

Who's at the wheel of user driven projects when user can't drive?

**A systemic co-design perspective on methods, results and critical reflections when
developing electronic assistants serving elderly people**

Lars Albinsson
Calistoga Springs Research Institute
lars@maestro.se

Olov Forsgren
Högskolan i Borås
Olov.forsgren@hb.se

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Abstract

This research report represents some general findings of the EU funded Information systems research project Avanti. Based on the fundamentals of a systemic view it also presents some critical reflections on the R/D method used.

The Avanti project followed the favoured model for EU/IST projects, with a strong emphasis on user requirements. Due to nature of the users, they were unable to state requirements. The paper demonstrates in theory and practice that this is not unique to the Avanti project, but rather a common problem for user driven projects.

The challenge for the future is to design interactive research and development methods better reflecting the dynamic character of requirements and user ideals as guidance for information systems development. The presented Ideal oriented co-design approach is one step in this direction.

Introduction to the Avanti project

As stated in Annex 1 *“The primary aim of the AVANTI project is to encourage inclusion in the information society of those people who cannot or think they do not want to be involved by developing an intelligent assistant who can take over the interface to Internet services. Barriers to use such as language, disability and fear of technology will be addressed.”*¹

This initial goal statement, which was formulated early 2000, has to be commented from the light of developments until now when the project ends Dec 2003. The statement includes a number of assumptions or fundamental perspectives.

1. The information society is a good place to be in and the aim of Avanti is to help people into this good place.
2. The people who do not want to be in the information society should at least be given a fair chance to have a look and see if they really want to stay outside. And people who feel difficulties and barriers in coming in should be given tools reducing the difficulties felt.
3. The tool for reducing difficulties and also for encouraging outsiders to come in is an electronic assistant.

From our point of view it is clear that the Avanti research question is pointing to a design research approach. We are going to design something - “an electronic assistant” that will help people feel comfortable in the information society. We are also going to test if what we create really makes the people feel more comfortable. In summary, the research work should result in an electronic assistant helping people to feel comfortable in the information society. It is also assumed that this information society will be a better society for all.

The Avanti project proposal was written with the intention that the project was going to be user driven and not technology driven. During the process of writing the proposal it was also taken for granted that the expert reviewers of the proposals used a development framework

¹ Moussalli, A., & fl, m. (2001). *Avanti - IST-2000-28585*.: EU - IST 5 RP

with a number of work packages where the initial work package was to generate the user requirements in order to secure a user driven project development.

The project was designed following this principle and it was successfully accepted for funding. In this sense the project team did chose the right strategy. But this also had some consequences for the later development in the project.

The Requirements problem

The Avanti target group has, by definition, no or very little experience in using IT. In the Avanti project, however, the first task was to gather the users requirements. These requirements were to guide all developments in the project. This proved difficult. The users could not initially state any requirements, just general remarks on their opinion of technology. They also would make general comments on the council and the public sector as whole. These statements were not in the form of requirements as laid out by the Avanti Handbook.

As one part of the project in Kista/Stockholm we tried an Ideal oriented co-design approach. The developed scenarios did show that an e-mail electronic assistant was really top priority wanted by our target user group. An assistant that could help the target group of people to set up an e-mail account and also help them to produce e-mails to public service providers but also to the children and other parts of the family. Another wanted assistant would help the target group to exchange photos via Internet.

This line of development was closed because the project co-ordinator was afraid that the review experts of the EU-commission would say that e-mail is not a public electronic service – so it is outside the boundaries of the Avanti project.

In the end the requirements captured was heavily influenced by the council staffs opinion and by the projector coordinator, trying to second-guess what the EU-commissions review board would think, simply because the project needed statements of requirements to proceed.

It was not until the first prototype was shown to the users that we could start a meaningful dialogue with them on what they would actually want. But the, of course, it was too late in the Avanti project model to change the user requirements.

The requirements problem consists of two specific challenges:

- The user can't initially state requirements
- The users will change their requirements during the project

What is the background to this actual situation?

In our view the above situation can be described as an unhealthy over-reaction on a too technological driven development of IT-solutions. As a result of this reaction a user driven paradigm of technological research and development has been established. This has also influenced the EU-IST research projects in general. As a result many project proposals emphasise the user requirements as a baseline for the development in the project.

The ideal oriented co-design approach

The requirements problem in the Avanti project was not unique to that project. Many projects fail or at least run over budget because the approach adopted is not congruent with dynamics of requirements. This is hardly surprising from a theoretical point of view.

