should be evaluated and how we should evaluate should be held. The output from this activity is as basis for choosing one or a combination of the six evaluation types discussed above (confer Cronholm (2004) for a discussion about meaningful combinations). Possible knowledge sources are business managers and assigner. We also propose that the evaluator describes business processes in order to develop knowledge. This knowledge can be achieved through studying business documentation or observing business actors. We recommend using Action Diagrams (Goldkuhl & Röstlinger, 2003, pp 42-44) for documenting business processes. Action Diagrams support identification of IT-supported business activities and business actors. This information is then used in the following activities "describing the IT-system's functionality and user roles" and "describe users".

[1] An example can be found in Cronholm & Goldkuhl (2003, pp 7-9).

In Action diagrams different activities of a business process and how these activities are related to each other are explicitly described. Actions performed by human actors as well as information system actions are considered. Note that Action diagrams describe types of activities, and not the actual occurrences. Action diagrams can be used to describe material flow and information flow within a business process (see Figure 11).

Material and information (as action objects) are described and related to activities as prerequisites (input) or results (output). One important notational feature is that Action diagrams describe the performer of each activity; i.e. what actor/actor group (actor role) or which IS that is supposed to perform the particular activity. Figure 12 illustrates an example of an Action Diagram. The diagram corresponds to the document presented in Figure 1. Other examples with a richer semantic describing more complex situations can be found in Goldkuhl & Röstlinger, 2003, pp 15-17).

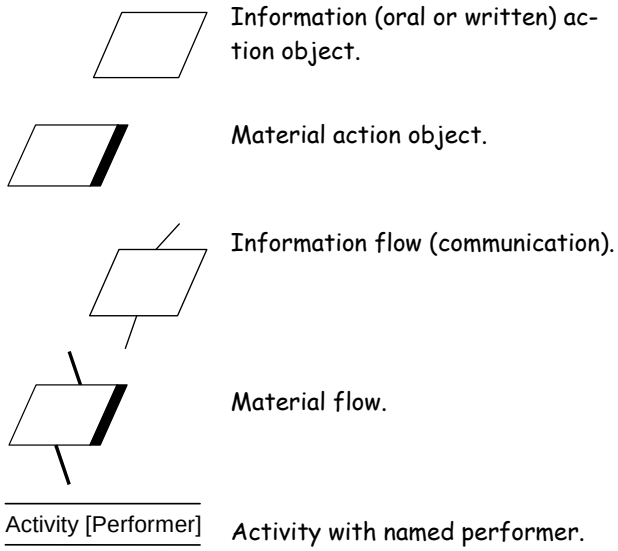

Figure 11 Basic notation used for activities, action objects and flows in Action diagrams.

