

Developing a personal **finance management system** with the approach of **Contextual Design**

Franziska Franz
Jan Pohlmann
Jinyun Zhong
Susanna Westerblad

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INTRODUCTION

This paper accrues within the scope of the course User Centered Systems Design at University of Uppsala. We are supposed to plan and explain a schedule for the development process of a "new" personal finance management system in addition to common online banking systems for the customers of the banks. Thereby the whole project plan with all activities it contains is based on the approach of Contextual Design by Hugh Beyer and Karen Holtzblatt.

BACKGROUND

CONTEXTUAL DESIGN

Contextual design is a customer centered process which is used to develop new systems. The term "customer" is used since it involves all the people who depend on the system, and not only the end users. The process emphasizes the importance of putting the customers' needs in focus and to get a deeper understanding of these which can't be captured by surveys or market research.

The design team needs to get a clear picture of the work of the customers and to see the customers' situation from different perspectives. When coming up with a new system it is important to provide a complete support for the customers' coherent work. The process consists of some techniques of how to gather information to achieve this and how to use this information to develop a new customer-supporting system. This is done in 7 steps:

1. *Contextual inquiry*: reveals who the customers are, their needs, and how they work.
2. *Work modeling*: captures the work of individual customers in diagrams to provide different perspectives on how they work.
3. *Consolidation*: Brings together customer data captured in the individual interviews. This helps the design team to see common pattern across the customer population.
4. *Work redesign*: Uses the consolidated data to come up with suggestions about how to improve work.
5. *The User Environment Design*: Shows the structure of the new system containing information about how the users get to and from the different parts, and what functions are available in each part.
6. *Prototyping*: With paper prototype functionality, practicability and usability of our new system are tested.

Contextual design is divided into three principles which are used throughout the whole process. The principles are using customer data, running the team, and driving design thinking.

The principle of data: All the data is gathered for a purpose: to drive the design process. All design should be based on trustworthy data about how customers work and the data should be based on real events. The data should be represented in such a way that it reveals how all parts of the work hangs together.

The principle of the team: Since design is done by people it is important to manage people and conversations. Use representations in the conversations to keep the team focused. Since the people in the design process settle the design it is important to have a cross functional team that can see things from different perspectives.

The principle of design thinking: The key to good design thinking is to do some design, then step back and look at what have been done and consider the whole design. When the structure is good, the next level of detail is worked out sequentially. This process keeps the design coherent as it moves forward.

PROJECT DESCRIPTION

ABOUT THE PROJECT

The goal of the project is to design a new personal finance management-online-home-banking system for SEB, in order to aid the current online banking system which lacks of personal financial assistant. Nowadays, the online banking systems only provide simple services for users to get access to their account status and manage bills remotely. When the users want to do their financial planning, they have to go somewhere else and use some other services to keep track of their expenses and income. While financial management is separated from its first-hand information and direct control over the funds, many problems such as security and efficiency could arise. Combining the online banking system and the management tool free the users from efforts of looking for other management tools and risk of using independent services. This is where the new extended on-line banking system, the financial manager, would come in handy.

This project is funded by SEB and planned to begin in May 2010, as a joined operation with the team from the department of Human Computer Interaction, Uppsala University.

SCOPE

This new system should provide services in following aspects:

- Online banking, as the current system, providing users with the possibility to view and manage their accounts online.
- Personal finance. The new system should provide services for the user of personal finance management, like [Quicken](#) or [Mint](#). It should achieve functions and goals such as:
 - Budget planning
 - Expenses/income diary
 - Categorizing the expenses
 - Handle assets and liabilities
- Financial advice, so that users of the system also can receive advice from experts of SEB.

The target group to research is the individual users who would like to use SEB on-line banking system and its extended financial management system, since business users normally use professional teams and tools while dealing with the management.

PROJECT ACTIVITIES

The project is structured into eight activities, which are performed in a sequential fashion. *Figure 1* gives an overview of this process. In the following sections, all activities are described in detail.