The theoretical motivation

The starting point of this theory was when the philosopher Immanuel Kant solved the philosophical dispute between the idealists focusing ideas as the essence of the world, and the realists focusing reality as the essence of the world. Kant's idea was that we need a priori ideas to interpret the real world. The basic idea is that we need to construct a question and to implement that question before we can expect an answer. This idea, today named perspective, was much more elaborated by another philosopher, Edgar Singer. He told us that we need to design measurement scales to be able to measure, or in other terms, we need to create good questions to get good answers. The next step was taken by West Churchman and Russ Ackoff, who told us about the direct connection between a measurement scale and an idea and a hope for the future. We, for instance, "measure" day care centres for children so that parents can choose between them.

But more important Churchman also told us that we have to design the measurement scale taking into account that different people have different hopes for the future and that they are changing over time. So when council staff measure/describe a day care centre s/he has to think about whom s/he is talking to; is it a family with several children, with disabled children, a family with strong environmental concerns, a family where the parents work long hours, etc etc The design of the measurement scale becomes a co-design system between different interests. This co-design is directly influencing the design of the day care centre database and the presentation of measurement results for people, in what we today call e-services.

This basic idea has been developed into a framework for the design of information systems by Olov Forsgren and others.² In simple terms the idea is that when we for example are developing real estate information systems we have to think about who will be asking the questions and what ideal futures are they thinking about. It is also important to develop the information system so it easy can be adapted to new questions.

The practical motivation

The requirements problem has always been present in information systems development, but recent developments in IS use have dramatically increased its impact. With the arrival of the Internet, the focus of IS has changed from an employee or group of employees using a computer system performing a distinct task that they are employed to perform, to a situation where service providers are trying to develop IT-produced services that will be used by many very different groups for different purposes. Many of the users are outside of the organisation in charged of the service and may even have conflicting interests with the service provider. The IT systems developed are seldom monolithic, more often they are dependant on and interacting with other systems, systems that may even be outside the control of the service provider. The beginning of this change can be traced back to the 80's with the arrival PCs and

² Forsgren, O. (1991). Co-constructive computer applications: Core ideas and some complementary strategies in the development of a humanistic computer science. In M. Bazewicz (Ed.), *Information systems architecture and technologies – ISAT'91* (pp. 45-53). Wroclaw: Politechnika Wroclawska

networks and has in many cases rendered “traditional systems development methods” less useful, if not useless.

In this situation the ideal oriented co-design approach has been evolving during 15 years of experience developing and researching the new type of IT systems. The ideal oriented co-design process, based on Forsgrens work, has been developed in a number of Swedish and European projects where Lars Albinsson has been the project architect.³

The ideal oriented co-design approach has been found to be rather successful in these cases. In some of these cases other methods also have been used and been less successful. This includes the development of: A Sales/ customer support system for the national Swedish Apoteksbolaget.⁴ A sale support system for the Swedish/international company Volvo and another buy support system for the Swedish/international company Ikea.⁵ An electronic bank for the Scandinavian SEB-bank.⁶

On methodologies

In any methodology there is the challenge of which level of detail its necessary to go into. Which prerequisites are reasonably? What training of project managers and other personas can be required? And are there even necessary for key persons to have certain personal characteristics? Many researchers have pointed out personal qualities of people who have led successful innovation projects. Building on the role of Maestro⁷ we address two areas of concern for those who wants to work with ideal oriented co-design, because they are fundamental to design methodologies.

The boundary problem

A particular challenge is completeness. In several parts of a design process you need to establish boundaries. How many ideas do you need? How many options should be explored? How many stakeholders do you need to identify? You can't investigate all possible alternatives, even if that would be possible, new ones would emerge faster than you can collect them.⁹

If the boundaries are to tight the design may be useless (suggesting a concrete floatation device), dangerous (DDT) or unethical (killing all left-handed to simplify scissors design). If the boundaries are set too wide you may never arrive at any design. Most systems thinkers have addressed the issue of boundaries, since it's at the heart of the systems approach¹⁰. With a traditional scientific thinking you would require an algorithm to find the right (true) boundaries. It's precisely the impossibility of such an algorithm that refutes the traditional scientific method where it's considered possible to “correctly” divide a system into distinct non-system parts. It has to be a moral issue of whether the designer(s) think the need for the

³ Albinsson, L., & Forsgren, O. (1996). MIT-boken, MIT-2000 slutrapport. Stockholm: Nutek