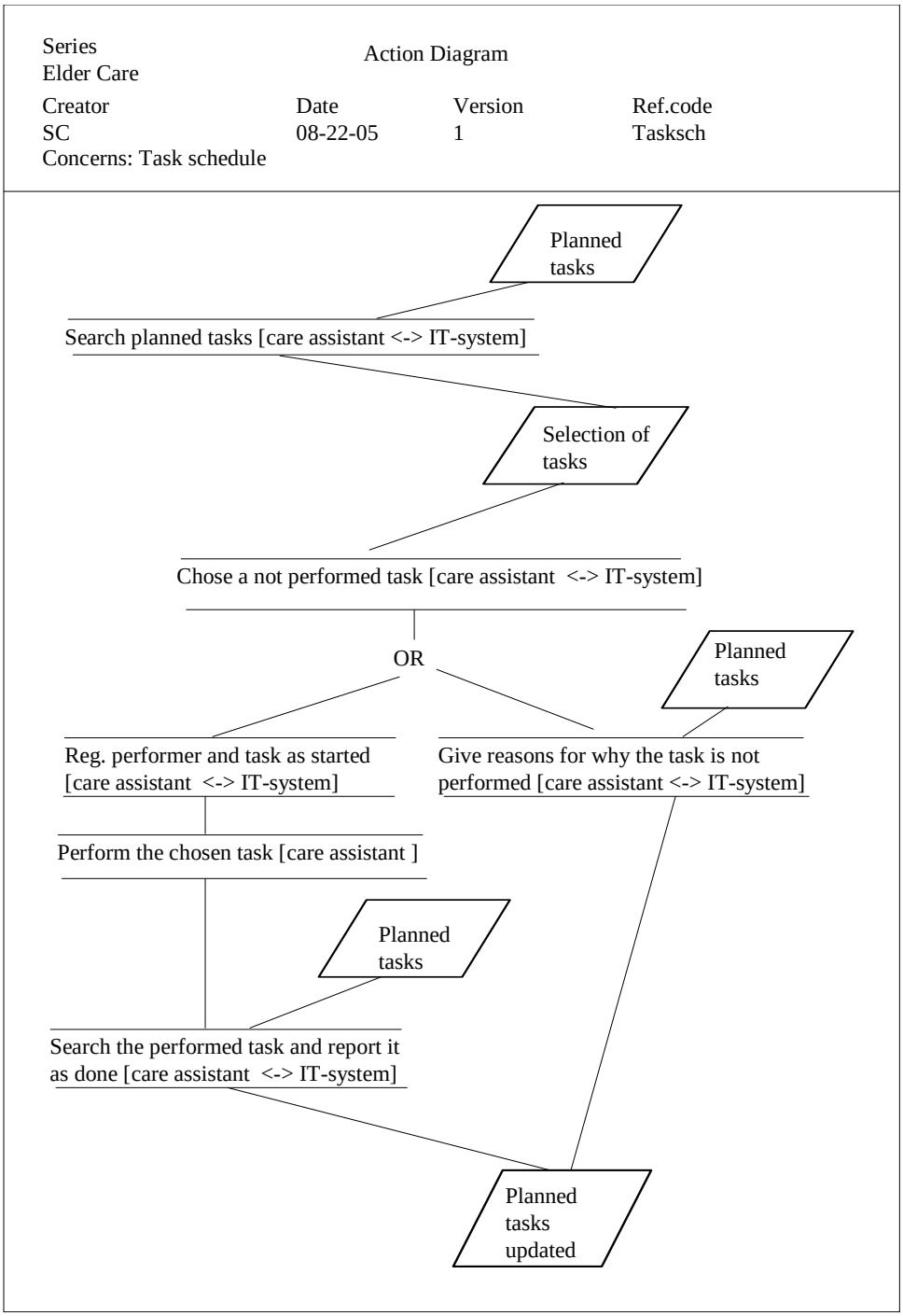

Figure 12 Example Action Diagram.

Describe the IT-system's functionality and user roles (type 1-6)

Describe an overview of the IT-system's functionality. The aim of this task is that the evaluator should be acquainted with the system. Besides being acquainted, the evaluator can gather information through studying the system documentation and from interviews with the system owner. The action diagrams created earlier are used in order to understand which business activity a specific IT-function should support. The action diagrams are also used as a basis for identifying user roles (such as purchaser, seller, planner etc.). IT-functions and user roles are documented in a function description overview (see Table 3). The overview consists of four

columns. The first column contains a reference to the corresponding Action Diagram. The second column informs us about the activity and the third column describes the IT-function. The fourth column informs us about which user role is responsible for the activity. This information is later on used in the activity “describe users”.

Table 3. Function description overview

Action Diagram	**Corresponding activity**	**IT-function**	**User role (performer)**
Tasksch	Search planned tasks	Give date, weekday, district, work practice, time period and status.	Care Assistant
Tasksch	Choose task	Mark the actual task	Care Assistant
Tasksch	Register performer and task as started	Give name of performer Register task as started	Care Assistant
Tasksch	Give reasons for why the task is not performed	Not done, reason	Care Assistant
Tasksch	Report the task as done	Report the task as done	Care Assistant

Describe users (type 1-6)

Describing users means to describe the users’ experience concerning the tasks they are responsible for, education, general computer maturity and specific knowledge about the evaluated IT-system. If the strategy “IT-systems as such” is chosen then there are no users available. However it is still important to describe possible users since the evaluation conclusion is dependent on the users’ experiences. Information can in this case be gathered from working descriptions or from interviews with business managers and systems owners. All user roles identified in the column “user role” in the document “function description overview” should be described. The output from this activity is a “user description” (see Figure 13). This document is later on used in the valuation phase.

User Description

Role:	Care Assistant
Tasks:	Performing errands for elderly
Education:	Nurse education
General computer maturity	Low
Specific IT-system knowledge:	Low
Other:	The care assistants have a low computer maturity but have a high business knowledge.

Figure 13 User description

6.3.2 Valuation phase

Valuate problems and strengths for IT-systems as such (type 1)

Evaluation according to this type means that observations of the IT-system are valuated as either a problem or as a strength. The evaluator approaches the system with an open and explorative mind; there are neither goals nor criteria that govern the focus of the evaluation. This evaluation type contains the activities "valuate problems and strengths" and "derive business effects" (see Figure 14).

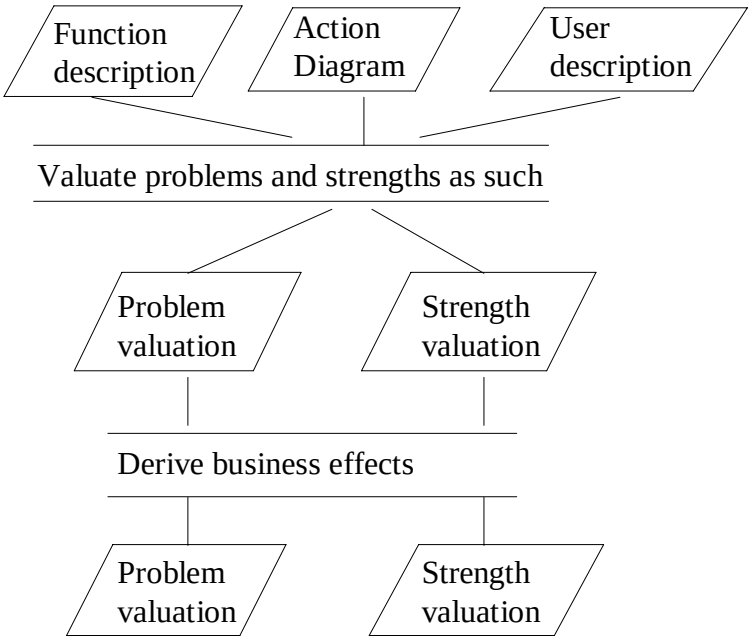

Figure 14 Valuation phase type 1 – Description of activities, documents and their relationships.

Available knowledge sources for the valuation are the IT-system, documentation of the IT-system and possibly a system owner. The document "function description overview" is used

as a basis for relating problems and strengths to a specific function. Problems and strengths are valuated with the user descriptions in mind.