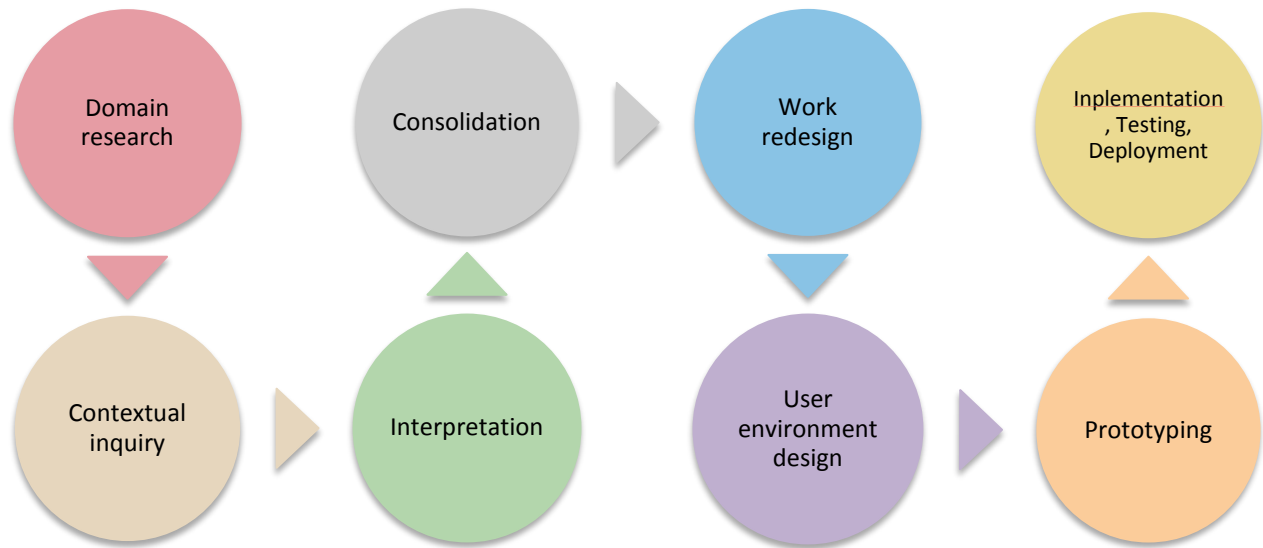


Figure 1: Overview of the project activities

ACTIVITY 1: DOMAIN RESEARCH

PURPOSE

The authors of Contextual Design only mention work of domain research marginally. We separate this activity from the contextual inquiry because we think it is an important part of developing a new system. The domain research is supposed to offer a better understanding of the project domain (the finance branch, existing software, etc.) to all the team members. The outcome knowledge of this first step should equip our team with the necessary insight to ask the right questions in the interview sessions and to understand the current working situation and possibilities of finance interested bank customers (our users).

INPUT

Project brief, provided by SEB.

PROCESS

The domain research activities consist of a whole market research, meaning investigation of already existing software as well as interviewing bank staff and financial consultancies to get a better insight into the banking systems, the financial world and its possibilities.

Members of the bank staff are the ones who are consulted by users of current systems who encounter problems. Therefore they are a big source of most seen operational obstacles.

Financial consultancies are the professionals in the financial world and could enlighten us about the possibilities we could offer our future users.

This information needs to be available at the visioning process at the latest, but it is actually better to be aware of it before the interview session to ask exactly pointed questions and hence getting really useful information out of the contextual inquiry.

With this information it is also possible to decide the classification of our usergroups.

OUTPUT

Written background- and market research data and a brief insight into finance branch are the main outcomes of this very first step.

ROLE REQUIRED

The marketing researches of already existing software (competitive market analysis) will be done by our Marketing Manager and the Developer.

The Interviews with bank staff and the financial consultancies will be done by our Usability engineer as well as by the Interaction Designer.

TIME REQUIRED

The four team members have two days for gathering the information and another day for presenting all information to the whole team and brief everybody about the current situation in our new product domain.

ACTIVITY 2: CONTEXTUAL INQUIRY

PURPOSE

Before any design work can be done, we need to gather user data to base on and fall back to. While marketing and having users on sit doesn't provide data on how the users work in their work environment, we are going to use contextual inquiry to gather user data.

The purpose of our contextual inquiry activity is to put technical experts in the user data by talking to users, asking how they work, and observing them in their work place. While common ways of working with users remove them from their context, contextual inquiry reveals hidden work structure so that we can discover implicit aspects of work that would normally be invisible. Through this activity, we should gather data about what the crucial functions are, what the users expect from the new system, where they are most likely to use the system, how well the system will fit into the users' personal financial management system and to improve their work, etc. During the later activities, requirements of the system shall be derived from these user data together with data from external resources.

Input

- Data gathered during activity 1: written background and market research data, a brief insight into finance branch.
- Project brief, provided by SEB

PROCESS

First of all, we'll define the problems of the extended banking system we intend to solve, in terms of the work of users we want to support. Then we shall make decisions on how to conduct the interview sessions with users, how we should get to them, how close we should get and etc. Then we shall make decisions on whom to interview.

The core of the contextual inquiry is to go where the users work, observe the users as he or she works, and talk to the user about the work. These are the tasks and methods we are going to use during contextual inquiry.

- Conducting face-to-face interview with 10 potential individual users. During the interview session, user researchers or interaction designers should be the main actor conducting the interview. There shall be

two teams doing the interviews and each of them shall handle one user per day. This would help us share some information of what the users' work and their intents for the system are.

- Observe the users while they use the current online home banking system, while focusing on problems they encounter and requirements that are not met in the current system.
- Observe the users while they use other financial management services while focusing on identifying crucial functions of a financial management tool, what the common practice with such a tool are and what aspects are not currently supported. The aim is to understand the market from the users perspective.

During the activity, we should follow four principles as below:

- Context. This principle tells us to actually go to the workplace of users' and see the work as it unfolds.
- Partnership. It means that the design team and the user should collaborate in understanding the work of users.
- Interpretation. Interpretation is the assignment of meaning to the observation.
- Focus. Focus defines the point of view an interviewer takes while studying work. (1)

OUTPUT

For each user, there will be notes and recordings from the interview, as well as written observation documents.

TEAM REQUIRED

Two teams consisting of 2 people each, who conduct the interview and the observation. User researchers and interaction designers are prior as team members. The team should be built through shared experiences.

TIME REQUIRED

We're going to interview 2 users a day with two teams and need 4 hours each to interpret those interviews in the interpretation session. That's why we assume 2.5 days just for activity 2.

ACTIVITY 3: INTERPRETATION SESSION

PURPOSE

Since the interview and observation are done with limited number of group members, it's important to have an interpretation session to let every team member experience all the interviews, in order to deliver a product that all team members agree on. In this way, the project team can build a shared understanding of the work of users and capture the user insights from more angles. Team members would bring in different opinions from their unique perspectives, which reveal different issues based on the same user data.

INPUT

User data gathered in Activity 1, that is, for each user, notes and recordings from the interview, as well as written observation documents.

PROCESS

After each interview and observation session, we will bring the team together to have a interpretation session. During the session, an interviewer walks through a single interview while the rest of the team listens, asks questions, draws work models, and records issues, interpretations and design ideas based on this interview. At the end of the interview as the wrap-up phase, every team member examine what has been discovered. Then they will list the top insights and post them on the wall on a flip chart.

