2002

Usability in Social Action: Reinterpreting Effectiveness, Efficiency and Satisfaction

Par J. Agerfalk
Orebro University, pak@esi.oru.se

Owen Eriksson
Dalarna University College, owen.eriksson@im.uu.se

Usability in Social Action: Reinterpreting Effectiveness, Efficiency and Satisfaction

Pär J. Ågerfalk
Örebro University, Dept. of Informatics (ESI)
SE-701 82 Örebro, Sweden
Phone: +46 19 303567, Fax: +46 19 332546
pak@esi.oru.se

Owen Eriksson
Dalarna University, Dept. of Computer Science and Informatics (IDI)
SE-781 88 Borlänge, Sweden
Phone: +46 23 778958, Fax: +46 23 778050
oer@du.se

Abstract

One of the most important qualities related to the use of information systems is arguably the usability achieved in actual use-situations. Three central criteria for usability as reflected in contemporary definitions are the effectiveness, efficiency and satisfaction with which users can achieve specified goals. A problem with these criteria is that they are expressed in terms of achieving goals, which, at least tacitly, seem to be restricted to goals related to an instrumental view of information system use. In this paper, we discuss how the concept of usability can be understood and utilized within a social action context. Specifically, we address how communicative goals are related to the criteria of effectiveness, efficiency and satisfaction. We argue that, in order to understand usability, we must consider both instrumental and communicative goals, since their combination constitutes a fundamental part of the social action context in which systems are used. Both instrumental and communicative goals affect the way systems and use-situations are designed and conceived.

Keywords

Communicative action, instrumental action, rationality, orientation, goal, speech act theory

1. Introduction

The primary goal of using an automatic teller machine (ATM) seems rather obvious: to get some money out of it. Maguire (2001), for example, describes the ATM use-situation as consisting of a bank customer as primary user, the ATM as such (a computerized information system (IS)), and, among other things, the task of obtaining money. However, if we look more carefully at this use-situation, we can observe that there is another actor involved—the bank, on whose behalf the ATM acts as an agent. The bank, as an institution, can be seen as a social actor performing communicative action made manifest by financial transactions taking place at the user interface of the ATM. Therefore, it seems fruitful to view the use-situation from a social action perspective (Weber 1978, Habermas 1984). When taking social action (that is, intentional behaviour that is oriented towards the behaviour of others) as a starting

point for understanding this use-situation, we must consider not only the instrumental goal of fetching the money, but also communicative goals that are related to social norms (Stamper, Liu, Hafkamp & Ades 2000). If the only thing that mattered were to obtain money efficiently, we would not need, for example, to design a system prohibiting unauthorized people from getting money from it. This means that we cannot simply analyse, for example, how efficiently the ATM could be used by the user: we must also discuss whether it is used in a socially acceptable way. This is important to recognize because ATMs are built for honest and decent people, and they have features to prevent their misuse by dishonest people. Of course, since the tacit norms governing social action are a naturally institutionalized part of our lives, it is obvious for everyone that an ATM has to be protected from unauthorized use. However, we maintain that it is imperative to make explicit such tacit norms and related communicative goals. This is important because norms and communicative goals affect how the whole use-situation, including the ATM, is designed, and as a consequence they are also important for understanding the usability of the ATM. In this paper, we present a social action perspective that aims at such explication, and we show how it can be used as an integrated complement to contemporary notions of usability. This is done by addressing how communicative goals are related to effectiveness, efficiency and satisfaction—three central criteria for the contemporary understanding of usability (Bevan 1995, ISO 9241-11 1998, Maguire 2001). Frøkjær, Hertzum and Hornbæk (2000) have directed attention towards the *correlation* between these three criteria, and found it to be rather weak. Based on this finding, they conclude that 'there is no substitute for including all three aspects in usability evaluations' (Frøkjær et al. 2000, p. 351). They further argue that when using a narrower selection of usability measures, evaluators run an obvious risk of ignoring important aspects of usability. Inspired by this conclusion, we choose to direct attention towards the more fundamental question of the *interpretation* of these criteria. Even though they are necessary, is the common interpretation of effectiveness, efficiency and satisfaction, as reflected in the current usability literature (see below), really sufficient when viewing information systems as tools for social action and communication?