Since the strategy "IT-systems as such" is chosen there is no real possibility to derive business effects that arise from the use of the IT-system. However, the evaluator should try to derive possible business effects that can arise. The identified findings from the valuation act as a basis for deriving business effects. For example, if the function "choose task" is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The results from both these activities are added in a "problem valuation table" and a "strength valuation table" (see Table 4 and Table 5).

Table 4. Problem valuation table

IT-function	**Problem-ID**	**Problem valuation**	**Business effect**
Mark a specific task	1	Unclear how the action should be performed	Can lead to an uncertainty about which task that are performed and which are not
Task not performed, reason	2	The IT-system does not support the business rule: "a reason must be given when a task not is performed".	Information is missing in discussions with relatives about why a task not is performed.

Table 5. Strength valuation table

IT-function	**Strength-ID**	**Strength valuation**	**Business effect**
Register task as started or report it as done	1	Easy registration. There is an immediate feedback from the system that the performed action has succeeded.	The status of the task is visible and thereby the communication between the care assistants is supported.
Give parameters for searching planned tasks.	2	Easy interaction and a clear feedback. The list of tasks is immediately updated according to the given parameters.	Sorting of tasks is supported. The control of that tasks have been done are supported.

Valuate problems and strengths for IT-systems in use (type 2)

Evaluation according to this type means that observations of the IT-system are valuated as either a problem or as a strength. The evaluator approaches the system with an open and explorative mind; there are neither goals nor criteria that govern the focus of the evaluation.

This type includes the activities: observe and interview; valuate problems and strengths and derive business effects (see Figure 15).

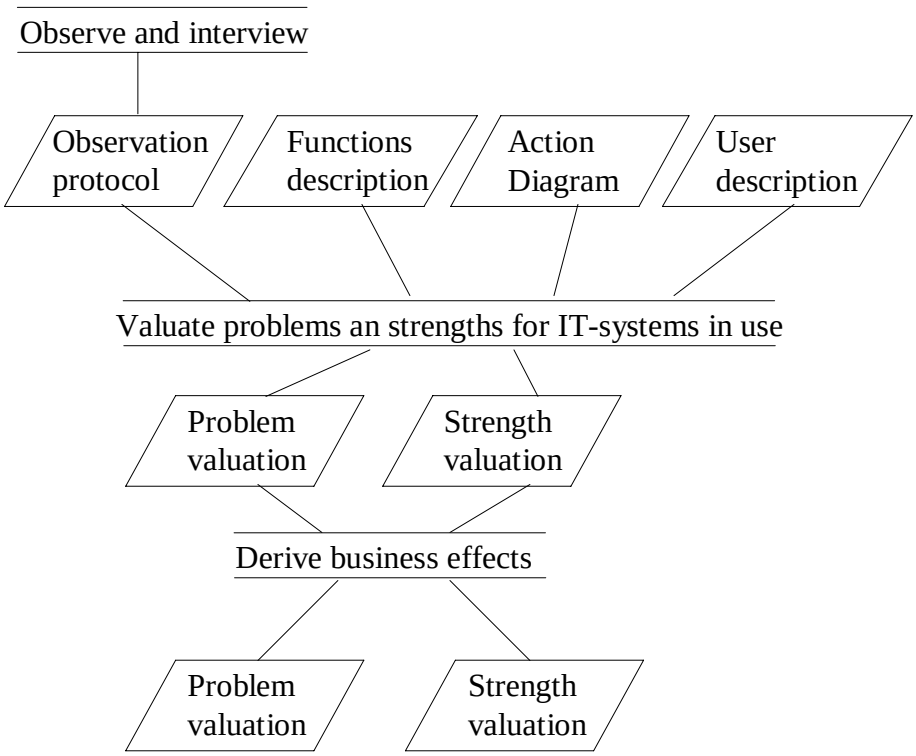

Figure 15 Valuation phase type 2 - Description of activities, documents and their relationships.

Available knowledge sources for the valuation are the IT-system, documentation of the IT-system, system owner, business managers and users. The main difference between this type and the corresponding “as such type” is that there are users are available. Having users available gives the possibility to observe interaction and to interview. We recommend using the observation technique “think aloud” (Monk et al, 1993). Using this technique means encouraging the user to think aloud during the interaction. Questions like “what are you thinking of?”, “why do you hesitate?” and “did your intended action succeeded?” are asked. The evaluator uses an observation protocol (see Table 6). The protocol consists of four rows: the actual IT-function, the observation, the cause for the observation and the effect of the observation. We recommend that the evaluator observe the users performing real tasks in natural environments. The observations should be followed up by interviews.

The observations are characterized either as a strength or as a problem. The valuation is based on, besides observing interaction, studies of the IT-system and user descriptions. The document “function description” is used in order to relate the identified problems and strengths to a specific function.

The activity “derive business effects” means that the evaluator based on the valuation findings should derive business effects. A business effect is something that affects the business and arises from user interaction. For example, if the function “choose task” is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The result is documented in a problem valuation table (see Table 4) and a strength valuation table (see Table 5).

