Design for Dummies – Understanding Design Work in Virtual Workspaces

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ABSTRACT
New IT artifacts and new ways of designing artifacts challenges the common distinction between design and use. The extensive use of general packaged software changes the conditions under which users influence the design process of the IT artifact. We report from a longitudinal case study of the introduction and use of a packaged web-based groupware product in a financial services corporation. The case study is based both on interviews, a questionnaire and http-log analysis. Our case study suggests that we need to extend our understanding of IS-design as something that continues in what we usually call the use situation. We propose to define this activity as *end-user design*, and argue for the usefulness of the concept, drawing on Wanda Orlikowskis notion of technology-in-practice.

Keywords
Design theory, use, Virtual workspaces, organizational communication, end-user design.

INTRODUCTION
A common distinction in software design as in design in general is that between *design* and *use*. Designer design and users use. However, one of the crucial specialist competencies needed to design software is that of the users. This introduction of users in the design process has again blurred the distinction between what we should characterize as *design* and *use*.

There is a large body of literature in which the relationship between *design* and *use* is examined critically (Schön, 1983; Norman 88; Nardi 1993). Even though design is used in a number of different senses, software design is considered an activity initiated and controlled by professional designers and programmers. These professionals then involve users in different ways and degrees.

The involvement of users in design is challenged in the design of packaged software. This is due to the distance in time and space between the development of the software and the use situation. We suggest that re-thinking the distinction between design and use might help researchers and designers of packaged software. This includes introducing *end-user design*. Then we can think of packaged IT-development as *designing for end-user design*, which can be a conceptual support for ensuring participatory design in packaged software development.

Bringing use to the design situation or bringing design to the use situation
One of the solutions to meet the challenges to software development is the active involvement of users. This is being emphasized by both the CSCW and PD research communities. One of the interesting concepts for engaging users is that of tailoring. Current research in collaborative tailoring is carried out by e.g. (Teege 2000) and (Mørch & Mehandiev 2000).

Over the year's concepts like prototyping (Floyd 1992), tailoring (Trigg 1987) and bricolage (Bucher, Mogensen, Sharpio 2001) has been introduced in order to describe or define the design process with user participation. The users participation has for the most part been limited to users participating in the development process. An exception is Bonnie Nardis visions of the end-user making alterations by high level programming (Nardi 1993). But end-users making alterations on the programming level

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has not become a success. Specialists in work practice cannot also be specialists of high-level programming.

DISTINCTION OF END-USER DESIGN

The point of departure for the research presented in the following is a change from a context where the designer co-designs with the user. We have studied the users continuations of the design process in what is usually referred to as the use-situation.

This leads us to suggest the introduction of the concept of *end-user design*. While tailoring would seem like a natural candidate, we find it problematic in our context of packaged software. Tailoring is normally conceived as clothing being uniquely designed by tailors to fit certain customers. This is not what we observe studying packaged products like virtual workspaces, which is the object of our case study. Virtual workspaces are more like off-the-peg clothes, trimmed by the users, not to fit the needs of the individual, but to fit the co-workers and their shared praxis. Moreover, research in tailoring is primarily concerned with the internal complexity of an artifact and the complexity of the tailoring mechanisms. We are more concerned with the complexities between the artifact, which in our case is a virtual workspace and the environment, which we refer to as a work practice.

DEFINING END-USER DESIGN

Before documenting end-user design empirically we need a definition of what we mean by end-user design from a conceptual standpoint.

We think that Orlikowski's application of structuration theory has done a great deal of the definitional preparations for defining the concept of end-user design, and we shall use her concept of technology-in-practice as our outset.