⁴ Forsgren, O. (Ed.). (1994). *Idealorienterad design - Om konsten att hålla idealen levande i systemutveckling*. Umeå: NUTEK, Närings- och Teknikutvecklingsverket (Swedish National Board for Technical Development)

⁵ Albinsson, L., & Forsgren, O. (1996). MIT-boken, MIT-2000 slutrapport. Stockholm: Nutek

⁶ Forsgren, O. (1997). *Co-constructive reflective practitioners*. Paper presented at the Systems for Sustainability, Fifth International Conference, London 7-11 July 1997.(Invited plenary)

⁷ Squires, Arthur M. (1986) *The Tender Ship: Government Management of Technological Change*. Boston: Birkhauser.

⁸ McKenney, James L. (1995). *Waves of Change*. Harvard Business School Press.

⁹ Herbert Simon got the Nobel price for his work on this problem

¹⁰ For instance: Churchman, C West. (1979). *The Systems Approach and its enemies*. Basic Books.

design justifies the risk of it. Abdicating this responsibility in favour of an algorithm would be highly immoral. Algorithms have no responsibility, people have.

“The Moode”

The “Moode” is a blend of “mood” and “mode”, referring to a certain thinking, disposition, personal quality and attitude of the systemic designer. It’s difficult to precisely define, as it’s often dependant on the person to have certain types of experiences, in the same way parenthood is difficult to explain to people with no kids. The development of learning experiences that carry the flavour of the Moode is specific task for us in the future.

The Moode and the boundary problem

The approaches to the boundary problem can describe as three levels. The first, the traditional designer, is where there is no influential awareness of the problem. The designer has a more or less fixed set of stakeholders, perspectives, methodologies etc that s/he is using in the exercise. The second level is where the insight in the boundary problem leads to paralysing. Since its impossible to be certain of the consequences, the designer don’t dare to design. The third level is where there is designer actively chooses the boundaries according to the situation, taking into account that *not* doing something may also be immoral. This third level thinking is part of “the Moode”.

The Moode and Design

In many cases a stakeholder may not actually participate in the design process. In these cases the ability of the designer(s) to represent them is crucial. The ability to step into someone else shoes is an important skill of a designer and the empathic imagination as part of “the Moode”. Any professional designer needs to able to design for someone other than him/herself. What we here refer to is the ability to change between several different perspectives.

The fundamental characteristic of the Moode

As we have described above it is possible to think in more detail about the Moode. In this we are also in the risk of loosening focus of the core idea or feeling. The core is that “we have to decide”. We have left the mechanistic world when it was obvious that a dead man was dead. In the new Moode we have to co-design and decide measurement scales to use when we are identifying – for example - a dead man. Furthermore we also have to decide on where to put the limits on these scales. The experiences of following such decisions are made every day in medicine when the decision is going to be made if a man is “brain-dead” or not.

It is our estimation that many more Information systems research project would succeed if the responsible people were in the Moode. It is so easy to slip back into a mechanistic way of thinking – depicting user requirements and so on. Despite the risk of going into too much detail again we will here develop some heuristic help for how to work with information systems in this new Moode.

Some basic elements in the ideal oriented co-design approach

We choose the metaphor of a road with different number of lanes and different width. The ideal oriented co-design approach is not a complete systems development methodology or project management methodology. It’s possible to combine the approach with many existing

methodologies. It does however represent critical qualities of systems development and project management. Any methodology that fails to meet these qualities is likely to lead to failure.

Lane 1: Stakeholders

There is little use in designing things without knowledge of those who are supposed to benefit from them. This lane is about getting to know and engage the most important stakeholders.

The stakeholders are the persons or groups that have to, for whatever reason, like the system for it to be successful. This will include actual users, but also decision-makers and otherwise influential people or people the designers think should be influential for any reason. The acid test is “what happens if this person or group don’t like it?”

Often there are conflicting, or seemingly conflicting, interests between the stakeholders. For instance, the management of the service provider wants to cut costs, the clients want increased service and staff wants to work less overtime. Some of these conflicts of interest will be over prestige, power and career, which people seldom admit to, but are of vital importance to understand to be successful¹¹. It is only by having as clear an image as possible of these interests that one can hope to arrive at a design acceptable by all.

So how do we describe the stakeholders? Well, artists have struggled for thousands of years trying to describe, understand and represent human beings. So there is no ready-made algorithm or data sheet.