2. The Contemporary Instrumental View on Usability

Arguably, one of the most important qualities related to the use of information systems is the usability achieved in actual use-situations (Bevan 1995, Maguire 2001). One of the most widely adopted and cited definitions of usability is that of the International Organization for Standardization (ISO 9241-11), which identifies usability with the ability to use a product for its intended purposes: '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' (ISO 9241-11 1998). As reflected in the definition, three central criteria for usability are the *effectiveness*, *efficiency* and *satisfaction* with which users can achieve specified goals.

The first criterion, effectiveness, suggests that specified goals are to be achieved with accuracy and completeness (ISO 9241-11 1998). Effectiveness can be understood as 'how good a system is at doing what it is supposed to do' (Preece, Rogers & Sharp 2002, p. 14) and is related to the 'utility' of the system (Grudin 1992)—that is, 'to the extent to which the system provides the right kind of functionality so that users can do what they need or want to do' (Preece et al. 2002, p. 16).

The second criterion, efficiency, suggests that specified goals are to be achieved with as little expenditure of resources as possible (ISO 9241-11 1998). Put another way, measures of efficiency relate the level of effectiveness achieved to the expenditure of resources (Bevan 1995). According to Bevan (1995), resources may be 'mental or physical effort, which can be

used to give measures of human efficiency, or time, which can be used to give a measure of temporal efficiency, or financial cost, which can be used to give a measure of economic efficiency'.

The third criterion, satisfaction, suggests that users should feel comfortable with, and have positive attitudes towards, the use of the system (ISO 9241-11 1998). In this sense, satisfaction relates to concepts such as ease of use, user satisfaction and usefulness (Davis 1989, Mathieson & Keil 1998).

The 'specified context of use' includes users, tasks, equipment and the physical environment, where 'task' is defined in terms of activities required to achieve a goal (ISO 9241-11 1998). Maguire (2001, p. 460) stresses the importance of the social context, noting that 'attitudes of the organization and its employees … can affect whether a system is accepted and used to carry out the work' and that 'the structure of the organization, the way people work … the availability of assistance and the frequency of interruptions, are also likely to affect the usability of a product.'

Overall, this view of user behaviour at the user interface of an IS can be compared with the traditional teleological action model. In this model, the actor uses various means (instruments) to achieve his or her goals—that is, to accomplish desired effects. 'When we describe behaviour as teleological action, we suppose that the agent reckons with an objective world in which he can know something and in which he can purposively intervene' (Habermas 1984, p. 117). Actions are governed by action plans that actors choose based on their interpretation of the action situation and the goals to be reached with the actions (Norman 1988). According to Habermas (1978), such actions are founded in means/ends rationality.

Within the teleological action model, action is often interpreted as an instrumental act. That is, the focus is on the means/ends rational behaviour of a single actor and the means he uses to achieve subjective goals. Of course, actions performed in interaction with information systems can be viewed as instrumental acts. To illustrate such an act, we can return to the use of the ATM where the instrumental goal to be achieved is to obtain money. To achieve this goal, the action plan is to manipulate the ATM correctly (to push the right buttons in the correct order); the instruments used are the buttons on the ATM, the ATM card, the fingers to push with, etc.; and the desired effect is that bills will eventually have been transferred from the machine to the user's wallet.

From certain points of view, it is appropriate and sufficient to focus on means/ends rationality in order to understand human action. This is the case when an actor follows technical rules 'mechanically' to operate an IS to achieve an instrumental goal in the way described above. In other cases, this perspective is too restrictive. The reason is that in most use-situations, other actors and social values, norms and consequences must be considered. Specifically, it is important from a system development perspective to make sure that the means/ends rationality of a user conforms to the overall social context in which the user acts, even if the user is potentially unaware of or uninterested in this larger context. This is where communicative action comes into play.

