

Working Paper

**Poss On-line
(Personalisation of Self-Service Solutions across
On-line platforms):
Tools, techniques and methods for development.
Strategiske Forskningsprogram for IT**

By

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Appendix A

PERSONALISATION OF SELF-SERVICE SOLUTIONS ACROSS ON-LINE PLATFORMS

- tools, techniques and methods for development

Project idea

The project on Personalisation of Self-service Solutions across On-line Platforms (POSS ON-LINE) focuses on users, clients, and self-service solutions. It is based on the understanding that clients and users are different and have different goals, and that self-service takes place in different contexts, on different platforms, and within different applications and this requires development of complementary approaches and solutions.

Traditionally the tools used to predict user behaviour build on users leaving traces of their actions. However, new application and developments for existing applications do not gather traces, and new ways of profiling the user is needed. To digitalise e.g. public services such as TOLD & SKAT to meet citizen's needs is a huge challenge because the user's context has to be taken into account. As the tracking tools are not sufficiently refined (1,4,14) pushing of information to users with the aim of increasing sales, e.g. AMAZON, still leaves much to be wished for. Despite the fact that the user profile, which the system generates, is continuously updated through user's interaction with the system (15), e.g. myyahoo.com.

Personalised application may both service the client and the user. The system gathers data about the user, which enables the client to push information to the user. Personalisation enables graphic user interface design that is personalised and relevant to the individual user and invites the user to get access to information with less strain.

Personalisation of self-service solutions is promising and IT companies are experiencing an increase in the clients' demands. At the same time the development of solutions moves within a shorter and shorter time span. Hence the process of innovations is paced and there is an increasing need of new ways of looking at the process of development. However, we lack methods to predict user behaviour without having to deal with huge amounts of data and data from both quantitative data as well as life world observations are required.

Project objectives

With POSS ON-LINE we suggest a strategic IT research and development from the field of Human-Computer Interaction. The main objective of the project is:

Development of tools, techniques and methods for development, design and tests of personalised self-service solution for on-line technologies.

Personalisation

The concept of personalisation refers to when the system, on the basis of tracking user's interaction and demographic data provided by the user, changes the information to target the individual user (1). Personalisation operates with ability for the data alone to be able to predict user behaviour on the background on former users with similar patterns. One possibility for developing a more personalised content is to develop methods for collecting

data, which can be used to predict the users actions through their click streams and via life world observations of user behaviour. Digital cultural probes may be a possibility (7), where the data collection is structured by the investigator, but controlled by the user. Other methods are development of user representation e.g. personas (13), user archetypes (11) and use scenarios (3).

Personalisation requires categorisation and pre-processing of data, extraction of correlations between data, and determination of actions in order to create recommendations. The prediction can be difficult and each individual user must be perceived as belonging to a segment, a category or a type. It is not possible to offer truly individualised solutions.

The challenge is to be able to predict user-behaviour from a small amount of data (quantitative combined with qualitative)

Because the descriptions of the human is decisive for the designer's conceptions of the user and eventually governs the development of the user interface (10) there is a need for development of more nuanced representations - multimodal representations - of online technology users that can be applied in analysis, design, and evaluation of self-service applications.

The challenge is to uncover the representations of users embedded in methods and tools, and to develop dynamic tools for capturing floating context

On-line technologies for self-service

Self-service may be both e-business as well as public service to citizens and refers to the user servicing herself through interaction with a system. Self-service solutions developed for cross platforms are already part of the mobile society (2,15). However, the present solutions are too unfinished to really make a break through (1,8,12). Future requirement is to use applications wherever and whenever. This raises issues about the *graphic user interface*, the *way the user uses* the technology when *in non-predictable surroundings*, and the *expectations the clients have* to the business goals.

When interaction with systems is characterised by changing digital interfaces, recognition becomes a constitutive parameter. E.g. a user has interacted with the system via his desk computer earlier in the day and is now out in the field checking the crop and needs to update information via a mobile device. How does the interaction become recognisable on the new interface?

Assuming that the user has to supply other than text based information, and that the user representations also consist of narrative elements and pictures, puts special demands upon the systems handling of e.g. segments, categories, or types.

The challenge is to develop tools and methods that can support both development and tests of personalised self-service applications for on-line technology and at the same time service the user according to her/his needs and situation.

The customers: Users and clients

To personalise demands a profound knowledge of the different user group and their patterns of behaviour in accordance with the different on-line technologies (9,14). The individual application means that users differ not only in age and the ability to use the application, but also in needs, interests, attitudes, and in use situations where the choice of platform influences the use situation and the context.

The challenge is to be able to develop methods and tools that can distinguish between large pools of users and still satisfy the individual user

New developed solutions require the user to take several decisions and actions¹ before becoming functional. But the a priori requirements must make sense, the user must feel comfortable about information requested, and the requirement for data entry should not disrupt the user's tasks (12). Hence the personalised applications should be understandable and aimed at the user's needs and situations (16).²

But how do users experience personalised solutions? There is a balance to be struck between pushing information to the user and the relevance of the information offered, e.g. when a male user searching on hair products is given a link to sanitary towels and tampons, because studies have shown that it is mainly women who search on products for hair. Why does the system offer me this? What data has been collected about my person? Am I being serviced or being observed? There is a contradictions between, on one hand, business interests and demands for effectiveness, and on the other hand the interest of the individual: transparency and decisions.