Orlikowski argues that we should draw a distinction between the technology as artifact, and the technology-in-practice. What happens in the use situation is that users interact with some properties of the technology at hand (ignoring most of them) and in this interaction create and recreate the social structures that constitute work. "These enacted structures of technology use, which I term *technologies-in-practice,* are the sets of rules and resources that are (re) constituted in people's recurrent engagement with the technologies at hand." (Orlikowski 1999 p. 407)

While users interact with some of the properties of the IT artifact, they do not interact with all of them, nor can the designer predict which properties. We find this conceptual distinction between the technology as artifact and the technology-in-practice a proper description of what we have seen empirically in our study of virtual workspaces. The use of virtual workspaces in our empirical case shows diversity in use as well as a very selective choice of which functionality to use.

Using Orlikowskis distinction between the IT artifact and the technology-in-practice we define end-user design as:

The collaborative establishment of the social practice of use (technology-in-practice) as well as the change of system features by users (technology as artifact). End-user design is performed by the users in the use situation. It is typically not temporally nor organizationally separated from use.

One example of end-user design is the negotiation, decision and implementation of a folder structure in a virtual workspace. Another example is the process of agreeing and implementing the use of a virtual workspace for distributing meeting minutes in a project.

INVESTIGATING END-USER DESIGN

We introduce virtual workspaces as the empirical example of why the existing division between design and use is becoming blurred and why we suggest to introduce end-user design to capture what we see as an overlooked aspect of the design process..

Virtual workspaces are packaged groupware applications that support collaboration among a group of people. They are based on Internet technology and are often available as an ASP service on the Internet.

Our argument for the introduction of end-user design is based on empirical investigations of virtual workspaces. The data are derived from a longitudinal case study of the introduction and use of Lotus Quickplace in a multi-national financial corporation. Lotus Quickplace is a packaged virtual workspace product marketed by IBM, which was introduced in the organization to support distributed collaboration. Lotus Quickplace, as are other virtual workspaces, is a fairly simple technology that allows sharing and structuring of documents, simple work-flow and integration with e-mail.

We studied the introduction and use of Lotus Quickplace using both quantitative and qualitative methods. The quantitative data are derived from a net survey, where 150 employees participated as well as analysis of the logging of the Quickplace usage. The qualitative data is based on observations and interviews. The log-files used is the http-log from the Quickplace server. The http-log stores each request to the Quickplace server with information about user, time of request, URL among other things. From the URL we have been able to extract information about which Quickplace and what kind of request the client has made. We were also able to extract the names of folders in the Quickplace from the URL. We use an analysis of the folders as an important indication of end-user design

We gathered our empirical data in the following way: The Quickplace technology was introduced in the corporation may 2000. In April 2001 we did 8 interviews. They were interviews with the responsible for the rollout of Quickplace, the Quickplace server administrator and the rest were with managers of selected Quickplaces,. Log-files have been retrieved, cleansed, stored and analyzed in a relational database in the period 5. May 2001 – 12. February 2002. The questionnaire was conducted in the period from 23. November 2001 – 11. December 2001.

In the period 4. October - 23. November 2001 up to the questionnaire there were 106 Quickplaces showing activity in the log files. 56 answers to the questionnaire were returned covering 45 of the 106 Quickplaces.

For the purpose of this paper we have selected three exemplars of how Quickplace is used in the organization. The categorization of Quickplace underlying our exemplars are derived from interviews and confirmed in the questionnaire. The three exemplars are: organizational unit, project, and recurrent task.

Our approach to studying end-user design has been a somewhat archeological approach. We have not studied end-user design directly by observation. We have rather found traces of design activity as well as some limited descriptions of the design processes derived from the questionnaire and interviews. The log files and studies of the folder structures in the Quickplaces derived from the log-files have been our primary sources for collecting "traces" of design activity.

VIRTUAL WORKSPACES IN A FINANCIAL SERVICES CORPORATION

The multi-national financial services corporation studied was created as the result of a merger between three financial services companies announced in March 2000. Lotus Quickplace was introduced in the organization in May 2000 as a tool to support the projects that should merge the three companies. It has turned out, as our exemplars illustrate, that it is being used for very diverse purposes - and for purposes other than the intended

The technology was introduced without any implementation or educational effort. The announcement of the availability has been selected e-mails and word-of-mouth.