3. Communicative Action trough Information Systems

Instrumental actions are often performed in a social action context—that is, 'determined by expectations as to the behaviour of objects in the environment and of other human beings' (Weber 1978, p. 24)—which means that we have to consider them as social actions. According to Weber, the term *action* refers to the human behaviour that attaches subjective meaning,

social means taking consideration of others' behaviour, and, consequently, *social action* is action that is oriented to the behaviour of others and that is usually purposive (Weber 1978). Being oriented to the behaviour of other actors (persons or institutions) requires an understanding of social norms (Stamper et al. 2000). Social norms are rules that govern social action, and these rules are oriented towards social goals and values (Weber 1978). This implies that norms are social rules that are based on a type of goal and rationality different from technical rules. Norms are social rules based on values and human behaviour, and they are not always tangible: 'one cannot always put one's hands conveniently on a norm. A norm is more like a field of force that makes the members of the community tend to behave or think in a certain way' (Stamper et al. 2000, p. 15). Social norms (like technical rules) are a basis for achieving instrumental goals, but the use of norms must be considered in a social action context. Furthermore, they are a basis for evaluating the extent to which actions are 'good' or 'bad'—that is, for evaluating the quality of social actions (Eriksson 2002).

One particular form of social action is action performed by the use of language, which is the subject matter of the theories of speech acts (Austin 1962, Searle 1969) and communicative action (Habermas 1984). In these theories, language is considered as an instrument for human communication and social action within a social action context. Typical social actions performed by the use of language—so-called speech acts—include: making a request, stating a fact, expressing a wish and making a promise. People perform these actions to obtain instrumental goals. Nonetheless, perhaps one of the most important insights provided by speech act theory is that the use of language, and success in using it, is based on following a number of general rules (conventions), and that a speech act must be understood and evaluated within a social context. Auramäki, Lehtinen and Lyytinen (1988) define the context of a speech act to be a combination of *speaker*, *hearer*, *time*, *place* and *possible world*. The first two concepts refer to the actors who perform and interpret action, and time and place represent the temporal and spatial aspects of this action. The possible world consists of the residual features of the context that make a particular action possible and meaningful. Typically, these include shared norms, values and beliefs, and the existence of certain social and material (brute) facts. Note that this notion of social context is more fundamental to IS use than the view suggested by, for example, Maguire (2001). The social context is not just a complicating factor that must be considered. The social context is what makes social actions at the user interface meaningful in the first place, and, as such, is not just 'likely to affect the usability' (Maguire 2001, p. 460), but rather the basis for understanding usability altogether.

Searle (1969, p. 69) claims that the speaker's communicative intent with a speech act is to make the listener understand what he is trying to do by his speech act. Building on that notion, Habermas (1984) claims that the aim of communication, in general, is to create mutual understanding. According to Habermas (1979), the aim of reaching understanding implies bringing about an agreement constituted by reciprocal comprehension, shared knowledge, mutual trust and accord. This implies that a speaker who performs a speech act, and who is oriented towards mutual understanding, must be able to raise four corresponding validity claims concerning the comprehensibility, truth, sincerity and rightness of the act. It also means that the listener must be able to evaluate, control and criticize the speech act based on these validity claims.

