

## **THE SOCIAL ROLE OF HCI: SOCIAL AND CULTURAL CONSEQUENCES OF DESIGN**

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### **ABSTRACT**

Due to the noticeable changes in our society caused by globalization and technology, we propose an extended and more social role of HCI (Human-Computer Interaction). As we will argue, design is not only the design of an artifact; it is also the design of a new social order requiring the users to internalize the properties and social characteristics of that artifact. This calls for a wider design focus encompassing not only the artifact's impact on the use context, but also an increased awareness of the social and cultural consequences of the introduction of the artifact. This argument is supported by looking at examples of human development and activity within an Activity Theoretical context as well as our empiric studies of the implementation of a new conference system in a Danish IT-company.

### **KEY WORDS**

Interaction design, Activity Theory, social and cultural norms sphere, use context, empirical studies.

### **1. Introduction**

Until around 1990 the HCI community founded many of its theories and methods on the theoretical discipline of Cognitive Science. The intention was to uncover the natural and cognitive facts about the human mind in order to design the optimal user interface [1]. From about 1990 we witnessed a change in focus from human factors to human actors [2], and especially the Nordic HCI community moved in the direction of a more contextual design approach. Theoretical approaches inspired by phenomenology, ethnography and Activity Theory made their way into HCI arguing that mainstream theory did not provide an adequate account of how people think and behave in the world (e.g. [3,4]). Today the discussion concerning the importance of including the use context in the design process as well as how to bridge the gap between analysis of contextual factors and the design of the interface is still ongoing.

We support this shift toward a more contextual design approach. However, we believe that the focus of the HCI discipline is still too narrow. As information technology

increasingly becomes an integral part of our daily lives, we must expand our design analysis to not only focus on the use context, i.e. the task-related circumstances, but to include what we term: the social and cultural norms sphere. A traditional analysis of the use context includes a study of the task in focus, the artifact to support this task, and the people involved in using this artifact. In contrast to a traditional analysis, an analysis of the social and cultural norms sphere includes a study of how the introduction of the artifact not only has an impact on the way the task is performed, but also affects the way we interact socially and culturally. Therefore we must consider the impact of the artifact on the use context situation as well as the consequences for our social and cultural norms within and beyond the use context.

#### **1.1 Example: the introduction of the cell phone**

An example is the design of the cell phone. When introduced to the market the cell phone replaced the personal pager in many ways. The pager was originally designed for the purpose of making it easier for people to get in contact with each other when away from a stationary phone. When beeping a person's pager, it was a request for a call from that person. The introduction of the cell phone made it even easier to get in touch with each other regardless of the location, as one now had the choice between making a phone call and sending a text message.

In the design of a cell phone a traditional HCI approach would focus on the use context to figure out the functions of the cell phone and how to structure them on the interface. It could, thus, be identified from the use context that the cell phone i.e. needed an address list, an inbox for text messages and a settings feature. The final design of the interface would then be reached through (iterative) testing cycles. This approach only has focus on the impact of the cell phone on the use context; i.e. making it easier to get in contact with each other.

This approach lacks focus on the consequences of the introduction of the cell phone on our social and cultural norms. An example is how the introduction of the cell phone has increased our social networks by making it

easier to establish an informal contact by means of text-messaging. This in turn has changed our social norm and understanding of being “reachable”. Among teenagers you must reply to a text message within a short time to maintain your network of friends, and in many workplaces it is commonly expected that the employees can be reached via their cell phone even outside office hours.

Initially, these changes in our social and cultural norms were not considered part of the design of the cell phone. We do not claim that these changes in norms could have been fully anticipated since they emerge over time from the use praxis. But we propose a stronger focus on the fact that the design of an artifact is not only the design of new way of performing a task, e.g. using a cell phone instead of a pager to reach a person: it is the design of a new social order. This can be described in an Activity Theoretical framework.

## 2. Development and Human Activity

Activity Theory was originally developed by L. Vygotsky and A. N. Leontjev as part of Marxist psychology of the 1920s Soviet Union. Today, the original foundation of Activity Theory has been re-formulated and applied in such diverse disciplines as pedagogic, psychology and Human-Computer interaction. Activity Theory is therefore nowadays considered a theoretical framework more than an individual theory.

