A Tentative Model for Procuring Usable Systems

Stefan Holmlid and Henrik Artman

Interaction and Presentation Lab, Royal Institute of Technology
100 44 STOCKHOLM, Sweden
{holmlid, artman}@nada.kth.se

Abstract

In this paper a proposal for a system development model for procurers is presented. The model is aimed at increasing the usability of supplied systems. It is meant to be a supportive tool for any procurer, and is developed from experiences and documented problems in system development. The model is based on three field studies of procurement organizations and their role in the system development process. The model comprises planning, communication, monitoring and evaluation as parallel activities by procurers within any system development project.

1   Introduction

After a case description in a book about system development skill, the conclusion comes down to one problem:

> Through the ambition that everything should be specified exactly, one accomplished an extensive, and probably correct, foundation. But, by *only* doing an exact reproduction, both on high and low levels of abstraction, this thorough work created no understanding by the customer. [Hoberg, 1998, p. 34, our translation]

It is indeed a problem that suppliers and procurers do not share a common and shared view of the development process. Moreover, the quote represent an asymmetry often assumed in system development, that the procurer should understand, or more specifically, adapt to the supplier. We think that this assumed asymmetry is the problem, rather than the symptom. Therefore, we believe it is essential to understand the *procurer's* role in system development, in particular in relation to usability issues.

2   Theoretical background

Except for in a few discussions (Grudin, 1995; Winkler & Buie, 1995), the issue of procurement has attracted little attention of the Human Computer Interaction (HCI) community. There are virtually no empirical studies of how procurers reason about usability and user involvement as requirements for a system. Some aspects can be found in (Keil & Carmel, 1995; Ives & Olson, 1984; Forsgren, 1996), who emphasize the importance of user involvement and usability. Reviewing the general literature of HCI, one discovers that focus is on the production of the user interface in product and in house development (Helander, Landauer, & Prabhu, 1997; Preece, Rogers, Sharp & Benyon, 1996; Shneiderman, 1998; Dix, Finlay, Abowd & Beale, 1998; Cooper, 1999). System development methods and models for user-centred system development have also mainly focused on the developmental side of the contract (see Newman & Lamming, 1995;

Greenbaum & Kyng, 1991; Constantine & Lockwood, 1999). The implicit reasoning seems to be that it is the contractor's responsibility to ask the right questions and produce the right design (see Pohl, 1993; Dorfman & Thayer, 1990; Macaulay, 1996). This means that procurers have only a passive voice in the development of usable systems.

The procurer, to us, is the person or the group of persons who have a sketchy idea of the system, who are responsible for its fulfilment, who have the power to distribute resources during the completion of the project, and who have the authority to sign off payments and contracts. In our view, high procurement competence must include an awareness of usability issues as well as organisational goals. It must also include the ability to plan, communicate, monitor, and evaluate the process of reaching these goals.

3   Case review

In an open exploratory manner we have been working with cases in order to understand procurement as it occurs in real-life procurement situations. The three cases span a range of procurement situations; one small company procuring a web-based system from a small company, a large governmental body procuring a administrative system from the internal development department, and a large bank making a proposal for tender for a content management system.

3.1   Contracting negotiations and emergent requirements

In one of our case studies in contract development of an Internet application for working environment evaluation (Artman, 2002) we elucidated several conflicts between the procurer and the contractor. First we found that the procurer project leader and the contractor project leader had different views on usability and user involvement. The procurer project leader was more process-oriented, while the contractor viewed usability solely as product properties (see also Holmlid, 2002). They also had different views on how detailed the project was on the outset. The procurer found the project to be general and open-ended regarding its implementation, while the contractor found it to be very closed and detailed. During the design phase of the project several controversies became apparent. Iterations of the design sketches were not as rapid as had been anticipated, and did not take into account the emergent requirements from the formative evaluations. The procurer project leader did, after some iterations, prototype detailing user requirements and a suggestion for interaction design. Much of the controversies can be ascribed to different ideas of the motive for iterations. The procurer project leader expected rough sketches as suggestions and evaluative material, while the contractor designers saw their sketches as more firm suggestions. The contractor project leader, working as a mediator, did not want the designer to come in direct contact with users, which of course made the communication even more problematic (see Keil & Carmel, 1995). The project was not completed within time and budget. Interestingly, the contractor project leader today works for the procurer and is very focused on being platform and supplier independent. The case points out the importance of agreed upon definitions, process-oriented requirements, synchronised motives of process and product as well as an active dialogue bridging asymmetries.