Searle (1969) has defined five pragmatic language functions that show five typical ways of using language, and goals (illocutionary points) that are related to these functions. The aim of a request, for example, is that it should count as an attempt to get the listener to perform a subsequent action (1969, p. 69). In a banking context, we can imagine that the customer walks up to the counter inside the bank and says, '*I would like to withdraw €50 from my account, please*'. In this case, the customer performs the speech act of making a request. The

customer must in this case follow the general rules valid for requests, and the success of the speech act depends on how the customer performs the request and how the clerk interprets it, all within the actual social context. In order to succeed with his social act, the customer must make the clerk understand how much money he wants to withdraw, and, most importantly, that he is authorized to make the request. In order to interpret the request, the clerk must relate it to the actual social context. This implies that the request must be related to established social norms, and to procedures that exist in the bank in general, and in the context of this specific customer–bank relationship in particular. There is, for example, probably a standard procedure for checking customers' identities, which must be followed. When people behave like this—that is, they are oriented towards mutual understanding and conform to socially shared norms—we say that they are basing their actions on communicative rationality and performing communicative action (Habermas 1984).

Communicative action is social action based on mutual understanding, and thus it conforms to mutually accepted social norms. Such action is not primarily oriented towards personal gains, even though mutual understanding and personal gains may very well coincide (Habermas 1979). The crucial point here is that the use of the ATM can be viewed as communicative action as well (Goldkuhl & Ågerfalk 2002). Inside the bank, as well as at the ATM, the participating actors must achieve certain communicative goals (such as making the customer understand that he must provide evidence of his identity), which are based on social norms. This is in addition to achieving the instrumental goals (such as withdrawing money). Of course, it is also possible to take norms and values into account to violate them deliberately for personal gains: this would be instrumentally oriented social action. Such *strategic action* (Habermas 1984) may be important in order to understand systems development as an activity (Hirschheim, Klein & Lyytinen 1996). Even more important to see is that in most moral-practical senses, supporting such actions should not be a goal of systems design (cf. Ljungberg & Holm 1996).

According to Weber (1978), rationality can be understood as a combination of means in relation to ends, ends in relation to values, and ethical principles in relation to action. This means that it is always possible to relate rational social action to the means (instruments) used to achieve goals, and to the values and ethical principles to which the action conforms. The first aspect can be referred to as an instrumental orientation towards action, and the latter as a communicative orientation (Habermas 1984). Taken together, the two orientations are important in understanding action within its social context—that is, in understanding social action.

Each of the two orientations, instrumental and communicative, is related to its own set of goals. The instrumental orientation is related to *instrumental goals*, which may be expressed in terms of achieving a given end. The communicative orientation is related to *communicative goals*, which may be expressed in terms of creating understanding and mutual agreement. It is important to see that social action includes both instrumental and communicative goals. To quote Habermas (1991, p. 241): 'My critics have on occasion overlooked the fact that *both* models of action impute to the actors a capacity for setting ends and for goal-oriented action as well as an interest in executing their own plans for action.' This implies that we need to take communicative and not only instrumental goals into consideration when considering the usability of information systems: both instrumental goals and communicative goals are crucial for understanding the usability of the ATM.

4. Usability in Social Action: A Critical Examination

4.1 The ATM Example

Let us now return to the ATM example and examine how usability can be understood from a social action point of view. To that end, we will analyse five typical actions performed in interaction with the system. Of course, the description constitutes an oversimplification, but it is sufficiently detailed for the aim of this paper. The ATM use-situation is visualized in Figure 1 by the use of a notation called an Action Diagram (Ågerfalk & Goldkuhl 2001).