Table 6. Observation protocol

IT-function	Marking of a task
Observation	The user does not understand how to mark a task
Cause	Hidden (non-visible) functionality
Interaction effect	The task is not marked

IT-function	Task not done, reason
Observation	The user fails to give reasons for not performing a task
Cause	The user does not understand why he/she should give a reason
Interaction effect	None

Identifying business goals (type 3, 4)

This activity is done when goal based evaluation strategy is chosen. The evaluator creates an inventory of the occurring business goals. Business goals can be found in strategy documents and in goal descriptions or by interviewing business managers. Business goals are documented in a goal list (see Table 7) and in a goal diagram (see Figure 16). A goal list is an enumeration of the goals. A goal diagram is a result of goal analysis (Goldkuhl & Röstlinger, 2003). Goals that are described on a lower level are viewed as means for goals on a higher level. Goals on the highest level are considered as main goals.

Table 7. Goal list

Goal-ID	**Goal description**
1	Maximum individualisation of care
2	Simplify communication between care assistants
3	Increase monitoring to check that tasks have been performed

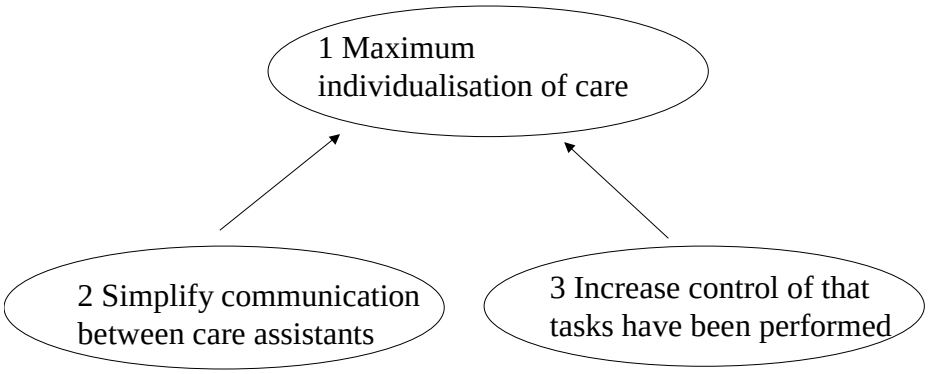

Figure 16 Goal diagram

Goal based valuation of IT-systems as such (type 3)

Evaluation according to this type means that the IT-system is valuated in accordance with predefined business goals. The business goals govern the valuation. This activity includes the main activities: valuate goals and derive business effects (see Figure 17). The identified business goals (see above) work as a basis.

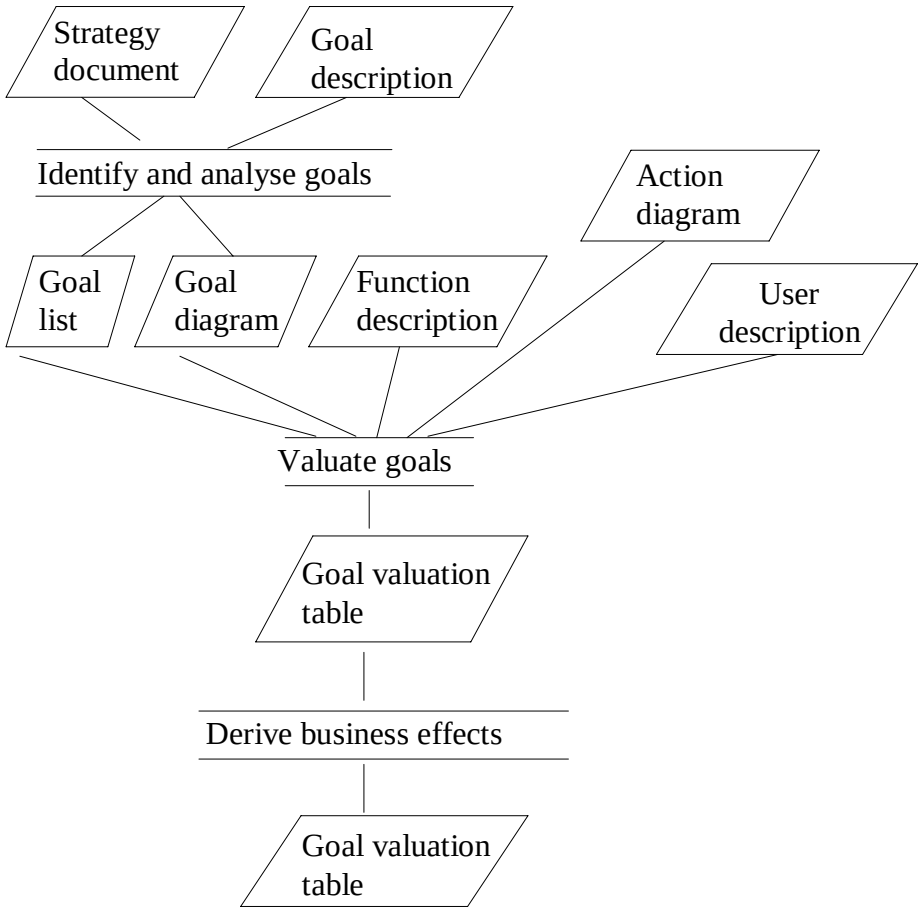

Figure 17 Valuation phase type 3 - Description of activities, documents and their relationships.

Available knowledge sources for this activity is the IT-system, system documentation, system owner, business manager, strategy documents and goal descriptions. The goal valuation can result in four different outcomes. One outcome is that the IT-system supports one or several of the business goals. A second outcome is that the IT-system counteracts one or several business goals. A third outcome is that functionality for supporting a business goal is missing. A fourth possible outcome is that there is redundant functionality (no goal is supported).