The challenge is to combine personalisation of on-line services with transparent decision processes and individual personal needs.

Clients, both public and private, have a goal for each application launched, it can be corporate identity, sale, lower costs for service, or an increase in service (14,15). However, these goals are seldom the same as the users goals (16). Methods to get customers to imagine users and use situations, as well as possibilities they have not envisioned should be developed. Just as the methods must explore and build on customers' competencies, qualifications, and knowledge. Methods should uncover what the clients do not know and what they need to know, not only their visions and requirements.

The challenge is to be able to develop methods that can connect client goals with user goals.

To carry out this project calls for an experimental approach and real life observations combined with iterative prototyping and concurrent test and evaluation. Users are continuously on the move; a user is always in a context, has a task and interacts with a system. A user belongs to a representation of users, which may change if the context changes.

¹ see e.g. myyahoo.com

² www.toldskat.dk makes it is possible to report tax and VAT and to get access to forms when in front of a computer. The website makes it possible for the user to identify as citizen, company, or advisor. But the website does not remember user's identity, it does not give the user hints for further information when in a special situation and it does not provide the user with access when not in front of the computer.

Hence the context is floating and requires continuously uncovering. The system is, a priori, unknown and needs to be identified hence also the interface needs to recognise.

As a framework, we suggest an experimental approach that allows for prototypical multi-modal user representations of the human user in HCI design and for the methods and design techniques to be tested and developed in iterations *during the whole development and use cycle*.

Project results

The results of the project will be a set of tools, techniques and methods for design and tests of personalised self-service solution for on-line technologies.

- Theoretical framework
- Tools and techniques for design of interfaces on different platforms.
- Tests developed for personalised interfaces.
- Tests developed for different contexts.
- Tests developed for different platforms

Milestones

- Theoretical framework for project.
- Methods for analysis, design, test and evaluation
- Analysis of qualitative and quantitative data
- Development of drafts and prototypes
- Evaluation of test methods

The process is iterative and the milestones are revisited throughout the projects lifetime

Research plan

Estimated time is four years. The project relies on close cooperation with the professional partners and with international contacts. There are five work packages:

1. Knowledge Framework for personalisation and self-service solutions
2. Methodological Framework for analysis, design, test and evaluation
3. Empirical studies: qualitative and quantitative data collection
4. Experimental design & prototyping
5. Test and evaluation

The project includes dissemination of findings and workshop and seminars for professionals. The dissemination of information will begin quite early in the process.

Partner contribution and business engagement

CBS, Department of Informatics. The HCI research is driven by a design and use perspective. The focus of the group is: Methods and techniques in pre-investigations, analysis, design, test and evaluation. CBS/INF will host the project, and the HCI professor will be the project manager. All members of the research group will participate.

1508 A/S and Twins

The involved companies participate with business cases as well as equipment. 1508 A/S contributes with host servers (Dell PowerEdge 1300, Compaq Proliant ML350, PowerEdge 700) and AV-equipment (Sony dvcam PD 150, JVC Monitor, DVD and VHS recorders, Manfrotto lighttable, Manfrotto camerapod, 4 MAC G5 for rendering, Sony digital camera cyber-shot 5,0 megapixel).

Twins contributes with equipment for development of personalised solutions. Servers with Microsoft SQL and Analysis Services. Own developed software for input and analysis of use patterns and for personalisation of user interfaces.

Strategic significance, public utility, and relevance for business

A society where everybody can perform self-service, each from their competence and need, each from the context they are part of puts demands on the design process. Knowledge about the users their goals and context, the clients and their business goals create a demand for a distribution of knowledge in the whole of the developing organisation. Techniques, tools, and methods that can support the systems development process must accompany the distributed knowledge.

By market an ability to create intelligent Internet solutions and by developing new methods the companies are able the keep a lead.

Relations to research on an national and international level

Danish research focuses on data mining (18) in order to enhance sales (9). International research in personalisation has focussed on classifying and analysing personalisation methods (4,9,15), but little interest has been paid to the value of personalisation for the user (15,16,17). Personalisation of on-line services is context-specific services to individuals. And most literature mention services such as customised ring tones or location based services. (8). But these services do not take into account the differences in users, the differences in user behaviour, and user needs.

There is a difference between customisation and personalisation: Customisation is an adjustment of a site of each user's preferences regarding structure and presentation (like MyYahoo). Personalisation includes categorisation and preprocessing of data as well as extraction of correlations between data, determination of actions that should be recommended by the personalised system (12).

Web personalisation operates with ability for the web data alone to be able to predict user behaviour on the background on former users with similar patterns (4). This view of the users takes a leap only from behaviour and from data that the users have entered themselves (often demographic data) and not from user needs and situations that might influence the demands on information.

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