When it comes to actual users there is big difference between user inside the service provider and those who are outside. Insiders can be trained to use the system, or it can be in their job description to use it etc. The most difficult to grasp are outside users. Outsider, like clients, citizens, etc often have a choice whether to engage, they can seldom be trained and they can set their own criteria. The service providers do not employ them, they are often not known as individuals and we have to create and communicate the incentives for them to engage in the socio-technical system we are co-designing. In marketing the outside users are referred to as target groups. The purpose of identifying target groups is to be able to second-guess, discuss and test their reaction to various concepts.

This is the heart of the co-design process. By introducing the various perspectives of the stakeholders in to the design process the likelihood of a valid, useful and acceptable design increased. In many cases a stakeholder may not actually participate in the design process. In these cases the ability of the designer(s) to represent them is crucial.

Rather than just using simple demographics its valuable to try to create groups that may have similar values, expectations and situations in respect to the originating question.

Put together a group of people representing different perspectives, different stakeholders and different vocations. In a workshop let them start individually to generate lists of stakeholders. Then bring the group together and let everybody score stakeholders for importance. Choose the most important, minding that no important perspective gets completely voted away.

¹¹ See for instance Herbemont, Olivier d' C  sar, Bruno Curtin, Tom Etcheber, Pascal. (1998) “Managing Sensitive Projects”, Routledge. for an approach to this.

Once the stakeholders are identified, they or representatives for them can be invited to participate in the rest of the design process. As the stakeholders may change their ideals during the process, it's necessary to maintain a close relationship during the project.

Of course it's necessary to continuously monitor whether the list of stakeholders are relevant.

In the Avanti project this stakeholder dynamics went into the extremes. Many members of the first user panel became so interested in IT that they entered a PC/Internet training program. Therefore they were no longer representatives of the Avanti target group when time came for the second test panel. (The whole purpose of the Avanti project is of course that someday there should be no Avanti target group or users.)

Lane 2: Ideal Scenarios

The challenge in any design process is the balance between reality today and what may be tomorrow. How can we talk about things that yet don't exist? Inventions that don't relate to people's experiences are very difficult for them to grasp. On the other hand there is always the risk of just repeating what's already been done.

A particular problem is the language to express ideas in. In IT development there are more or less standardised statements of requirement. These are very useful to the IT professional who are used to reading them. Non-IT professionals often have difficulties in understanding their implications. Many conflicts regarding the outcome of IT projects stem from this. The developers have met the specifications but the result is not what the customer wanted, even though the specifications were agreed on. Similar problems exist in architecture where architects are used to "read" blue prints, but the people who shall live or work in the building will have difficulties in getting a feel for the actual house.

This is the other cornerstone of co-design. If stakeholders can't understand the language of design chosen, they can't contribute. Means to maintain a constructive and meaningful dialogue on the design are of great importance. These will include both languages of design as well as group methodologies.

The approach we've found most useful is using mini-scenarios. There are many types of scenarios. In the ideal oriented co-design process a scenario is first person description of how things ideally should, could or would be, as a result of the originating question. The scenario should focus the use of the system and its consequences for the stakeholders. The scenarios are along the lines of the "use case" approach. However the scenarios should cover the whole system including all aspects of importance, not just the technical parts. These aspects may also transcend the service provider considered for the system. Especially concerning the public sector the users ideal will incorporate services that involve several government agencies, council departments and private corporations.

The overall strategy is to really describe the *ideal* scenarios, without too much concern for the current situation. We have found that the ideals concerning any area are a good way to incorporate "requirements" into a design process without limiting the outcome to particular initial suggestions or prejudice. It's a good way to maintain freedom of thought while with steering towards a goal.

Again the designer(s) may represent stakeholders if they are not participating in the process.

This is the most “creative” lane, and its here that the innovation has to take place.

It is also our experience that new, even rather radical ideas, as long as they are congruent with the stakeholders ideals often are appreciated.

Lane 3: Consequence

Ideas that are not possible to realise are of little value in a co-design process. But often there are many ways to achieve something and what may be impossible to someone maybe seen as within reach by someone else. “Impossible” challenges also may spur innovation, design and problem solving.

By separating the lanes that generate the ideal scenarios from the lane that tries to find ways to implement them, the possibility to find a way increases. If the person who comes up with an ideal scenario immediately have to answer how this could be realised, she/he is likely to fail. By separating the lanes we allow for the bringing in of various expertise to come up with creative solutions to the problems that arise from the ideal scenarios¹².