WORK MODELS

After the interpretation the team draws work models of each user they have interviewed to illustrate the users' work from different perspectives. The different kinds of work models help the team to get a better understanding of the users' work process when they use the current banking system:

- A sequence model is the most basic information about how work is done. When people perform a task they always have a strategy and intent. The goal is to change the steps to make the work more efficient. The team starts to identify the intent that the user want to achieve and the trigger that initiate it. Then they list all the steps in the right order. Steps that might cause problems are highlighted.
- Artifacts are things people create or modify to do their job like to-do-lists, spreadsheets, and documents. An artifact model is a picture of a tool that is used in the work. The design team writes down important functions and how the artifact is used on the picture. First the team highlights the different parts of the artifact. Then they write intents directly on the part of the artifact that support the intent. Lightning bolts indicate where parts of the artifact somehow interfere with the work.
- The physical environment in which the users use the banking system either support the work or is getting in the way. Studying the environment can give a clue on how people think and structure their usage of the system since they restructure their workplace to support that. The physical model shows how the environment affects the work and consists of a caricature of the work place. Things the team looks for when making the model are organization of space, division of space, grouping of people, movements, etc.
- Every kind of work takes place in a culture with constraints, policies, values, etc. To be successful a system needs to account for the constraints users are under. The culture is often revealed in the way people talk about their job. The design team must understand the influences in the users work. The team illustrates the influencers (individuals, or groups in the organization) by bubbles. The amount the bubbles overlap shows the extent of the effect on the work. The team uses arrows to represent the directions of influences and lightning bolts to represent problems.

OUTPUT

Graphical work models created for each interviewee.

TEAM REQUIRED

Every member of the team.

TIME REQUIRED

We are going to need 5 days since we assume the interpretation session is going to take 4 hours per interviewed person. Since all the team members need to be part of this session they can't work in parallel.

ACTIVITY 4: CONSOLIDATION SESSION

PURPOSE

In the previous activity work models were made for each user being interviewed. In this step every type of the models are consolidated across all users. The consolidation session is a way to bring together all the individual user data. By looking for common patterns, the consolidated models give the design team a clear picture and a coherent understanding of the users' work. By seeing the underlying structure of the work, it is easier to see what actually causes the problems.

INPUT

The inputs for this activity are the individual work models made in the previous step and notes from the interpretation session.

PROCESS

AFFINITY DIAGRAM

The first consolidating step is to create an affinity diagram. It consists of all the notes captured during the interpretation session and is organized in a hierarchical structure revealing common issues.

The basic process is to put up one note and then select notes that go with it (for example notes with similar issues). The affinity diagram tells the user story and by reading the diagram the design team can get an understanding of the scope of the user problems. In this way the team can get an overview of users' opinions.

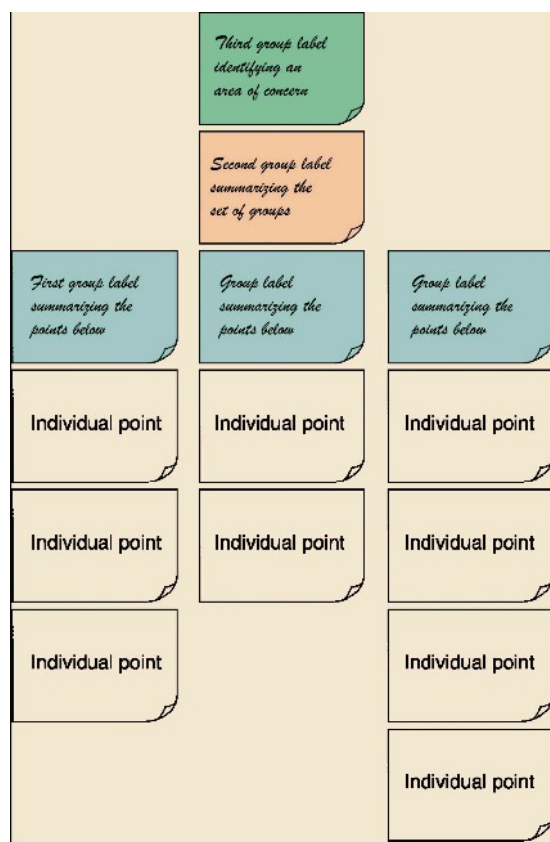


Figure 2: Example of an affinity diagram (2)

CONSOLIDATING SEQUENCE MODEL

The consolidated sequence model reveals the structure of a task and shows the strategies common across all the users of the banking system. The model brings together different cases where many users accomplish the same task using the banking system and reveals the order and strategy for doing it, and the different motivations that drives specific actions. It shows where a task might be needlessly complex and could be simplified by a new system.

Scan the sequences (i.e. the steps of a task) to identify activities. Find the first activity (the trigger) and match the triggers across sequences for all users. Define them and name an *abstract step* to represent all the triggers. Do the same for all the steps accomplishing the same thing until the whole sequence is consolidated.

CONSOLIDATING ARTIFACT MODEL

Consolidating artifact models describe common organizing concepts. It complements sequence models since it describes the things manipulated while doing the task described in the sequence.

The first step is to group artifacts of a similar type (i.e. that have the same usage in the work). Find the common parts of each artifact and identify structure, intent, and usage for these parts. Look for different ways people use these parts. Draw the consolidated model that shows all the common parts.