The process for getting a Quickplace consists of sending an e-mail to the security department and ask for them to set up a Quickplace with some named managers responsible for the room. The business justification was that people from more than one country had to work together. The concept of manager used here is taken from Quickplace, where the manager is a user with rights to e.g. invite members and change folder structures. Some of the Quickplace managers are real life managers, while others only have the "privilege" in the Quickplace.

Quickplace is introduced in the organization as another communication technology. The existing technologies available, which all our respondents were using, were: e-mail, telephones, Intranet and LAN drives.

1. Org. unit

The presentation of this Quickplace is based on two answers to the questionnaire and analysis of log files. The Quickplace was initialized 18. August 2000 and has been running for app. 15 months at the time of the survey.

An organizational unit in the corporate institutional banking division uses our first exemplar. Corporate Institutional Banking serves large corporations and institutional customers and this organizational unit serves customers in 13 different countries where the bank is represented. The unit was formed at the time of the merger by combining the similar units in the pre-merger banks. The unit has started a Quickplace to support a number of communication processes. They use it for exchanging marketing material, as a working directory for communication to e.g. customers and for maintaining the holiday lists.

An important part of the units work is to issue loans to customers. For this work they use the Quickplace in several ways. The Quickplace is used to store approved credit limits, guidelines for issuing loans and as an information repository for ongoing credit projects.

2. Recurrent Task

This Quickplace is based on an interview with the manager, one answer to the questionnaire and log-analysis. The Quickplace was initialized 17. May 2000

The Recurrent Task Quickplace is used by the translator unit in the communications department. The translators use it as a tool to coordinate the translation of three different recurrent translation tasks: The translation of the quarterly and annual reports, the company magazine, and press releases. All of these documents are translated to the four Nordic languages and in English.

The translation process of the quarterly and annual reports is a very time critical task and the translation process actually begins before the report is completed in English. The translation is thus partly running in parallel with the completion of the report. This produces a situation where there is a need for tight coordination and version management. The Quickplace is used to support this coordination and version management.

3. Project

This Quickplace is based on an interview with the manager, one answer to the questionnaire and log-analysis. The Quickplace was initialized on 15. November 2000.

The Project Quickplace is supporting an IT infrastructure project. The purpose of the project is to build a security infrastructure that should result in all customers having just one ID when doing various electronic business with the bank.

The Quickplace is used by the members of the project as well as an extended team of affected units in the corporation, including other infrastructure projects running in parallel. It is used as a shared document repository for e.g. meeting minutes, decision material, presentations, and solution documentation for both the IT-solution and the business processes.

This initial brief description of our three exemplars should serve to illustrate the diversity of uses. The same simple tool is being used in quite different ways to serve different purposes in the organization. Without any centralized implementation and educational effort different work practices have evolved with the Quickplace technology. In Orlikowskis words, three different technologies-in-practice have emerged in our three exemplars.

Both the org. unit, the recurrent task and the project Quickplace have established new work practices or redefined existing ones using Quickplace as an integrated part of the practice. This establishment of work practices indicates to us, that some interesting collaborative activity has taken place to define this new work practice and integrate it with Quickplace. It is this activity we would like to refer to as end-user design.

According to our definition of end-user design, it integrates both the establishment of a new work practice and the change of properties of the IT artifact. While our brief description indicate the establishment of new work practices we still need to see how this is integrated with changes to the IT artifact.

One typical change that is made to a virtual workspace as well as most groupware products when establishing a work practice around it, is the structuring of documents in different folders. We document the second half of end-user design by looking at folder structures of the three exemplars as well as descriptions of the process of establishing the folder structure taken from the questionnaire.