So the consequence lane has two tracks, one is dealing with trying to evaluate the scenarios, and decide on witch one to try to make real. In this decision there often is a relation between their usefulness and cost. A particular concern is also the maturity of the stakeholders in respect to the proposal, i.e. its “radical-ness”. Sometimes an idea requires a major effort to communicate to stakeholders, while other ideas are easier to appreciate. We have sometimes used the phrase “sufficiently first” to describe an ideal position, where a proposal is perfectly balanced between being easy to appreciate and yet novel and effective¹³. During the co-design process the consequence lane will build a more refined and detailed image of what the proposal is and how it can be realised. It’s often useful to illustrate the complete proposal with prototypes, animations, sketches or anything that helps the stakeholders understand the proposal and its consequences.

The other track is to make the proposal real. This may often the most resource demanding part of the project. We will, however, not go into this in any detail here. There are many approaches and methodologies for systems development. The demand for our perspective is that it dynamic and can “live” in co-existence with the other lanes. This may call for certain adoption of the methodology.

Towards finalisation of a step or the complete project is important to engage the stakeholders in a dialogue if the new situation is an improvement from their perspective.

The Design of the Design Process

Due to the dynamics of stakeholders the entire process needs to be flexible. This calls for a Meta Design activity, the design of the Design Process itself. This is the design approach alternative to rigorous methodology or projects management that describes projects in great detail. Of course it raises the question of which design approach one should use. We suggest,

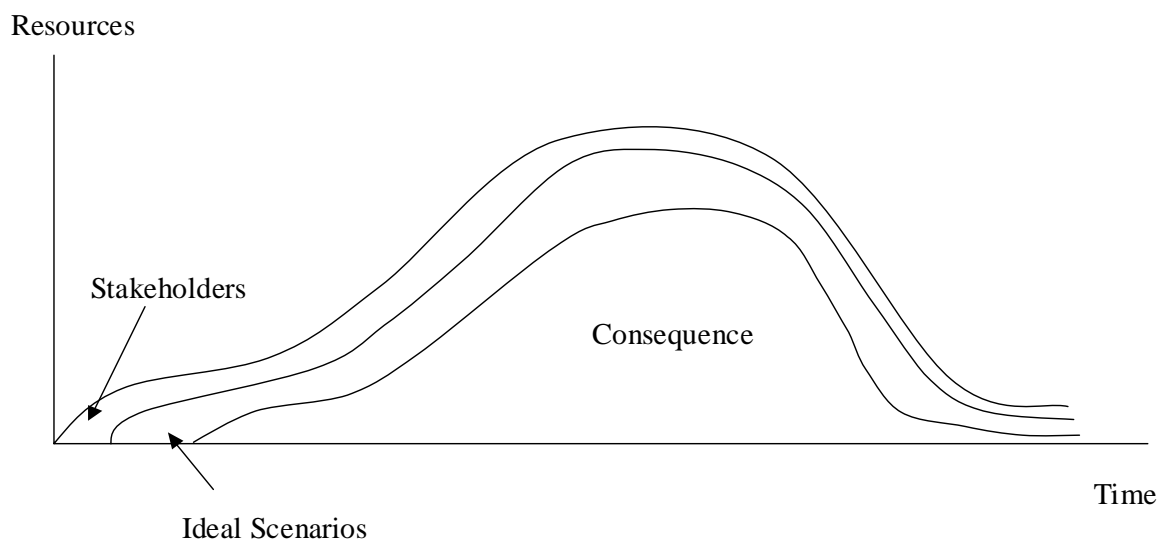
¹² This reason is the same as the fundament for “brain storming” group technique. Immediate criticism is to be avoided.

¹³ This resembles the concept of designer Raymond Loewy called MAYA, the Most Advanced, Yet Acceptable design.

recursively that the design of the design is carried out in the same way as the design. We also borrow Douglas C Engelbarts concept for dealing with endless conceptual recursion and state the design of the design of the design is dealt with in the design of the design. All levels “above” are incorporated in this.

A few fundamental observations guide the design of the design:

- All the lanes have to run in parallel, because as the stakeholders become more and more detailed in their responses, the more detailed the design proposal becomes.
- The technical, financial, organisational etc consequences of the scenarios will add new input during the whole co-design process.
- Stakeholders view on the project as whole may change from insight gotten during the project. This may affect scope, goals or even the very existence of the project.