In the HCI community, Activity Theory is often used within the contextual approach. But we argue that the full potential of this framework is yet to be seen. As stated above, it seems that a traditional HCI analysis of the use context (whether using the framework of Activity Theory or any other theory) focuses on the task and the design of the artifact related to that task. The knowledge about the use context is thus only applied to the task-oriented design of the artifact. But the Activity Theoretical approach can also be used to achieve an understanding of the social and cultural consequences from the introduction of a new artifact. To achieve this, we will reintroduce the original texts of A. N. Leontjev and L. Vygotsky [5, 6, 7].

The writings of Leontjev and Vygotsky have their philosophical background in dialectical materialism as found in the writings of Marx and Engels [8, 9]. The common ground is the dialectical principle; that a thesis gives rise to its own opposite, the anti-thesis, and the conflict is resolved by uniting the two in a synthesis. The argument is that the human and cultural history can be explained from this dialectic principle.

From an Activity Theoretical point of view all human activity can be seen as a dialectical enterprise. When interacting with the environment a person gets in contact with different objects. The relation to these objects is often mediated by a means: language, tool, sign etc. In

these relations the person initially has an expectation (thesis) about the object, which is based on the person’s former experiences. These experiences form the basis of the person’s motivation and behaviour. In interaction with the environment, these expectations can meet resistance (anti-thesis) and, thus, be revised into a new expectation (synthesis). Consequently, this new expectation forms the basis of a different behaviour and a different motivation. Human activities at a micro level as well as societal development at a macro level can be described from this dialectic principle.

### 2.1 Internalization and externalization

Let us consider an example of an activity at a micro level. A subject, Christian, is using a cell phone as a tool to get in touch with Stephen (the object). Monday afternoon Stephen has sent Christian a text message asking Christian if they could reschedule their badminton appointment from Friday to Saturday. Christian replies to this on Thursday. In this case Christian has the expectation (thesis) that he just needs to deliver the message before Friday. But when he gets in contact with Stephen, Stephen is upset because Christian did not respond earlier. Stephen claims that a cell phone makes it easy for people to respond immediately (anti-thesis). Consequently, Christian has to revise his original expectation, so in the future he knows that Stephen appreciates a fast response when using the cell phone (synthesis).

Therefore, in this activity it is the tool that shapes and guides behaviour. In an Activity Theoretical framework this is described as Christian internalizing the properties and social characteristics of the cell phone. This means that when we interact with the world we make the properties and social characteristics of the object/tool a part of our psyche [5, 6, 7].

The opposite process of internalization can also occur. This is when our ideas materialize into new artifacts, which is termed externalization. This is what happens when we design a new artifact. Internalization and externalization are thus opposite processes. As a result, when creating a new artifact man shapes his environment - while at the same time this environment also shapes man.

Human development, thus, results from the dialectic interplay between the individual and the surrounding factors. Whenever we interact with the world, our ways of thinking and interacting with each other are gradually changed at both a micro- and macro level. The process of externalization can be seen as the reification of meaning while the process of internalization is the reproduction of culture. The creation of external tools leads to the creation of internal tools making the transformation of culture possible.

The dialectic relationship between artifacts and social interaction can be illustrated by an empirical study that we made in a Danish IT-company.

### 3. Implementation of a New Conference System

Our study took place in an IT-company with approximately 300 employees spread geographically at three different locations. The company provides a wide range of ICT services for the educational sector covering everything from the technical connection to pedagogical tools, and more than 500,000 users are often in contact with the company's products and ICT services.

In this company we studied the impact and consequences of the implementation of a new conference system for internal communication. This was done through empirical research; observing staff's use of the conference system and the daily work in the company's technical support department (23 employees). In addition to this, we did 7 qualitative interviews with employees from the technical support department and 3 interviews with persons responsible for the use and implementation of the conference system. In total, we followed the company through six months and ended up with a rich amount of empirical data.