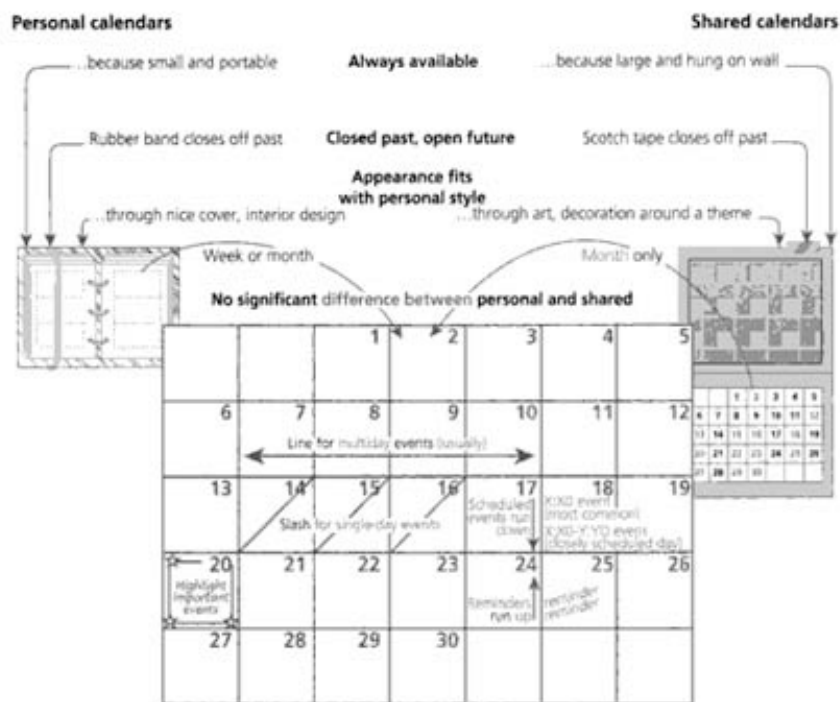


Figure 3: Example of an artifact model

CONSOLIDATING PHYSICAL MODEL

The consolidating physical model shows the common structure of the physical environment and how its hardware and software are used across the users of the banking system. It also identifies the constraints that the environment imposes on work.

The consolidation starts by grouping the physical models into types of places (e.g. whole buildings, meeting rooms, etc). where the users normally use the banking system. Then the team identifies the usage of the places and movement patterns. They look at the position of objects and people, e.g. if users can reach an object without getting up or not. At last they build a consolidated model containing the usage and breakdowns from the individual models.

CONSOLIDATING CULTURAL MODEL

The consolidating cultural model reveals common aspects of culture across all users. The model might be crucial when deciding what direction a design should take. It shows what matters to users when they are using the system; what they care about, how they think about the task they perform, and under what constraints they work.

The first step is to walk through each individual model and group influencers who constrain the work in the same way (have the same cultural influence). The team lays all the influencers out on the consolidated model and shows the relationship. Then they consolidate the influences by collecting all the influences between each pair of influencers and remove duplicates. At last they draw the final model, showing all unique influencers and influences.

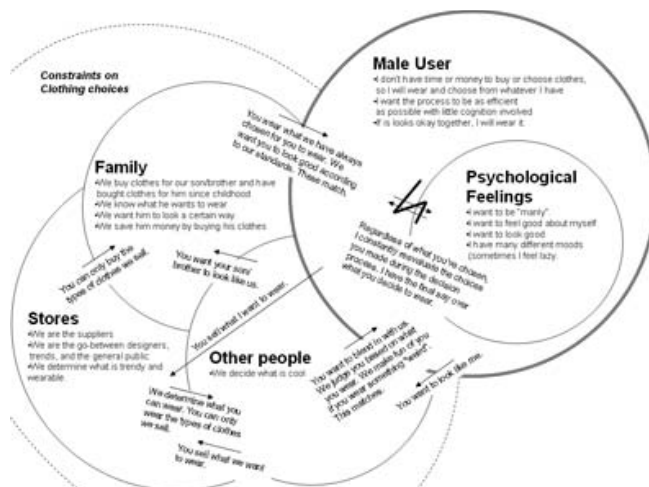


Figure 4: Example of a cultural model

OUTPUT

The output is the affinity diagram and the consolidated work models

TEAM REQUIRED

All team members.

TIME REQUIRED

One day per model/diagram - 5 days in total.

ACTIVITY 5: WORK REDESIGN

PURPOSE

During this activity, the creative leap from the gathered user data to a new work practice, supported by technology, is made. Based on the understanding of the users' current work, new and better ways of working are developed and documented.

INPUT

Affinity diagram, consolidated work models, background- and market research data

PROCESS DETAILS

The redesign of the work is separated into five steps, which have to be followed in this order:

- Walking the data: see different aspects of the work and synthesize them
- Visioning: invent multiple possible responses
- Evaluation and integration: develop a single corporate response
- Concurrent action: move all parts of the organization towards this response
- Storyboarding: specify details about how the tasks are supported by the new system

WALKING THE DATA

The requirement for the redesign of the work practice is knowledge about and a deep understanding of the users' current work. Therefore, all participating team members have to refresh their memories by looking at the different types of data again. This includes the user data, i.e. the affinity diagram and the consolidated work models, and the marketing data, i.e. the results of activity 1. The team members should inquire into the models by looking at certain aspects of each one to find possible issues:

- The cultural model is focused on values and policies. The team members should try to find ways to support the positive values of the users, while making it difficult to achieve negative values. Often these goals are conflicting, e.g. when it comes to speed of use and security. Policies such as laws play an important role in the banking sector and have to be kept in mind.
- For the physical model, the team has to understand what can be changed and what cannot. The intent of the user's physical structures should be represented in the new work structure. The movement and storage of artifacts such as bills has to be considered and supported. Paperwork can rarely be completely eliminated, but it should be kept to a minimum by covering all possible intents in the system and the two should be kept in sync.
- The sequence model should be guided by the idea of eliminating work for the user. This can be done by eliminating the intent behind a task or supporting it in a different way, therefore removing the need for the whole task, or by removing or automating steps in a task. It is however imperative to keep secondary intents in mind and not render those unachievable.
- When looking at the artifact model, the team again has to keep all the user's intents in mind. Often they can be supported more directly. The structure of the system should be guided by the structure of the artifact, but it should not be a simple copy. The data displayed should be tailored to the specific needs of the user.
- Additionally, metaphors can help to gain a better understanding of the work practice. If a similar work practice that the team has sufficient experience in can be found, they can think about the roles and tools

in this domain. By comparing them and finding similarities and differences, ideas can be transformed and ported over to help the redesign.