A typical project may look like the figure above. In the early part resources are spent on stakeholders and ideal scenarios. Later resources increase in the consequence lane, first with prototypes and analysis, later with integration, testing and expansion of system as well as with organisational issues and marketing of the new system. The number of iterations required may vary, but in few of the cases we have been involved in or studied it has been possible to arrive at a reasonably acceptable, stable design with less than three iterations. Often the iterations have been a sketch or mock up, a prototype and a deployable system. A mock up is a visual example of the systems and its user interactions. A prototype has actual functionality in all or some critical aspects but may not be integrated with dependant processes and systems.

In early systems development there was a distinct time when specifications were “frozen” and implementation begun. In many modern development approaches the border between prototypes and deployable systems have been blurred, if not erased. The ideal oriented co-design is indifferent to whether the project should like to freeze specifications for certain period. We do note, however, that a prolonged static ness of the design is likely to make it obsolete due to the dynamics of the stakeholders. They choice of time for “freezing” if that’s necessary should take this into account and be made clear to the stakeholders. Often the innovation amongst stakeholders does decline and a rather stable design emerges. Deciding to

freeze the design is always one of the most important decisions in the design of the design process.

Activities concerning an information system do not end until it's completely discarded. The figure illustrates all lanes should be active during the entire life of the system. They may require little resources, but are necessary to monitor if change and/or improvements to the system may be necessary due to change in environment of it. At a later point the need for change will be identified, and the three lanes will increase correspondingly.

So rather than make a distinction between development and use, we suggest that a view of intense design followed by periods with more stability is adopted. This will of course require a continuous management of a system¹⁴.

Avanti project highlighted from an Ideal oriented Co-design Approach

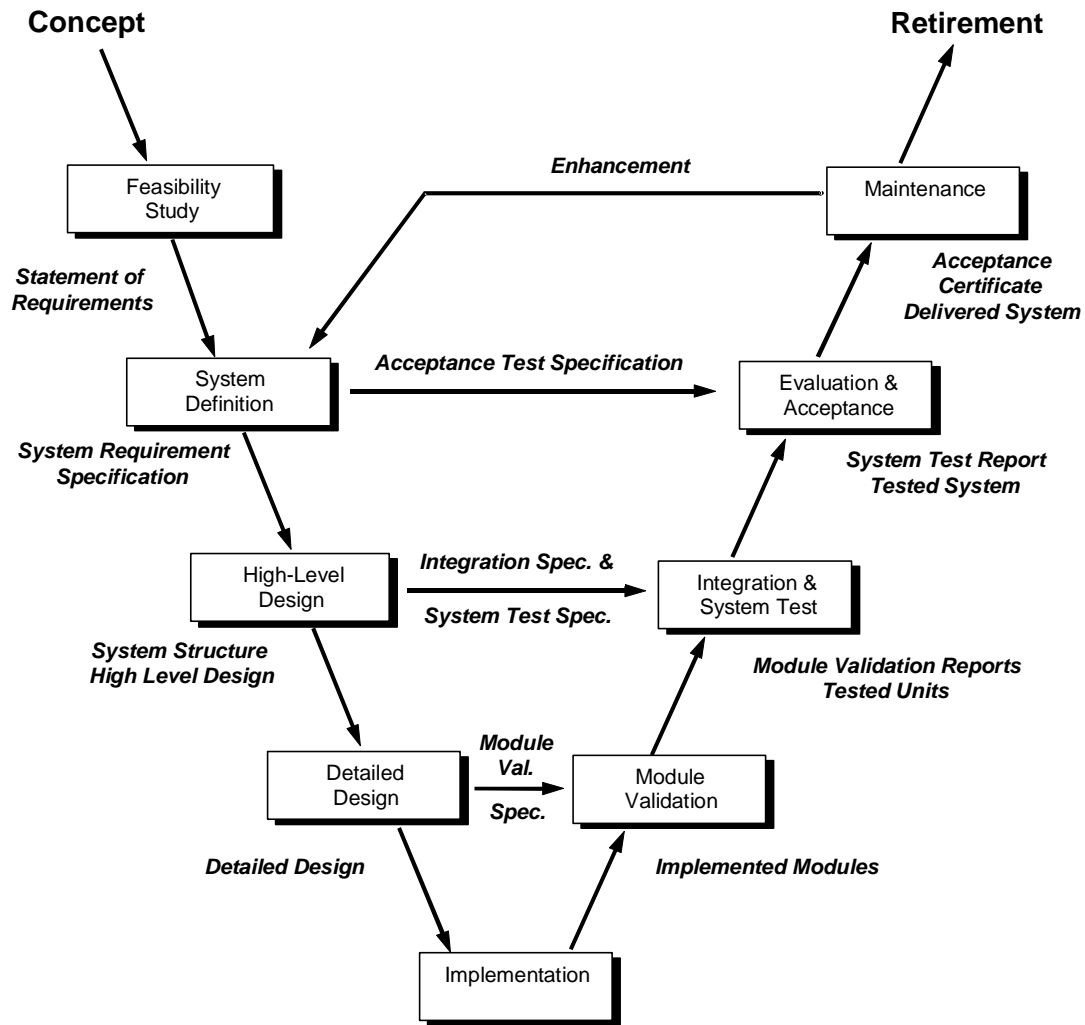
In this part we will compare the actual work in the Avanti project with the ideal oriented co-design approach as our frame of reference.