Table 8. Goal valuation table

Business goal	**Supporting IT-function**	**Counteracting IT-function**	**Missing IT-function**	**Redundant IT-function**	**Business effect**
2 Simplify communication between care assistants	Register task as started or done.				The status of the task is visible and thereby the communication between care assistants is supported.
3 Increase monitoring to check that tasks have been performed		Marking a task			Lead to an uncertainty about which tasks that are performed and which are not
3 Increase monitoring to check that tasks have been performed	Giving parameters for searching of planned tasks				Sorting of tasks is supported. The monitoring to check that tasks have been done is supported.
3 Increase monitoring to check that tasks have been performed	Not done, reason				Given information supports discussions with relatives about why a task not is performed.
3 Increase monitoring to check that tasks have been performed		Not done, reason			Information is missing in discussions with relatives about why a task is not performed

Since the strategy “IT-systems as such” is chosen there is no real possibility to derive business effects that arise from the use of the IT-system. However, the evaluator should try to derive possible business effects that can arise. The identified findings from the valuation act as a basis for deriving business effects. For example, if the function “choose task” is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The result from this activity is documented in a goal valuation table (see Table 8).

Goal based valuation of IT-systems in use (type 4)

Evaluation according to this type means that the IT-system is valuated in accordance with predefined business goals. The business goals govern the valuation. This type includes the activities observe and interview, valuate goals and derive business effects (see Figure 18).

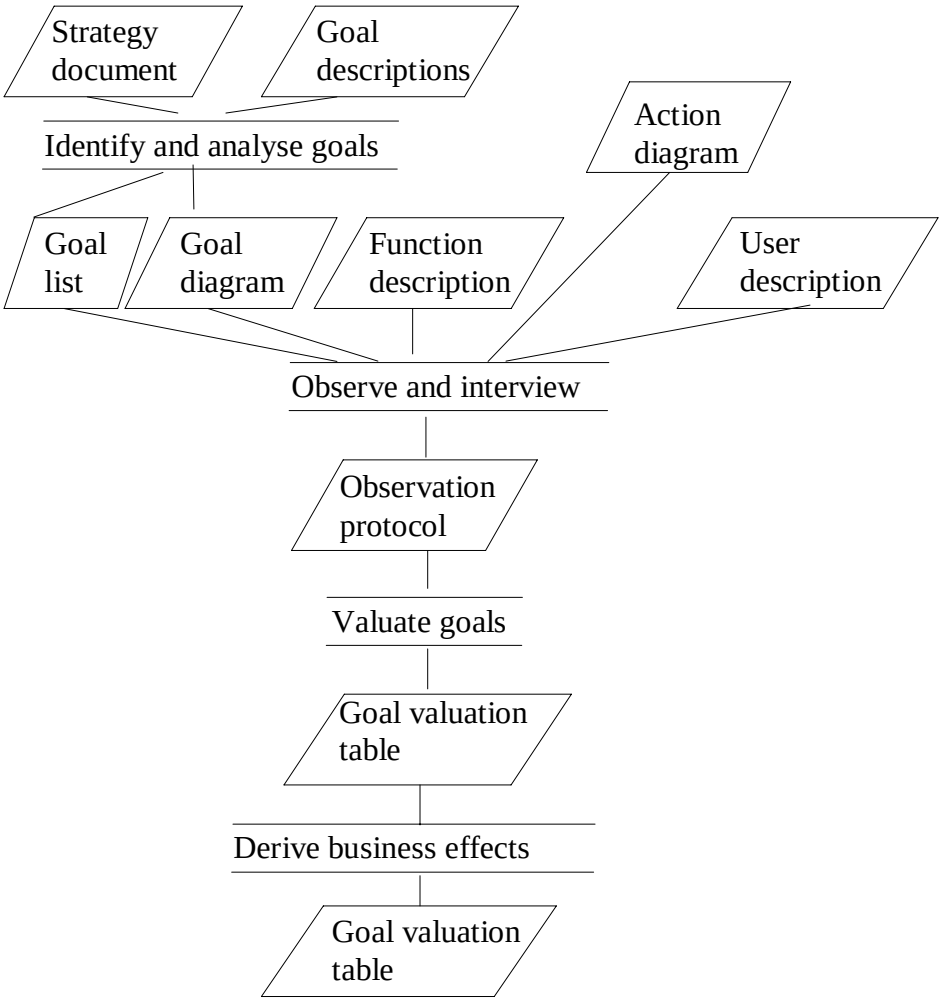

Figure 18 Valuation phase type 4 - Description of activities, documents and their relationships.

Available knowledge sources for this activity are the IT-system, system documentation, system owner, business manager, strategy documents, goal descriptions and users. The main dif-

ference between this type and the corresponding "as such type" is that there are users are available. Having users available gives the possibility to observe interaction and to interview. We recommend using the observation technique "think aloud" (Monk et al, 1993). Using this technique means encouraging the user to think aloud during the interaction. Questions like "what are you thinking of?", "why do you hesitate?" and "did your intended action succeeded?" are asked. The evaluator uses an observation protocol (see Table 6). The protocol consists of four rows: the actual IT-function, the observation, the cause for the observation and the effect of the observation. We recommend that the evaluator observe the users performing real tasks in natural environments. The observations should be followed up by interviews.

The observations work as basis for the goal valuation. The goal valuation can result in four different outcomes. One outcome is that the IT-system supports one or several of the business goals. A second outcome is that the IT-system counteracts one or several business goals. A third outcome is that functionality for supporting a business goal is missing. A fourth possible outcome is that there is redundant functionality (no goal is supported).