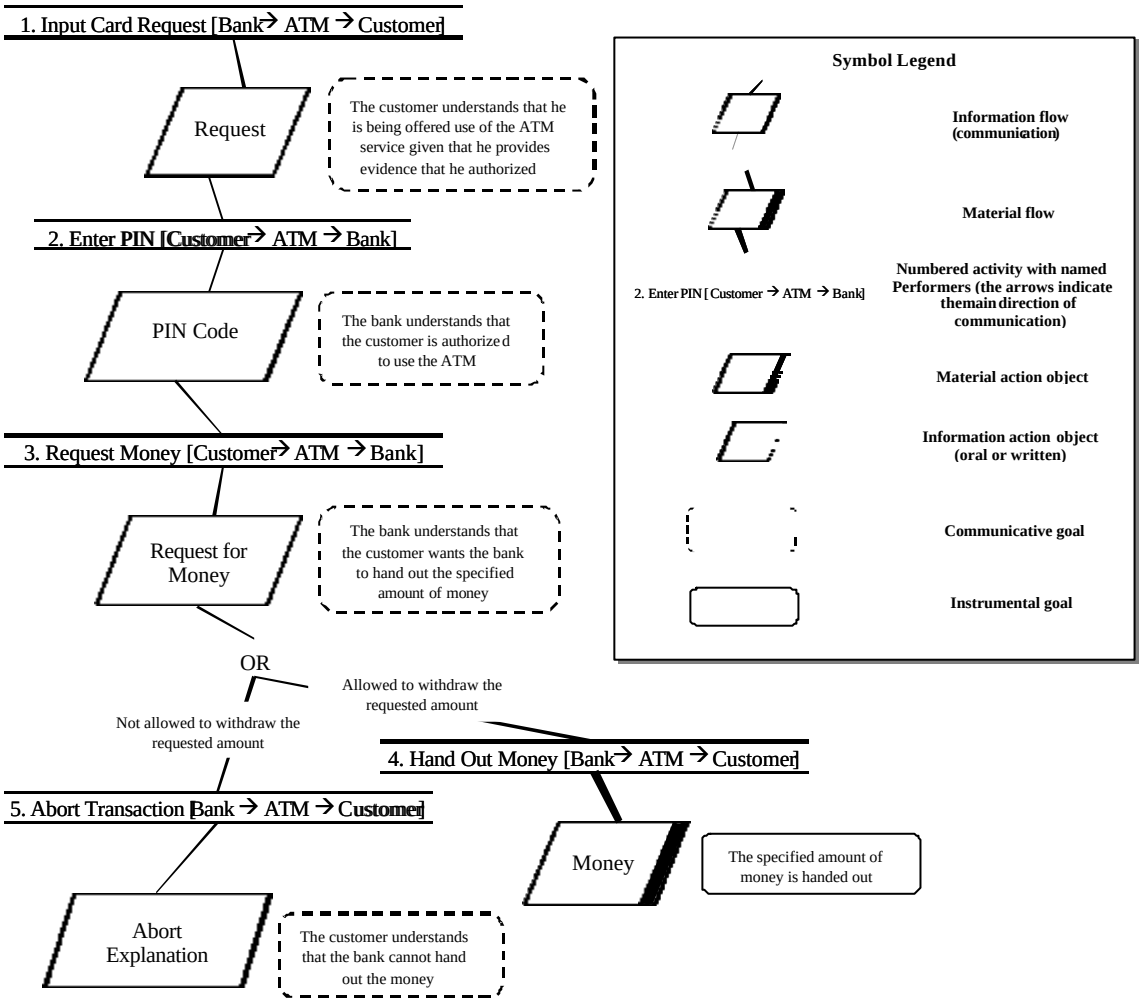

Figure 1. Action Diagram showing the ATM use-context.

In the Action Diagram, we have utilized an additional feature, rounded rectangles, to illustrate the main goals of each action, both communicative (dashed border) and instrumental (solid border). It is important to recognize that all actions embody both an instrumental and a communicative orientation, which implies that:

- actions 1, 2, 3 and 5 can be related to both communicative and instrumental goals, but since they are communicatively oriented this implies that communicative goals should be emphasized when the quality of the acts is considered; and that

- action 4 should primarily be considered based on the instrumental goal of handing out money, even though the act also embodies a subordinated communicative orientation.