3.2   Power and management

Our case study with the Swedish Tax Government (RSV) was a retrospective interview study of a project that was meant to be a best-practice project when it comes to user centred design and usability. The study elucidates several interesting problems. At the start of the project strong emphasis was put on usability and user-centred design, but gradually, the results of those efforts were not recognized as much as expected. Our analysis suggest that usability requirements was not recognized as much because of two major factors; the steer group did not have the competence and

interest to evaluate the results, and RSV issued new directives for platform use. Further analyses suggest that the steer group mainly reacted to obvious project problems rather than taking a strategic perspective and steer the project in the directions of the initial directives. The new directives forced the developers to investigate new technologies and made some usability requirements (e.g. short commands) impossible. This in turn made power conflicts between the usability professionals and the programmers within the project apparent. As a consequence, one of the usability professionals skipped the project, as he could not see that it would fulfil the usability goals. Instead of being a best-practice project of usability, where user requirements and needs directed technology, the project took a traditional approach where technology directed user adaptations. Later investigations revealed that most of the requirements within the initial directive could have been taken care of, although not within time and budget. The case interviews suggest that the procurer steer group could have acted more proactively and strongly with continuously analysing requirements and the technology supporting these goals. RSV is now revising its procurement organisation and will take a more strategic account for usability.

3.3 Usability activities and conceptual models of work

Together with a large Swedish bank we followed the procurement of a Content Management system (see Markensten, this volume). The department handling the procurement had no formal education in usability or user-centred design, working more from out of common sense. Our presence, with a focus on usability activities, increased discussion on such issues. Markensten's analysis suggests that the procurers were influenced more by rational and technology centred models of the work process than the actual usage presented by the users. As an effect of that, they had problems listening to the descriptions of work procedures articulated by the users. As Markensten shows the interview became an arena for persuading the user how rational and consequent a certain work procedure would become. This in turn made the articulation of adequate user requirements problematic. The case points out how important it is for those articulating procurement and user requirements to have a conscious idea of usability and user-centred activities when collecting information to articulate user requirements.

4 A tentative procurement model

The framework model consists of four general activities throughout a system development process. Perspectives to be taken into account while dealing with these activities are roles, process issues, power-relationship and goals (see table 1).

Table 1. The structure of the proposed model

Activity Perspective	Planning/ Organization	Communication	Monitoring	Evaluation/ Assessment
Goals	Fit between business goals and usability goals	Requirements formulation	Secure the projects development to planned goals	Fulfilment of technology, usability and business goals
Process	Stakeholder involvement Assess motives	Prototyping Conceptual modelling	Assess progression Usability tests	Evaluation
Role	Analyst Steer-group	Designer	Procurer project leader Steer-group	Evaluator
Power-relationship	Conflicting goals	Asymmetrical motives and knowledge	Usability activities vs. technology implementation	Resistance to change Conflicts of responsibility

During *planning and organisation* procurers must become aware of the fact that users are the ones who will contribute the most to meet the business goals, as well as acknowledge how this should

be done. The problem a procurer must take care of during planning is that most system development processes is supplier focused, where phases of the projects are defined more on the terms of the production, than the needs and phases of the procurer organisation. They must also become aware of the asymmetry of knowledge of and differing motives for the procurer and contractor to participate. This is essential to be able to monitor and handle upcoming misunderstandings. Costs are one of the main aspects that procurers acknowledge, but as we know from other studies few projects finish on time and budget. Procurers should be more focused on quality aspects, as these later will appear in evaluations. A common problem is that procurers order specific technology often based on shallow knowledge and analyses. Within the model there is also room for perspectives and definitions on technology development, as means for organisational change, competence development or as plain information processes.

The *communication process* can be divided into several parts, the communication between the procurer project leader and the users, the communication between procurer and contractor, etc. In the first relation we have seen how project leaders try to impose certain information structures and requirements on the users. In the second, we have found that the procurer should not assimilate and adopt the jargon of the developers / contractors, as labels might hide the mismatch for each actual understanding. The goals of the procurer, users and the developer might be only loosely fit. The problem facing the procurers deals here with that of false belief of shared motives and references to concepts. The procurer must take charge of articulation of motives, requirements and definitions of concepts. That is, the procurer organisation must take a proactive role in respect to the supplier in order to balance the asymmetries of jargon and systematic knowledge, as well as being one step ahead of the project.