This is done in small groups of 2-3 people, after which the points of discussion are shared between groups. The whole team decides together which aspects of the work they want to respond to and which should be left out. For each model, a short list of the most important issues is made. This sets the scope for the next step, the visioning.

VISIONING

The visioning process is described as "grounded brainstorming" (3), because ideas are not evaluated until later, but based on the understanding and data of the users' work. First, the team brainstorms two different lists as a preparation for the real visioning. One list consists of all technologies that can be used in the system of the redesigned work. The other contains slogan-like ideas about the new work practice, such as "the system should alert the user when he is exceeding a budget".

Afterwards, the visioning proceeds. The team collaboratively develops multiple visions of the new work practice. A vision is an informal drawing showing people in roles, systems, communication between the different parts and the structure. It imagines how the new work practice would be if the redesign was in place.

Two special roles exist for the visioning:

- One person is the "pen", drawing ideas on a flip chart immediately, the pen is supposed to encourage people to talk and weave the team's ideas into the developing vision
- Another person is the facilitator who suggests additional aspects from the work models and helps the participants to pursue a thread by tying together the ideas into a story of work practice

The development of a vision follows a specific process:

- One of the slogan-like ideas is chosen as a starting point for the vision.
- All team members can throw in their ideas on how to expand the story around this idea.
- Ideas fitting into the current thread are drawn into the vision by the pen.
- When an idea is too far off the thread of the current vision, it is added to the list of starting points, to make sure it is not forgotten.
- When a vision is played out with no more ideas, the vision is complete. This should take about 30 minutes.

The goal is to develop about 3-4 visions. So far, no evaluation of the ideas has taken place. This is part of the next step.

EVALUATION AND INTEGRATION

It is important to not see the generated vision as part of the whole, they are different collections of options. Those options are not all necessarily good and certainly conflicting in many instances. Therefore it is now necessary to look into the aspects of each vision, analyse it and combine them back into a single coherent and clean design. It is important to stress that this is not about making compromises. Instead of making compromises about single pieces, the team picks and chooses from all available options. This is done in the following manner:

- For each vision, all positive aspects are collected first, written on post-it notes and attached to the vision. Afterwards the same is done for all negative aspects. Usually ideas to overcome these negative aspects will already come up now. They should be attached to the vision as well, but should not distract the team too much at this time.

- Next, the team looks at all the positive aspects of all visions and decides which ones are the most important and should not be lost.
- Often some of the chosen aspects are conflicting. In this case, the easier one is preferable. If no decision can be made, focused user data should be collected to solve this question.
- A new, final vision is drawn which combines all these positive aspects into a coherent view.

STORYBOARDING

Although the vision describes the new working practice as a whole, it is only a "big picture" view of the system and not detailed enough as a specification. These details are filled in by creating storyboards for the tasks supported by the system. Storyboards are similar to what is used in movie production to visually describe the scenes. They look like a comic strip, with every image showing an action of the user, either interacting with the system, a different user or performing a manual step. No details of the system are fleshed out, i.e. terminology, icons or even the layout. This provides the required overview of the functions and interaction for the next activity.

Because there is one storyboard per task, the vision is first divided into individual tasks. One such task could be for the user to assign a bank transaction to a certain category of expenses. In pairs, the tasks are then transformed into storyboards, using the consolidated vision and the user data as references. The storyboards are presented to the entire team, which discusses it together. If any problems and inconsistencies are found, these are then corrected by the responsible pair of team members.

OUTPUT

Multiple visions with annotations, the consolidated vision, storyboards

TEAM REQUIRED

For this activity the whole team is required. The different viewpoints of different team members are important for understanding the work on all levels and redesigning it with consideration for all aspects.

TIME REQUIRED

We plan one full day for walking the data and another day for the visioning process and the consolidation of those visions. Afterwards, 10 days are available to create and revise the storyboards, with 3 buffer days in case there are more tasks to design than expected. Therefore, the work redesign activity as a whole is planned for 15 days.

ACTIVITY 6: USER ENVIRONMENT DESIGN

The User Environment Design is a user-work-oriented scheme that structures all the objects and functions of our new system and how they depend on each other.

PURPOSE

The UED ensures the coherence of the system, it keeps the user's work orderly and natural so that we are not complicating it. By considering all our storyboards while structuring the UED (User Environment Design) we make sure that the final system fits to several users and needs while the partition of functions into focus areas keep the system coherence.

INPUT

The storyboards we build up in the last step are the sequential description of our user's work and show one single thread each. They contain the implications for the system levels, functions and their linking.

PROCESS DETAILS

To structure all these information the focus areas are the essential part of the UED. A focus area contains all the functions and describes all the object a user concerns in one work step respectively in a certain thought. Means "[...] whenever the user is doing a new kind of work, worrying about a different set of concerns or engaged in a different style of thought it implies a new focus area." (4)

So in the focus area we list functions, links and constraints of the certain system levels or "places" where the user performs certain tasks. In that way the UED shows in a structural way how all the sequential threads of the storyboards fit together

OUTCOME

The authors call the outcome of this process step a "Floor Plan" (like what an architect prepares for a house before building it). With the UED we will have a comprehensive set of functional requirements and their linkages on which we can base the prototypes of the final User Interface Design.