Actions 1, 2, 3 and 5 are oriented towards the overall communicative goal of creating a mutual understanding, while Action 4 is oriented towards the customer's desired outcome in terms of getting the money out of the machine. What is important to emphasize from a social action point of view is the importance of the communicative goals and their role in ensuring that the actions are performed in a way that is not only efficient but also socially acceptable. For example, Actions 1 and 2 are mainly performed in order to ensure that the transaction is performed in a socially acceptable way—that is, based on social norms that govern the interaction. What is in focus here is whether the customer is allowed to use the ATM, not the instrumental goal of fetching the money. The communicative goal of Action 3 is related to whether or not the customer is allowed to withdraw the requested amount of money, and this action rests on a prior mutual agreement between the customer and the bank that the customer is not allowed to create a negative balance in his account. These communicative goals are essential for the design of the ATM and the way that the customer perceives the use-situation. If the customer tries, for example, to make a request that would have created a negative balance on his account, it is important that he understands that he is not allowed to withdraw this amount. It would probably be hard for the customer to trust a bank with an ATM that did not check whether the request would create a negative account balance, or even worse, did not check whether the user was authorized to use the ATM.

Analysing the use-situation in this way is crucial from a social action perspective since social action is concerned not only with how to perform actions in an efficient way, but also with the goodness and the moral-practical rationality of the actions, and the trust of social actors (individuals as well as institutions). It also implies that in order to understand the use-situation, both designers and the actors that use the system (in this case the bank and the customer) must have a thorough understanding of the social context in which the system is used. It is not only a matter of reaching the instrumental goal of getting the money out of the machine; it is also a matter of whether this is done in a socially acceptable way. It is therefore insufficient to analyse the ATM case in terms of satisfaction, efficiency and effectiveness with an instrumental orientation alone: these criteria must also be interpreted with a communicative orientation.

4.2 Interpretations of Effectiveness, Efficiency and Satisfaction

With an instrumental orientation, the human use of signs is abstracted in such a way that information is reduced to an instrument for 'triggering and maintaining goal-seeking behaviour to achieve pre-specified outcomes in a controlled environment' (Hirschheim et al. 1996, p. 19). From this perspective, it is highly relevant to speak of effectiveness and efficiency only in terms of desired outcome and relative expenditure of resources, and satisfaction as comfort and positive attitudes towards the system. If we broaden the view and also take into account a communicative orientation, we can interpret the three usability criteria—effectiveness, efficiency and satisfaction—in a more elaborated way (see Table 1).

Usability Criteria	Instrumental Orientation	Communicative Orientation
Effectiveness	Desired outcome	Mutual understanding
Efficiency	Relative expenditure of resources	N/A
Satisfaction	Comfort and positive attitudes	Trust

Table 1. Interpretation of effectiveness, efficiency and satisfaction with an instrumental and a communicative orientation.

Effectiveness

The first criterion, effectiveness, suggests that specified goals are to be achieved with accuracy and completeness (ISO 9241-11 1998). As an example of the operationalization of the criterion, we refer to the MUSiC (Metrics for Usability Standards in Computing) Performance Measurement Method (Bevan 1995). According to this method, measures of effectiveness relate goals for using an IS to the accuracy and completeness with which these goals can be achieved. Completeness—that is, the amount of a task completed by a user—is related to Quantity and Quality, and is a measure of the degree to which the outcome represents the achievement of the task goals. In the ATM example, completeness would correspond to whether the user managed to withdraw money (Quantity) and to the match between the amount requested and that received (Quality). Both measures are expressed as percentages and are used together to calculate the effectiveness of a task as (Bevan 1995):

Task Effectiveness = 1/100 (Quantity x Quality) %

With a communicative orientation, information systems should be designed to facilitate mutual understanding (Hirschheim et al. 1996). The main point of a communicative goal such as mutual understanding is that it is the validity of the goal that should be evaluated, not the task effectiveness in terms of percentages. Therefore, it is not feasible to evaluate mutual understanding with a formula such as the one presented above. Of course, communicative acts must also contribute to task effectiveness, but this is not enough (it is a necessary but not a sufficient condition). In order to understand the usability of an IS, we must consider the validity and meaning of the communicative goals and the social actions performed by use of the system, which is another matter. This implies another way of interpreting and evaluating effectiveness. As a consequence, we must learn how to evaluate social actions based on their meaning and validity. In order to understand the meaning of communicative acts, we have to know the conditions (as derived from the social context) under which they are acceptable based on their validity claims (Habermas 1984, p. 115).