Capturing the ideals of the stakeholders

The Avanti Project model is described in the Avanti Handbook:

The approach to be adopted is based on the following 'V Diagram' as the model for the development lifecycle.

¹⁴ This management is not addressed in this text. See for instance "MIT-Boken" (reference at the end.)



The Avanti project follows the same model as most IST and other EU financed projects. It starts out by capturing user requirements (“Statement of Requirements”), builds iteratively a system that meets these requirements. The last part of the project is the users evaluation of the system.

The model allows for enhancements of the systems but it does not allow enhancements or change of the user requirements. The project model does reflect the view that 1) the users are capable of explicitly stating their requirements, 2) these will not change during the project. This project model was particularly unsuitable for the Avanti project due to its target group.

“The Exemplar” as an Ideal oriented development process

During a steering group meeting in Stockholm December 2002 after a main shift of project management in the co-ordinating office, criticism was made about the quality of the developed demonstrators related to the quality of the used toolkit. As a result of this criticism a new project activity was initiated. This project activity was named “The Exemplar”. The exemplar was part of the exploitation activity and should be based on the results of the Avanti project, showing potential for the future.

A small team from the technological partners together with representatives from the cities worked intensely with the task of developing the Exemplar. The design approach was led by a Microsoft development team, the team also made it clear that this was a design approach and

that they wanted feed back on this process in order to do a better job next time. In this respect they continuously worked with the first line of the Ideal oriented design freeway. There were no users involved instead a lot of energy was put on defining the originating question and the most important stakeholders. After that an intense work was made to paint or dream up the most relevant ideal scenarios showing the most important stakeholders in episodes where their lives were made easier with use of an electronic assistant.

The consequences of the scenario was discussed and then the technical team used the developed toolkit in order to develop a system possible to use in the decided scenario into an exemplar.

So far the exemplar has been showed in a great number of occasions with different stakeholders and the comments are in general positive.¹⁵

As we can see the development of the exemplar follows rather close to an ideal co-design approach. The main difference is the more active involvement of the stakeholders in the co-design approach.

Development of the city demonstrators

Having been able to follow the project development in the different cities during the whole project our conclusion is that the cities have followed a rather Ideal oriented development approach with parallel lines in stead of sequential steps. This is also stated as the basic principle in the report D01 and the amendment to D01.¹⁶ The problem is that this philosophy is not reflected well enough in the work package design. Here the philosophy is more sequential, catch the requirements from the users and than build a system and then evaluate if the requirements are satisfied. This has confused the developers in the local demonstration sites as well as the external reviewers. In practical terms the result is that the Avanti project allowed for less cycles of the showing the stakeholders what had been developed and redesigning those systems on basis of the response (developed requirements) than what could have been the case.

A comment on management style and co-design

Related to the above question is the question of management style. It is a different thing to manage a co-design research project than a production project. In the beginning the Avanti was run as a production project where the main focus was on the deliverables to EC and not so much reflection on how the progress of thinking in the project could influence the project itself. The management was not in “the Moode”. During the second part of the project the management style shifted and in the end it was possible to establish a real co-design and open atmosphere in the project. This is also reflected in the final reports where it is possible to see how the demonstrators in each city has lead to impact both on a city level as well as a national level.

¹⁵ <http://194.203.41.27/avanti/about+the+project/The+Exemplar.htm>

¹⁶ Forsgren, O. (2001). *Requirements and Design Specifications: Avanti – External report D01 5th Framework – European Research Project*

Main results and conclusions for the future

The main results clearly showed that electronic assistants could serve as a better interface to electronic services helping inexperienced users.¹⁷ It was also the case that even experienced users did appreciate the guidance of an electronic assistant for more complicated services. The co-operation around the exemplar and the further development of the toolkit adopting internal criticism as well as integration of latest Fujitsu and Microsoft technology is also a promising result for a much wider impact of the results in the Avanti project.