Monitoring is what we would like to think of as the actual change project management. In our studies we have seen that the procurers is marginalized as soon as the development project starts. The project becomes a black box for the procurer, and only appears full-fledged when there are problems. This marginalizes the procurer to reactive thinking and action rather than being proactive and the one who leads and decides. First of all, goals, evaluation measures and criteria must be defined early. Secondly, the procurer must be secure in that it is her appropriate knowledge of the work that is in the forefront of the criteria. Emergent requirements and partly dependent projects must be monitored and evaluated. Project processes of usability must be monitored, for example by probing project member of the users needs and work processes.

Evaluation and assessment should be evident, but is not always. We see the problems and solutions of evaluation in relation to the above. Especially, the focus on the relation between usability goals and organisational goals seem to be important. Still many organisational goals may not be evident at the completion of the project. Usability is sometimes seen as self-contained rather than connected to organisational goals. Another issue concerning evaluations is when and by whom they should be done. An independent evaluator can take the criteria and evaluate without any pre-understanding of project progression. On the other hand, independent evaluators may not have domain knowledge. Evaluations and criteria for acceptance must be set early in the project, and these must be monitored and secured during planning and contracting.

To summarize, we believe that the procurer must formulate the "what and how" of users work situation before actual procurement. What activities and tasks should the user perform and in what way are these activities supporting the organisation's need for change? Secondly, how should the user perform these activities? These two questions can then direct the contractor – what must be done and how it should be done in order to conform to the goals of the procurer organisation.

5 Future work

We will continue to develop the details of the model, especially with emphasis on how procurers can streamline organisational and usability goals as well as how procurers can monitor actual development projects. We will do this through case studies of actual procurement and through more active participation in development projects together with different stakeholders. We also organise workshops with usability professionals and researchers. Another line of future work is to organise reflection seminars together with procurement practitioners were we present and discuss research and actual development projects. We also expect that education and focus will change accordingly in order to meet the demands of future usability procurement.

6 Acknowledgements

References

Artman, H. (2002). Procurer Usability Requirements: Negotiations in contract development. Proceedings of NORDICHI 02. pp 61-70.

Constantine, L.L., Lockwood, L.A.D. (1999) *Software for Use*. New York: Addison-Wesley.

Cooper, A. (1999). *The Inmates are Running the Asylum*. New York: SAMS.

Dix, A., Finlay, J., Abowd, G., Beale, R. (1997). *Human Computer Interaction*. Harlow: Prentice Hall.

Dorfman, M., Thayer, R., H. (1993). *Standards, Guidelines and Examples of System and Software Requirements Engineering*. International Thompson Publishing.

Forsgren, P. (1996). *Management of Industrial IT Procurement,* Doctoral Thesis. Industrial Control Systems, Royal Institute of Technology, Stockholm, Sweden.

Greenbaum, J. & Kyng M. (eds.), (1991), *Design at Work: Cooperative Design of Computer Systems*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Grudin, J., 1991. *The Development of Interactive Systems: Bridging the Gaps Between Developers and Users. IEEE Computer*, 24, 4, 59 –69.

Helander, M., Landauer, T., Prabhu, P. (1997) *Handbook of Human Computer Interaction*. Amsterdam: Elsevier Science.

Hoberg, C. (1998). Precision och improvisation [Precision and improvisation]. Stockholm: Combitech Software and Dialoger. [in Swedish].

Holmlid, S. (2002). *Adapting users: Towards a theory of use quality*. Linköping Studies in Science and Technology, Diss. No. 765. Linköpings universitet, Sweden.

Keil, M. and Carmel, E. (1995) Customer Developer Links in Software Development. *Communications of the ACM*, Vol. 38, Num. 5, May, pp.33 –44.

Macaulay, L., A. (1996). *Requirements Engineering.* London: Springer.

Newman, W., Lamming, M (1995). *Interactive Systems Design*. Harlow:Addison-Wesley.

Pohl, K. (1993). *The Three Dimensions of Requirements Engineering*. In Rolland, C., Bodart, F. And Cauvet, C (eds.) Proc. CAISE'93. Paris: Springer, 175 –292.

Preece, J., Rogers, Y., Sharp, H., Benyon, D., (1995). *Human-Computer Interaction*. Addison-Wesley.

Shneiderman, B. (1998). *Designing the User Interface* (3ed). Addison-Wesley.

Winkler, I., Buie, E. (1995) HCI Challenges in Government Contracting. *ACM SIGCHI Bulletin, v.27 n.4 p.35-37*.