Efficiency

The second criterion, efficiency, suggests that specified goals are to be achieved with as little expenditure of resources as possible (ISO 9241-11 1998). Following this definition, efficiency is calculated in the MUSiC Performance Measurement Method as (Bevan 1995):

Temporal Efficiency = Effectiveness / Task Time.

Since mutual understanding is hard to relate to the expenditure of resources, we therefore find it meaningless to speak of efficiency in relation to communicatively oriented goals. Of course, communication and the performance of action by use of language, taken together, can indeed be analysed in terms of efficiency. In this respect, it is important to see that the performance of a communicative act includes both an instrumental and a communicative orien-

tation: the orientations are merely ideal analytic abstractions. That is, when performing a communicative act at the interface, we also use the system (and our language) in an instrumental way, and this use can be related to the relative expenditure of resources.

Satisfaction

The third criterion, satisfaction, is the subjective criterion used for describing and measuring the actors' (users') feelings and attitudes towards the system and the goal-achievement that makes a system effective. Habermas (1979) claims that an agreement based on mutual understanding must include mutual trust. In order to act with the aim of creating mutual understanding, actors must rely on a social context that includes actors, norms and institutions. Trust is essentially based on faith in the word of others and the legitimacy of regulations, and underlines the importance of belief in other people (Salaün & Flores 2001). When relating the criterion of satisfaction to a communicative orientation, satisfaction is associated with the inter-subjectivity of social action, and with the trust that communicating actors have in each other as well as in the IS and the actions performed by and with the help of the IS (cf. Cardholm 1999). In this way, satisfaction is a property not only of a user's interaction with a system but also of an actor's participation in a social action context.

5. Conclusion

In this paper, we have suggested taking social action as a theoretical point of departure for understanding the usability of information systems. Using the ATM as an example, we have shown how the traditional criteria used to understand IS use in terms of effectiveness, efficiency and satisfaction can be reinterpreted from a social action perspective. When information systems are used in a social action context, they can be used to perform communicative action. All communicative actions have both an instrumental aspect and a communicative aspect, and the concept of orientation helps us to extract complementary success criteria for such actions from different perspectives.

In order to understand the usability of an IS, it is important to consider more than just an instrumental rationality concerned with the evaluation of objective facts (Ehn & Löwgren 1997). That is, we might view an action from: (a) an instrumental perspective, within which the success of the action can be judged according to such criteria as the achievement of desired outcome, relative expenditure of resources and subjective comfort and positive attitudes; and from (b) a communicative perspective, within which the success of the action can be judged based on established mutual understanding and achieved inter-subjective trust. Both perspectives, (a) and (b), are important and should be taken into account accordingly.

A problem with the contemporary understanding of usability is that it is often expressed in terms of achieving goals, which, at least tacitly, seem to be restricted to goals related to an instrumental orientation, as can be seen in, for example, the work of Bevan (1995) and Maguire (2001). We have argued that in order to understand usability, we must consider both instrumental and communicative goals since their combination constitutes a fundamental part of the social action context in which systems are used, and both instrumental and communicative goals affect the way in which systems and use-situations are designed and conceived.

References

Ågerfalk, PJ and Goldkuhl, G (2001), 'Business action and information modelling: the task of the new millennium' in *Information modeling in the new millennium*, eds M Rossi and K Siau, Idea Group Publishing, Hershey, PA, pp. 110–136.

Auramäki, E, Lehtinen, E & Lyytinen, K (1988), 'A speech act based office modelling approach', *ACM Transactions on Office Information Systems*, vol. 6, no. 2, pp. 126–152.

Austin, JL (1962), *How to do things with words*, Oxford University Press, Cambridge.