The activity "derive business effects" means that the evaluator based on the valuation findings should derive business effects. A business effect is something that affects the business and arises from user interaction. For example, if the function "choose task" is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The result from this activity is documented in a goal valuation table (see Table 8).

Choose criteria (type 5, 6)

The type of criteria and the extension of criteria is a result of the preparation phase. The chosen criteria depends also on which evaluation perspective that are chosen. Since criteria govern the evaluators' attention it is important that the choice is reflected (Cronholm & Goldkuhl, 2003). The evaluator should be sensitive and therefore feel free to change (add, modify, delete) the criteria during the evaluation process. Actable principles should be used and can be combined with criteria derived from other perspectives depending on the conditions for the evaluation situation. The chosen criteria are documented in a criteria list (see Table 9).

Table 9. Criteria list

Criteria
Can easily move to another document (easy to navigate)
Can immediately see if the intended action is executed (clear feed back)
Knows who has said what (personalized information)
Easily understands what he/she can do with the system (clear action repertoire)
…

Criteria based valuation of IT-systems as such (type 5)

Using this evaluation type means evaluating the IT-systems functionality based on the criteria chosen. The criteria govern the valuation. This type includes the two main activities: valuate criteria fulfilment and derive business effects (see Figure 19).

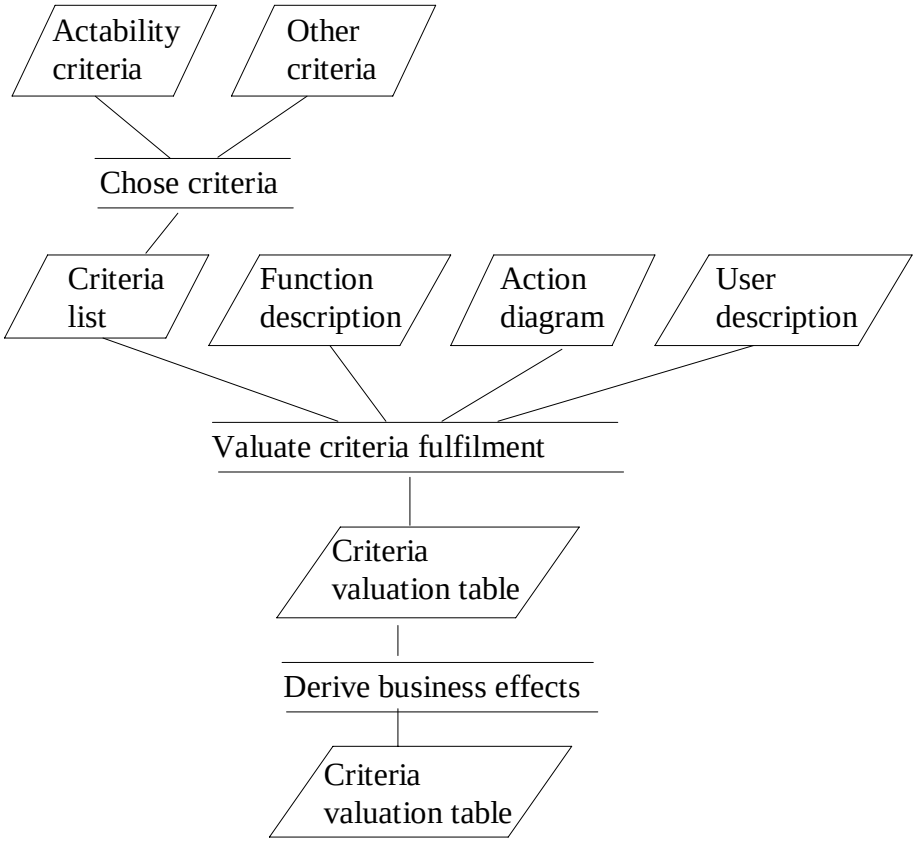

Figure 19 Valuation phase type 5 - Description of activities, documents and their relationships.

Possible knowledge sources are the IT-system, IT-system documentation, system owner and the criteria list. Since the strategy “IT-systems as such” is chosen there is no real possibility to derive business effects that arise from the use of the IT-system. However, the evaluator should try to derive possible business effects that can arise. The identified findings from the valuation act as a basis for deriving business effects. For example, if the function “choose task” is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The results from this activity are documented in a criteria valuation table (see Table 10). One valuation table is used per screen document.

Table 10. Criteria valuation table

Document: Task schedule		
Criteria	**Valuation**	**Business effect**
Can easily move to another document (easy to navigate)	Clear navigation buttons are offered. Navigation buttons are located in the same area in every document.	Possibilities to find the searched information are increased.
Can immediately see if the intended action is executed (clear feed back)	Constantly clear feed-back	Doubtfulness about which actions that are executed and what has been saved in the action memory is minimized.
Knows who has said what (personalized information)	Name of the task performer is given. A description of what has been done is given	Communication between care assistants is supported. Knowledge transferring between care assistants is supported.
Easily understands what he/she can do with the system (clear action repertoire)	It is unclear how to mark a task.	If the action is not performed there will be a doubtfulness about which actions are performed and which are not.

Criteria based valuation of IT-systems in use (type 6)

Using this evaluation type means evaluating the IT-systems functionality based on the criteria chosen. The criteria govern the valuation. This evaluation type includes the activities observe and interview, valuate criteria fulfilment and derive business effects (see Figure 20).