TIME REQUIRED

To build up the User Environment Design the team has to walk through all our 10 storyboards to filter the functions for the focus areas and find their connections. We assume half a day for one storyboard-walk-through and two days for finalizing the whole UED. Further we insert three "Buffer"-days just in case there'll occur any problems with the storyboards or other uncertainties which need to be discussed more intensive.

TEAM REQUIRED

All team members have to join in the procedure of building the User Environment Design because all the different skills of usability consultancies, interaction designers, developers etc. are needed to build a sustainable and useful system structure.

ACTIVITY 7: PROTOTYPING

Prototypes in the process of Contextual Design are paper sketches respectively an easy to change note sheet creation representing the User Interface based on the UED. Prototyping the new User Interface is the first step of styling the front end whereas the main focus is still on the functionality. The simple paper mock-up guarantees the attention on the functionality rather than on design issues.

PURPOSE

With prototypes we put the previous design work to the proof of the user's work. Thereby the prototypes act as a "language" for the communication between designers and users. They help the users to articulate their hidden unarticulated knowledge which comes up by interacting with the new system and doing their real work in it.

The goal of prototype based interview sessions is a continuous iteration and user centered extension of the system design.

INPUT

To sketch the prototypes we need that mutual understanding of the users work and our vision from the prior steps. The interview-phase ran with prototypes begins with one very first draft of the UI (User Interface) based on the UED, called the initial design.

PROCESS DETAILS

With the initial paper mock-up of our system we act out specific events in the users work. Thereby the interaction designers pretend to be the CPU and act like the system would do but listens to the user, what he would had expected, like to change or do different. The users get as well their own pen and paper equipment to visualize their ideas.

During the interview changes and new data can already be added in the paper mock-up.

All changes and user remarks are recorded and interpreted within the design team later. Here emotional aspects play a very important part to proof if the user likes the new product at all. Means we will ask the user for his/her feelings about the system as well. Changes to the UED as to the UI are then made to respond to the users issues. Thereafter the "new" prototype is tested again and again until the design stabilizes."The number of structural issues [UED] fall of and the User Interface issues start to predominate. This is your signal that the structure is pretty much right." (5)

Hereafter the UI is simultaneously tested while expanding the prototype to test the structure of another part of our system.

Hugh Beyer and Karen Holtzblatt recommend to perform the interview sessions with two or three users per iteration and to arrange a mix of old (who were already included in the inquiry activities) and completely new users. We agree with that and will do it like that.

In this phase of the process our users become co-designers. They have the very last word about the UI design. We are not going to represent the professionals but listen to the users' wishes.

OUTCOME

At the end of this iterative prototyping interview session we will have a profound visualization of the system requirements. We get a design that communicates the experience our new system will offer. "Prototypes make it possible to test work practice that doesn't even yet exist." (8) Means after that part of the Contextual Design process we are aware of all future possibilities that our system comes up with.

TIME REQUIRED

All iterations are supposed to happen rapidly. But it depends on the size of our system how long it will take until we stabilized the whole design.

In our work-flow (read below) we assume to need two weeks for 10 iterations, plus five days for setting the initial design. Therefore the whole activity takes 15 days.

TEAM REQUIRED

The work-flow of iteration could be arranged as follows. Each of the Usability Engineer, Interaction- and Interface Designer are going to interview one user in the morning, they could meet in the afternoon with the team and discuss the outcome of the prototype interview plus change the prototype according to this. The next day the prototype is tested and overworked in the next iteration. For the interview sessions we need two team members to carry out one interview. One has to take notes and the other one interacts with the user. That's why we need the whole team for these activities as well because Marketing manager, Developer and a second developer we hire for this job need to assist the interviewers.

ACTIVITY 8: IMPLEMENTATION, TESTING, DEPLOYMENT

PURPOSE

The purpose of Implementation, Testing and Deployment is a truly from beginning to end user centered end product.

INPUT

Starting point for the Implementation work is a stabilized prototype.

PROCESS DETAILS

According to Beyer and Holtzblatt the iterative prototyping process merges directly into an iterative implementation process and occurs parallel to the prototyping sessions. They recommend a piecewise development and release of the system, which focuses on the most important parts first. That sounds reasonable.

Nevertheless we want to emphasize that user test during and after implementation design and coding is essential. Therefore it receives a separate activity.

We would develop our financial management system with an agile development method and include continuous user test during the coding phase.

A final usability test belongs to this part as well, to compare our full system against the requirements and check if it is ready for deployment.

OUTCOME

Final System

TIME REQUIRED

We assume that the whole amount of implementation work could be done in four months.

TEAM REQUIRED

In this end phase of our project we're going to hire 9 more developers in addition to the permanent developer of our core team. Further we keep the usability engineer and the interface designer to apply the usability test during this phase. The Project manager is vital as well.

PROJECT RESOURCES

USER INVOLVEMENT

Figure 5 visualizes in which phases of Contextual Design the user is actively involved and contributes to the development process. According to the Contextual Design approach, user-involvement is provided for two activities, the user inquiry and the prototyping.