May be though the most important result of the project was that it has been found that the design of an electronic assistant force the designers to be more user oriented. That means that the designers have put themselves in the detailed situation of the user and all the thinking and feelings that can emerge in the mind of the user. In this sense design of electronic assistants can be one more driving force for a truly user oriented design freeway for IT-systems.

The results of the project also remind us that time is a dynamic concept. People change their mindsets. An inexperienced user is not an inexperienced user after a period of using IT. The inexperienced people in the Avanti target user groups did not belong to the target user groups after some tests. Actually many of them become so interested in IT so they started to take lessons in IT.

People also change because they start to know about new options. This is close related to the philosophical question of pre-knowledge. You need some knowledge to be able to formulate a question in order to get more knowledge. When you got these answers you are prepared to put even better questions. This rather fundamental idea was early formulated by the philosophers Kant and Singer¹⁸ but has nowadays been accepted by most researchers.

Using the learning from this project reflecting back on the Avanti project and many other IST-research projects we know of gives us a depressing result. First of all, the detailed descriptions in the work-package program of the application and the difficulties to change work directions in a funded project indicates that it is assumed that nothing is going to be learned during the research work. No new questions are expected to occur.

Perhaps even more fundamentally, the idea of asking users about their ideas and requirements about something they can not, or have difficulties to imagine, in order to get a user driven technological development, is just stupid from the perspective of pre-knowledge. The results of the Avanti project proves that the users develop better and more detailed questions the more experiences they get of for example an electronic assistant.

Finally may be the most depressing learning – in the same direction of thinking - from this and other EU-funded research projects we have been involved with is the absolutely stupid desire for control showed from the funding authority. When you in detail are requested to specify all the project activities and needs two year before the project actually is running. That together with the difficulties to change the project under its way and the really detailed production oriented report and control system used by the funding organisation often results in a situation best described in the word “tragicomic”. The practical result is that estimated

¹⁷ Whyte, A., & Macintosh, A. (Eds.). (2003). *Demonstration Analysis and Assessment report* (Vol. Part 2 User Experiences and Added Value). London: Avanti Consortium

Whyte, A., & Macintosh, A. (Eds.). (2003). *Demonstration Analysis and Assessment report* (Vol. Part 1 Context and Conclusions). London: Avanti Consortium

¹⁸ Singer, E. A., Jr. (1959). *Experience and reflection*. Philadelphia: University of Pennsylvania Press

more than half of the research funding is used for administration and “advanced bookkeeping”. On the surface the sometimes completely outdated project plan is followed very precisely. Very specified estimated costs are there just so exact on the Euro two or three years later. Hopefully some levels away actual costs reflecting the dynamic character of a successful research project.

Here we think that a new approach is desperately needed. One way to start is to use the method developed by successful national research funds in Sweden. As a research team you apply with a research question and how you plan to approach it and how you are planning to use the results. If you are funded you can do whatever you want – but you are expected to work with the formulated research question. If, – which is the normal case, your research question changes during work – you present the result of this new question. If you can not present any result at all then you will have difficulties to get a new grant.

Even if this may be the most cost effective way to run research projects from the funding organisations perspective because it saves bureaucracy costs and it focuses results it may be too far away from the detailed standard procedures used in EU-research management. One step in the right direction would be to focus results and include compulsory reports of change in methods and budget. Situations change in all projects, sometimes it is a new situation even before the project starts compared to when the application was written. People in the projects try to handle these changes the best they can not disturbing the original contract too much. The result is high administrative costs losing focus on results of research and development. Important of course is also the power of research administration itself. The only way to balance this power is to measure and to present the cost of research administration. An easy estimation from the public budgets shows that today administration cost more than half of the total project costs – and that is a waste of money.

Another weakness or waste of money in the Avanti project and most EU/IST-research projects is that it often stops with demonstrators. The research results would be of much more value if a successful project also could be followed by normal running pilot implementations for at least two years. Around such implementations really useful user oriented studies could guide new projects with new research questions in a dynamic world.

Back to our main message still there is a lot to do in the development from a machine age thinking production oriented research approach on to a systemic co-design oriented research approach. We have in this report presented an example and some arguments for how this can be taken a few steps further.

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