Available knowledge sources are the users, the IT-system, IT-system documentation, system owner and business managers. The main difference between this type and the corresponding "as such type" is that there are users are available. Having users available gives the possibility to observe interaction and to interview. We recommend using the observation technique "think aloud" (Monk et al, 1993). Using this technique means encouraging the user to think aloud during the interaction. Questions like "what are you thinking of?", "why do you hesitate?" and "did your intended action succeeded?" are asked. The evaluator uses an observation protocol (see Table 6). The protocol consists of four rows: the actual IT-function, the observation, the cause for the observation and the effect of the observation. We recommend that the evaluator observe the users performing real tasks in natural environments. The observations should be followed up by interviews.

The observations work as a basis for the criteria valuation. The activity "derive business effects" means that the evaluator based on the valuation findings should derive business effects. A business effect is something that affects the business and arises from user interaction. For example, if the function "choose task" is hard to find or to understand then an interaction problem arises. This interaction problem can lead to the business effect; the status of task is unknown since the status will not be registered. The result from this activity is documented in a criteria evaluation table (see Table 10).

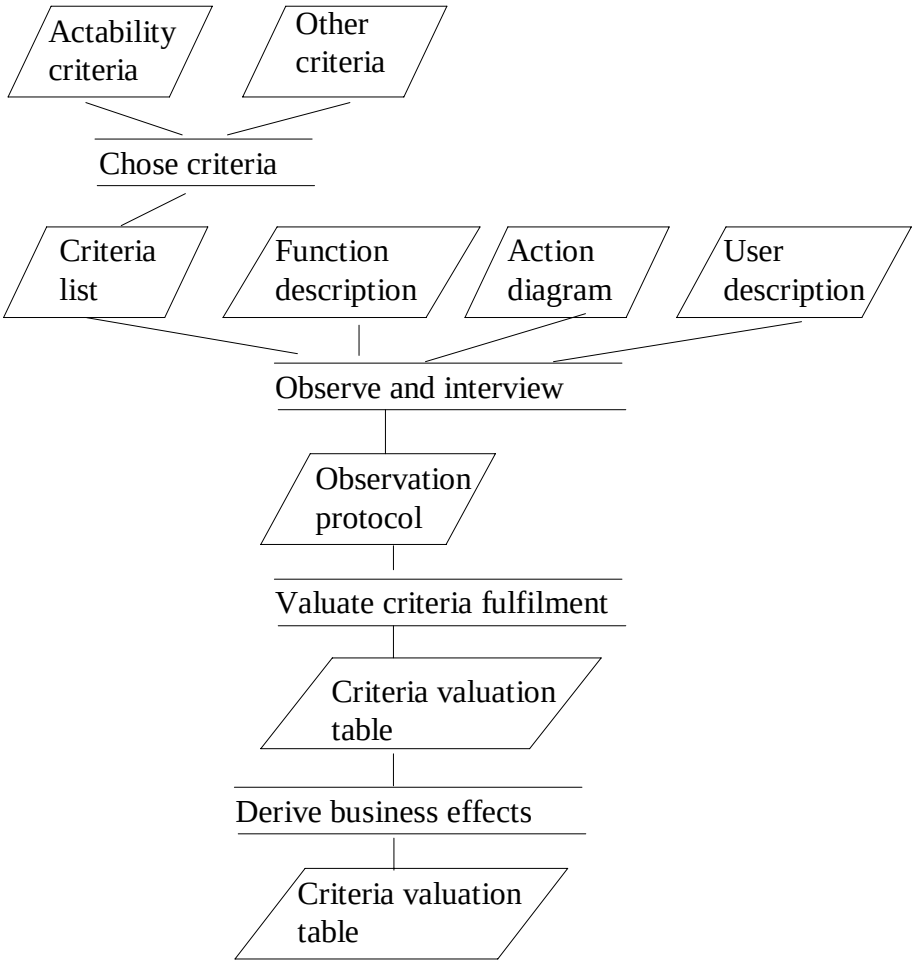

Figure 20 Valuation phase type 6 - Description of activities, documents and their relationships.

6.3.3 Conclusion phase

Draw conclusions (type 1-6)

The evaluation work ends with drawing conclusions. The conclusions consist of a summary of the most important problems and strengths identified (see Figure 21).

In order to identify the most important problems a problem analysis is carried out. The problems are related to each other in terms of cause and effect. The result is documented in problem diagrams (Goldkuhl & Röstlinger 2003, pp 17-18), (see Figure 22). The most important strengths are identified in a similar way and documented in strength diagrams (Goldkuhl & Röstlinger 2003), (see Figure 23). A problem/strength that consists of business effects resides normally among the central problems/strengths and interaction problems/strengths are normally viewed as a more low-level problem/strength.