In order to show the different design processes that have taken place we describe both the process and the product of the design process. The product of the design process is provided with the naming and organization of the folders in the three Quickplaces and how they have developed over time. The process is documented as descriptions taken from users who have answered the survey.

All Quickplaces are by default provided with a folder structure. The intended purpose of the folder structure is pretty self-explanatory: it is designed to provide basic functionality for people working together in some kind of group.

This initial folder structure has evolved into three very different structures. While some of the default folders were maintained, the overall impression is very different.

Default Folder structure:
Welcome
Library
Discussion
Calendar
Index
Tasks
Members
Customize

While the default folder structure is only one-level deep, Lotus Quickplace allows the creation of sub-folders or "sub-rooms" and this has been exploited in all three cases. The existence of sub-folders is indicated by a ":". We have decided to show only the top level in order to save space.

The analysis of the folder structure is taken from the http log. This has enabled us to see the change of the folder structure over time. The observation of the folder structures over time shows some interesting developments including gradually increasing complexity and then in some cases sudden simplifications. While we have chosen to simplify our exhibit for the sake of the present argument, this indicate a continuous rethinking of the folder structure and thus also a continuous rethinking of the work process over time.

If we take a look at the organizing principles for the three Quickplaces, they are not surprisingly quite diverse.

The acronym names of the folders in the org. unit refer to sub-groups dealing with different markets and problems.

Org. Unit 4/10 2001
Welcome
Members
Customize
Index
TEST ROOM EMF:
Library:
FIIC:
GFI:
EM - 3:
EM - 2:
EM - 1:
CBRM:

While the org. unit has a folder structure that is organized along with the organization, the recurrent task is not surprisingly organized after these tasks. As said, the three tasks that are coordinated in this Quickplace are quarterly and annual reports, press releases and "Nordic Ideas" the magazine.

The history of the folder structure, which is not documented here also shows a difference in how they

evolve. The folder structure in the Org. Unit shows a gradual increase in complexity and then a sudden simplification indicating a major re-organization. The folder structure of the Recurrent Task shows a continuous change that follows the recurrence of tasks along with the pattern of gradual increase in complexity and sudden re-organization.

The folder structure changes in particular with the recurrence of the financial reports. The folder structure pictured here is taken in the period between the translations of financial reports. While the financial reports are translated, another folder structure is used temporally. The two latest reports "Q4 2000" and "Q2 2001" are kept as an archive. Apart from most of the Quickplaces we have analyzed, a lot of documents are deleted from this Quickplace. This is explained by the recurrent task function. When the translation of a financial report is finished, only the final version is of interest.

The folder structure of the Project Quickplace is a mixture of categories both made according to audience as "Steering Group docs", sub-unit in the project like "Business processes" or document type like "Use case room".

Also the Project room has changed considerably over time as the project entered different phases. The "Pre-study room" folder is actually an archive of what was once the purpose of the whole Quickplace. As all projects in the corporation a project is always started up as a pre-study to analyze the benefits, costs and risks of doing the project. As the project pre-study was finished and budget was given to start the project, the Quickplace grew into a Quickplace for the project and the pre-study material was filed in an archive folder.

Indications of end-user design

What these cases indicate is that the members of the Quickplace has been engaged in a process we would like to refer to as end-user design. The different specific tasks the Quickplace is helping to accomplish has been designed by the members. The different folder structures document the changes to the artifact.

The actual design process that has resulted in the folder structures exhibited above has differed according to the answers provided in the questionnaire and from interviews with the manager of both the Recurrent Task and Project Quickplace.

The Org. Unit has organized the design of the folder structure in a workshop, where the strategy for using the Quickplace was agreed. Also, the interfacing of Quickplace with other available media like e-mail and Intranet was discussed. Individuals do minor changes to the structures without requiring workshops.

The recurrent task Quickplace has one manager of the Quickplace who decides on the structure of the Quickplace. She does consult the other translators, but she does the structuring and tells the members how to use it properly.