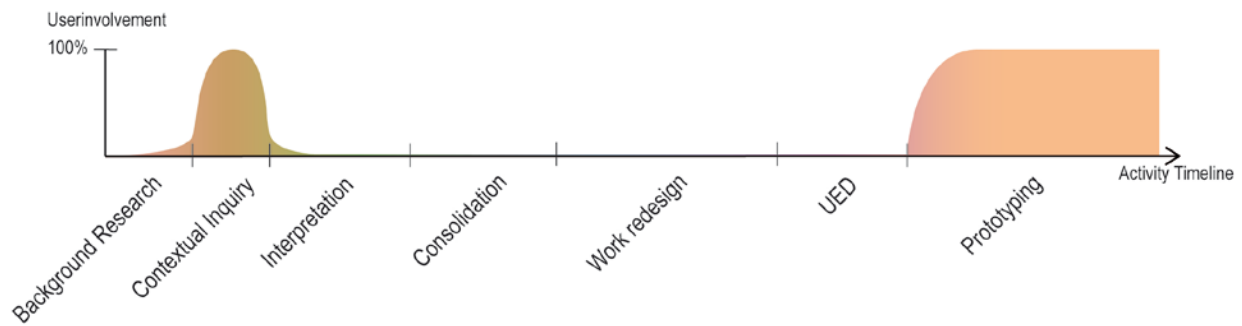


Figure 5: User involvement in the different activities

TEAM

Our core team consists of five people plus one project manager. We decided that we need competencies of a marketing manager, a usability engineer, an interaction designer, a user interface designer and a developer. We are going to hire one more developer for the prototyping sessions to attend the iterations and taking notes there. Eight more developers will contribute the implementation and integration phase to support our core team. All in all, we hire 10 developers for the last four months.

BUDGET

Activities	Task (Technique)	time (total) in days	assumption of working hour per role							TOTAL COST in Swedish kronor
			Marketing Manager kr 1,200 per hour	Usability Engineer kr 1,200 per hour	Interaction Designer kr 1,200 per hour	User interface Designer kr 1,200 per hour	Developers kr 1,200 per hour	Project Managers kr 1,600 per hour	Users kr 500 per hour	
1. Background Research	interviewing financial expertise	2	0	16	16	0	0	16	0	kr 64,000
	research of already existing products	2	16	0	0	0	16	16	0	kr 44,800
	Information presentation	1	8	8	8	8	8	8	0	kr 51,200
2. Contextual Inquiry	User observation & interview	2.5	0	20	20	20	20	20	40	kr 148,000
3. Interpretation Session	interview analysis	5	40	40	40	40	40	40	0	kr 256,000
Bufferdays		1.5	12	12	12	12	12	12		kr 76,800
4. Consolidation Session	modeling	5	40	40	40	40	40	40	0	kr 256,000
5. Work redesign	Walking the data	1	8	8	8	8	8	8	0	kr 51,200
	Visioning	0.5	4	4	4	4	4	4	0	kr 25,600
	Evaluation and integration	0.5	4	4	4	4	4	4	0	kr 25,600
	Storyboarding	10	80	80	80	80	80	80	0	kr 512,000
Bufferdays		3	24	24	24	24	24	24		kr 144,000
6. User Environment Design		7	56	56	56	56	56	56	0	kr 336,000
Bufferdays		3	24	24	24	24	24	24		kr 144,000
7. Prototyping	initial design	5	40	40	40	40	40	40	0	kr 240,000
	10 iterations	10	80	80	80	80	160	80	120	kr 668,000
Bufferdays		3	24	24	24	24	24	24		kr 144,000
8. Implementation & Testing		80	0	640	0	640	6400	640	200	kr 10,340,000
			460	1120	480	1104	6960	1136	360	kr 13,527,200

Figure 6: Budget calculation

According to our calculation shown in Figure 6 our project will cost 13.527.200 Swedish kronor.

TIME

In total, our project is expected to run for seven months. The first three months are reserved for activities of the contextual design approach, while the last 4 months will deal with the actual implementation of the system. For

many of the activities, a number of buffer days were planned to make sure that small delays in single activities do not affect the project timeline negatively.

Figure 7 shows the project timeline broken up into the different activities, including dependencies. Activity 8 was left out because of its long time span.

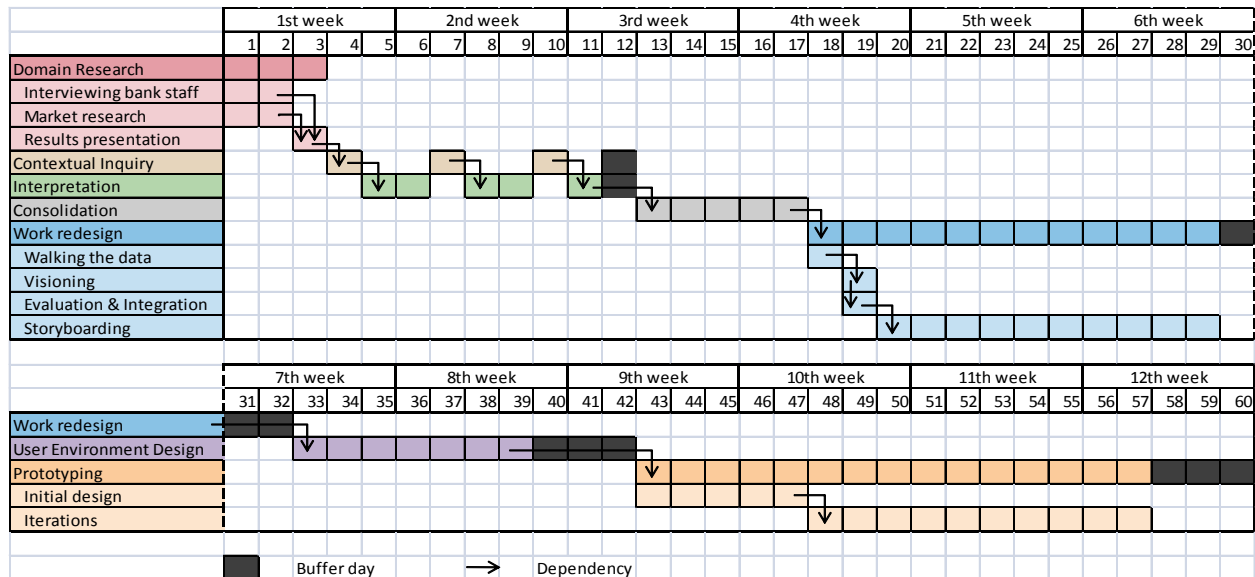


Figure 7: Project timeline

DISCUSSION

REFLECTIONS ON THE CONTEXTUAL DESIGN METHODOLOGY

Contextual Design is all about users' needs and their expectations. It focusses on usability and stresses user involvement constantly throughout the whole design phase of the system. In our opinion, what's very good and special about Contextual Design in practice is that the approach did not separate the users from their context and the observation is not only about the user's mental model but also about the work as a whole. In this way, the possibility to gather more accurate and reliable user data is raised, which leads to a better understanding of the domain and the actual problem to finally achieve the goal of a higher quality future system.