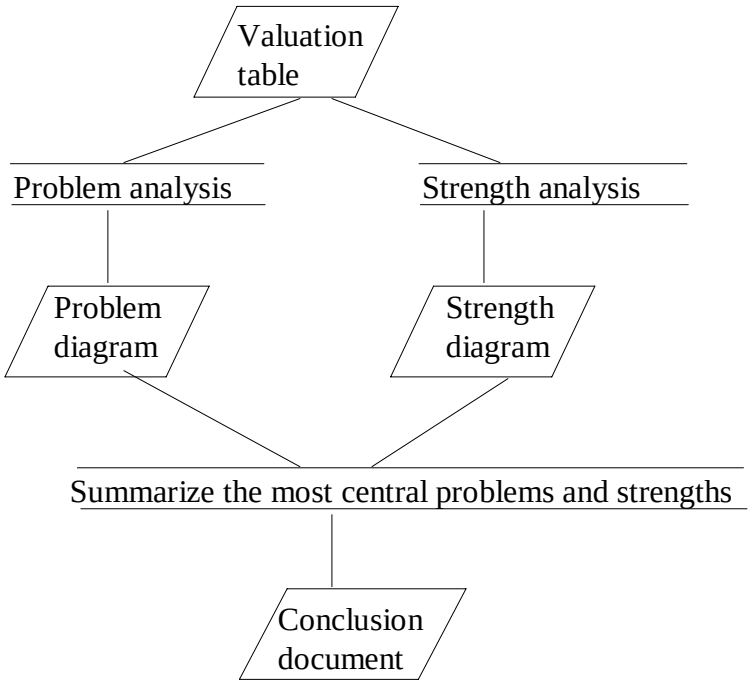

Figure 21 Conclusion phase - Description of activities, documents and their relationships.

The bases for this work are the valuation tables created in the valuation phase. If goal free evaluation is performed then the problems- and strength tables are used. If goal based evaluation is carried out then the goal valuation tables are used. The columns counteracting IT-functions and missing IT-functions are of special interest for problem analysis and supporting IT-functions are of special interest for strength analysis). Finally, if a criteria-based evaluation is performed then the criteria valuation tables are used.

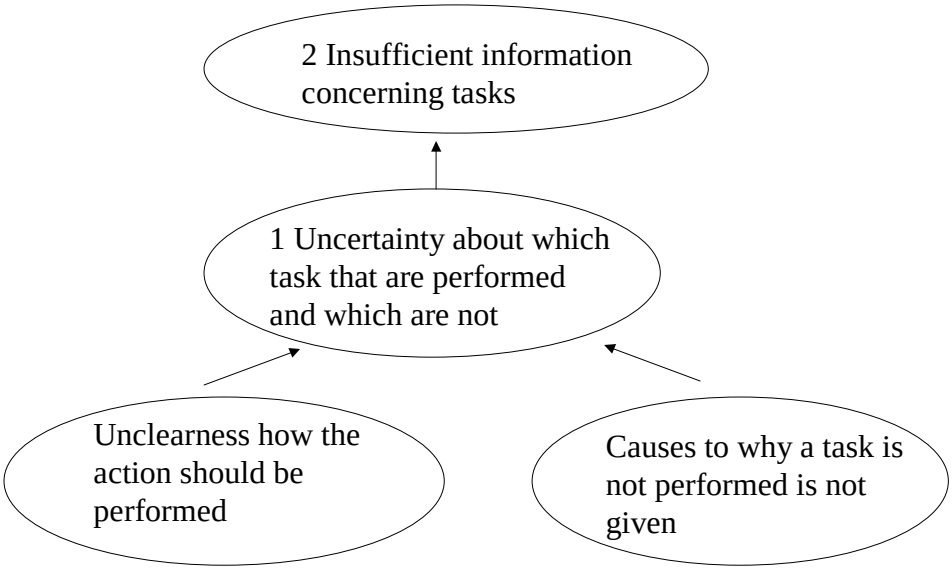

Figure 22 Problem Diagram

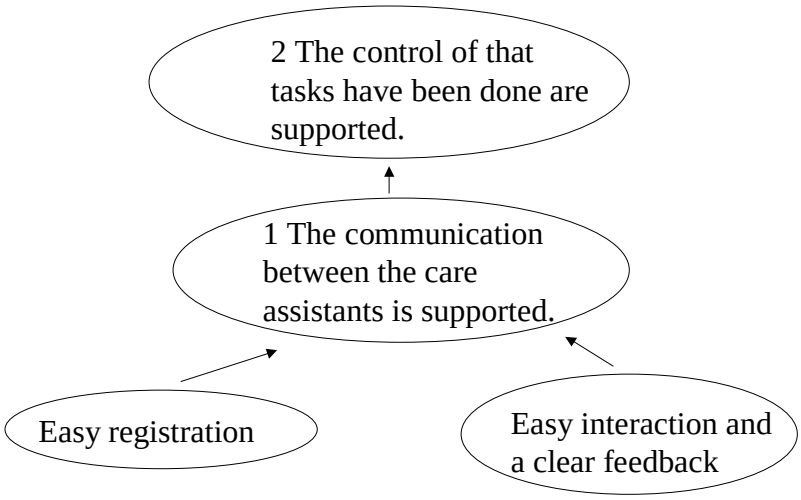

Figure 23 Strength Diagram

If "goal free evaluation as such" has been performed we recommend that this type should be combined with another type. The conclusions should therefore also consist of a recommendation for continued work. The summary should also contain a prioritised list of the most central problems and strengths. If possible change requirements or improvements should be suggested.

The central problems with possible change proposals are documented in a conclusion table (see Table 11). The assigner should from this table understand which problems are most important to consider. The summary should also highlight the central strengths. It is important that central strengths are preserved or at least considered in future change work.

Table 11. Conclusion table

Central problems	**Change proposals**
2 Insufficient information concerning tasks	Implement clearer information of how actions should be performed and avoid hidden functionality.
1 Uncertainty if a task is performed or not.	Implement a requirement to give a cause for tasks that not are performed.

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