The Project Quickplace organized the Quickplace after a principle of delegation. The overall project manager of the project decides on the level one structure while the responsible people for sub-projects like e.g. defining and implementing "Business processes" structure the sub-rooms.

The three design processes can be analytically separated in two parts:

1. The establishment of a new work practice like e.g. translating an annual report using the Quickplace
2. The design of the folder structure to support the work practice

We have only limited knowledge of how 1. has actually happened. Our interviews shows a mixture of different kinds. On the one end is very explicit design activity carried out collaboratively in workshops. Or individuals who design the work practice and then tell others to do things according to the design. On the other end work practices seems to emerge less explicit and seems rather as habits like we know from using e.g. e-mail.

Even though we can analytically separate the two activities, they are in practice tightly integrated. Orlikowskis concept of technology-in-practice focuses on the first part of the design process: the design of the new work practice. What we would like to emphasize is the integration of both the establishment of the work practice and the change of the IT artifact in what we suggest to refer to as end-user design.

Why call it design anyway?

The creation of folder structures that form the basis for our argument would probably be characterized as a trivial task in terms of the internal complexity of the IT artifact. It is a well known aspect of end-user computing at least since the PC. Rather than see the folder structures as a trivial task in terms of computing, it should be seen as traces of a very interesting collaborative design activity. When we triangulate the folder structure with the questionnaire and the activity in the Quickplace documented in the log files, it is clear that the end-user design, as we propose to call it, is a complex activity. And it is an activity that is at least as crucial to the successful use as is the properties of the IT artifact.

Rather than discussing the complexity or depth of the changes to the IT artifact in e.g. configuration files or source code, we would like to turn the attention to the

complexity of the relation between changing the artifact and changing the work practice.

The reason we insist on referring to end-user design is two-fold. Firstly, we would like to emphasize that changes are made to the artifact in the process of creating the technology-in-practice. Secondly, we would also like to emphasize the importance of the actual process leading to the technology-in-practice.

IMPLICATIONS

In this paper we have investigated a part of the design process for a virtual workspace.

Our case of folder structure changes might seem to trivial to be considered a design tasks. We think however, that the distinction between the internal complexity of the IT-artifact and the complexity of the relation between IT-artifact and the environment put forward by Alexander shed a different light on the problem.

Our hypothesis for further research based on the present case study is the following: Besides analyzing properties of IT artifacts and existing social structures, we suggest that design or end-user design be included as a key concept for understanding how certain use patterns emerge from the introduction of an IT artifact in a work practice. We suggest that users are not considered objects but are seen as agents in the design process.

We have not discussed explicitly the generality of our concept of end-user design. Our case study shows that end-user design makes sense in settings where:

- we are dealing with packaged IT-artifacts
- that are used collaboratively and
- where the functional specification is abstract in relation to the work practice it can support.

These criteria are e,g, typical for most groupware products. Investigations into the usefulness of the concept of end-user design in other settings however remains to be shown.

In the title of this paper we paraphrase the immense amount of "...for dummies" books available. We do this to deliver exactly the point of the book titles. This book is not for a dumb person, but for a non specialist in a field. What we have observed in our case study is design performed by users who are not specialists in the field of IT design.

The software development teams behind packaged software can only predict in which organizational contexts their product will be used. In that perspective, the end-users are the real specialists of the work practice. Therefore we suggest that the developers of packaged groupware software think of themselves as *designers for end-user design*. This is a new way of conceiving the idea of participatory design in the era of packaged software, and we believe that supporting *end-user design* in the software is a promising direction for both researchers and practitioners.

CONCLUSION

The present paper has studied empirically how an IT-artifact is being integrated into different work practices. In a context of packaged software - perhaps where we would least expect it- we have observed user-centered design. Actually we have observed something more. The design is not only centered on the user, the users are actually doing a significant portion of the design. To capture this we propose the concept of end-user design.

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