In this approach, contextual inquiry is used to gather user data. Users in their context might not be aware of the work process if they're too familiar with it and thus never think of it, or when one single user is only a small piece in a large puzzle. Therefore sometimes it's almost impossible to address the work and its tasks through common user study like questionnaires and interviews, since the users have very few ideas of what to tell. Contextual inquiry observes the users in their context and doesn't only rely on what the users have to say, which helps revealing the hidden work aspects and picturing the whole work process.

The affinity diagram and the 5 work models are important constants in the approach of Contextual Design. They collect the user data in a common format and allow the team members to see the work as a whole. We think it is good to have those artifacts, because they facilitate the communication among the team and to the user. The user data alone in an unstructured format is rather useless, only when it is put into an understandable and coherent form it can support the design process.

However, there are a few things that we have concerns about.

It seems that Contextual Design could be more helpful for developing systems within large organizations than to small companies, and even more, to products for individuals. In the book, when it comes to contextual inquiry, they assume that the users are working in a common, fixed work environment where designers go and observe the work and culture. But when it comes to products for individuals, it gets tricky since all of these users come from different work environment and they don't share the same culture, while their role in the work process is rather similar. In our project, since we're not designing a software for SEB itself but for it's individual users, it's difficult to perform contextual inquiry on the work process as well. The compensation for this is that we decide to observe individual users while they're in their own environment in which they normally perform online banking and personal finance managing, which is more expensive and time consuming than the suggested approach.

Also, Contextual Design mainly focusses on the study and investigation of users' current work practices in order to find out about the current work process. In this case, the expectations and ideas from the users are completely left out, and innovation and creativity are solely depending on the design team. In our project, during the interview with users and the observation of the users using current online banking system as well as other finance management tools, the outcome is the work processes of both systems and their problems. It's very hard to catch what's missing in this system or come up with new function when the design team doesn't have corresponding knowledge background. Thus another problem arises, that is, external resources like expertise on specific problems aren't valued. We think it's important for the users and for the design team to know what's possible out there and to have the users' feedback on those possibilities. Generally, Contextual Design seems to miss tapping certain important sources of knowledge and ideas which would help the redesign of the work practice.

Another point is that the process described doesn't go beyond paper-prototyping, although this is far from the end of a software project. The implementation and testing phase are when the design is put into practice, and disregarding them completely seems like a mistake to us. They are not exactly part of the design, but many things can go wrong here, and user-centered activities should continue throughout. At least these activities such as usability testing with users should be mentioned in the book.

In conclusion it remains to be said that Contextual Design is indeed a user centered development approach because it tailors the end-product very much to suit a specific organization or a specific work environment and therefore the outcome system will probably be highly user-friendly for the customers and users of the new system. But with this comes a major restriction of this approach. By tailoring the system completely to the needs of a very certain user group, the final product is appropriate for the design of in-house- and user specific software, but not for standard software. These need to be usable by more and differing user groups, which is difficult to achieve using the Contextual Design approach.

DIFFERENCES BETWEEN OUR APPROACH AND CONTEXTUAL DESIGN

Based on the discussion above, we made several adjustments to Contextual Design to fit the purpose of our project better.

- We used the term "user" in our project plan, instead of "customer" which they used in the book. In the book, it seems that whenever they talk about "customer", the word indicates the person who's going to use the system, which makes sense since Contextual Design is more about designing software for large organization, so the "customer" in the book (the people from the company) is the actually user of the

system. But in our case, the user of the system is not our customer SEB, is the customer of SEB. So we decided to use the term "user" to indicate the users of the system to avoid confusion.

- Activity 1 for domain research is added before the actual contextual inquiry. As mentioned above, we think lacking of external resources could be one of the limitations of the design of the system. In order to improve this, we decided to add one activity of domain research as the background study before we start any actual work in the sense of providing better knowledge on the domain, so that we can have something to base on in the later sessions. For example, during the interview we can ask for opinions on functions that are not in the current system, which we wouldn't have a clue if we haven't done any of the background research.
- We deleted flow model from the 5 aspects of work models. The flow model is about defining the users' roles to figure out if some roles are overlapping, i.e. two users have the same role. Since the users of our system work individually and don't integrate with other users there is no need for this model when developing our system.
- The cultural model is kept, even though in the book it says "This model [cultural model] is important when a system is designed for an internal organization or group. It is less important when the project is narrowly focused on the work of an individual." However we think our users are arguably affected by their social environment, such as their family and friends. Users have certain values about concepts like privacy and security. Additionally, policies, i.e. laws, affect our design. It is important to record these aspects with the customer data to make sure they find their way into the design. That's the reason why we keep the cultural model.

REFERENCES

- (1) Hugh Beyer, Karen Holzblatt: Contextual Design; page 61
- (2) http://www.id-book.com/casestudy_8-1.htm
- (3) Hugh Beyer, Karen Holzblatt: Contextual Design; page 277
- (4) Hugh Beyer, Karen Holzblatt: Contextual Design; page 325
- (5) Hugh Beyer, Karen Holzblatt: Contextual Design; page 410
- (6) Hugh Beyer, Karen Holzblatt: Contextual Design; page 374