Bevan, N (1995), 'Measuring usability as quality of use', *Software Quality Journal*, vol. 4, no. 2, pp. 115–130.

Cardholm, L (1999), 'Building trust in an electronic environment', In *Proceedings of the 4th Nordic Workshop on Secure IT systems: Encouraging Co-operation (NORDSEC'99)*, 1–2 November 1999, Kista, Sweden.

Davis, FD (1989), 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, vol. 13, no. 3, pp. 319–340.

Ehn, P & Löwgren, J (1997), 'Design for quality-in-use: human-computer interaction meets information systems development', In *Handbook of human-computer interaction*, eds M Helander, TK Landauer & P Prabhu, Elsevier Science B.V., Amsterdam, pp. 299–313.

Eriksson, O (2002), 'Communication quality in the context of information systems and business processes', In *Coordination and communication using signs: studies in organisational semiotics 2*, eds K Liu, RJ Clarke, PB Andersen, & RK Stamper, Kluwer Academic Publishers, Boston, pp. 115–128.

Frøkjær, E, Hertzum, M & Hornbæk, K (2000), 'Measuring usability: are effectiveness, efficiency, and satisfaction really correlated?', In *Proceedings of the CHI 2000 Conference on Human Factors in Computing Systems*, 1–6 April 2000, The Hague, Netherlands, ACM CHI.

Goldkuhl, G & Ågerfalk, PJ (2002), 'Actability: a way to understand information systems pragmatics' in *Coordination and communication using signs: studies in organisational semiotics 2*, eds K Liu, RJ Clarke, PB Andersen & RK Stamper, Kluwer Academic Publishers, Boston, pp. 85–113.

Grudin, J (1992), 'Utility and usability: research issues and development contexts', *Interacting with Computers*, vol. 4, no. 2, pp. 209–217.

Habermas, J (1979), *Communication and the evolution of society*, Heinemann, London.

Habermas, J (1984), *The Theory of communicative action*, Polity Press, Cambridge.

Habermas, J (1991), 'A reply' in *Communicative action: essays on Jürgen Habermas's The theory of communicative action*, eds A Honneth & H Joas, MIT Press, Cambridge, MA.

Hirschheim, R, Klein, HK & Lyytinen, K (1996), 'Exploring the intellectual structures of information systems development: a social action theoretic analysis', *Accounting, Management and Information Technologies*, vol. 6, no. 1–2, pp. 1–64.

ISO 9241-11 (1998), *Ergonomic Requirements for Office Work with Visual Display Terminals (VDTs), Part 11: Guidance on Usability*, 1st ed., 1998-03-15, International Organization for Standardization, Geneva.

Ljungberg, J & Holm, P (1996), 'Speech acts on trial', *Scandinavian Journal of Information Systems,* vol. 8, no. 1, pp. 29–52.

Maguire, M (2001), 'Context of use within usability activities', *International Journal of Human-Computer Studies,* vol. 55, no. 4, pp. 453–483.

Mathieson, K & Keil, M (1998), 'Beyond the interface: ease of use and task/technology fit', *Information & Management,* vol. 34, no. 4, pp. 221–230.

Norman, DA (1988), *The psychology of everyday things,* Basic Books, New York.

Preece, J, Rogers, Y & Sharp, H (2002), *Interaction design: beyond human-computer interaction,* John Wiley & Sons, Inc., New York, NY.

Salaün, Y & Flores, K (2001), 'Information quality: meeting the needs of the consumer', *International Journal of Information Management,* vol. 21, no. 1, pp. 21–37.

Searle, JR (1969), *Speech acts: an essay in the philosophy of language,* Cambridge University Press, Cambridge.

Stamper, RK, Liu, K, Hafkamp, M & Ades, Y (2000), 'Understanding the roles of signs and norms in organizations: a semiotic approach to information systems design', *Behaviour & Information Technology,* vol. 19, no. 1, pp. 15–27.

Weber, M (1978), *Economy and society,* University of California Press, Berkeley, CA.