#### 3.1 Expected impacts

Before the implementation of the conference system, the company used a text based communication system. In this system staff had to use command-keys or enter text commands. Consequently, staff was very reluctant to use it: "*It was difficult to get started when you wanted to write a message*" (interview with one of the employees). As a result there was not much communication across geographical and work-related boundaries within the company.

The new conference system, named IntraKom, had a graphic user interface in which staff could navigate and communicate using the icons and symbols on the interface. This supported the management's wish to facilitate a more free communication between staff. More specifically, the management's objectives were to:

- 1) remove the geographical boundaries between the different organizational units
- 2) support the company's strong debating culture stemming from the fact that the company is a spin off from Danish academic environments
- 3) enhance social interaction among staff and to create a good work climate

These objectives were the initial reasons for implementing the new conference system. It was expected that these could lead to more work efficiency and creative ideas.

As time showed these goals were in many ways met. Firstly, the borders between the departments *did* become less visible. One example was a discussion in IntraKom between employees from two geographically spread departments: This 'written' discussion lasted for a month and ended up with 48 different contributions before it closed.

Secondly, staff *did* communicate more freely. With the old system people were reluctant to start or take part in discussions, but now "*the discussions are sometimes exaggerated unnecessarily when they ought to be closed earlier*" (quote from IntraKom from a leader of department).

Thirdly, the social interaction *did* improve. Through the social forums in IntraKom people - who would otherwise never get in contact with each other - were brought together: "*If there are colleagues interested in fishing, regardless of where they are, we can share experiences*" (interview with employee).

#### 3.2 Unexpected social and cultural consequences

Interestingly, in reaching these goals other changes and consequences were also observed. As stated above, the goal of diminishing the boundaries between the different organizational units was met. But not only did people begin to communicate more freely about work related issues; they also began discussing topics that had not previously been discussed. During our interviews a number of employees explained how they were now more likely to start or take part in a discussion regarding e.g. sensitive topics or named persons, since it had become very easy for people to express their opinion to the entire organization without having to face anybody in person. This change in communication was evident in the topics and discussions that appeared in IntraKom; i.e. the management's strategic decisions and approach towards staff.

Thus, observing the communication in IntraKom it was obvious that not only did IntraKom *support* the company's strong debating culture, it in fact *enforced* it. Work-related and social communication involving groups of employees became more frequent and the discussions, jokes or social communication lasted longer than before the arrival of the conference system. Consequently, some of the employees ended up spending a lot of time communicating about different topics in IntraKom instead of spending this time on activities directly related to work.

In continuation of this the conference system became a meeting point for people who shared the same interest or hobby, such as fishing, wine tasting, movies etc. As a consequence of this enhanced social interaction a whole

new way of socialising emerged. A big part of the social talk in the hallways and kitchenettes moved from the physical space to the virtual space in the conference system: *“There is not so much talk in the hallways (...) where people stand with their coffee cup in their hand”* (interview with employee). The creativity rising from this informal chatting in the hallways was diminishing. Previously, people would put a note on the bulletin board in the canteen when wanting to sell their child’s bicycle or arrange a football match. Now this information and communication disappeared from the physical space. One example was a football match arranged by the technical support department: instead of putting a note on the bulletin board in the canteen or discussing it during lunch break, all practical details were settled through IntraKom without the participants meeting physically.

### 3.3 A new social and cultural order within the company

In conclusion, the implementation of the conference system did have some of the expected impact on the use context, i.e. the fulfillment of the management’s objectives. But at the same time it also had some unexpected social and cultural consequences: easier access to criticizing the management, more time spent on jokes and social topics, and less social interaction in hallways. Together with the intended impacts these unexpected consequences created a new social and cultural order within the company.

The new social order was viewed as both positive and negative by the staff. It was seen as a positive change for the employees who preferred written communication instead of face-to-face communication. Since the conference system created a common communication platform for everybody in the company regardless of age, gender, geographical placement, work areas, experiences etc. some employees saw IntraKom as a democratic improvement. Via IntraKom everybody could reach everybody and all messages reached the same number of people. This made it very easy for staff to spread their opinion, which *“will not be used against you”* (interview with employee).

On the other hand, new employees or employees who preferred communicating face-to-face felt that they had to communicate with their colleagues in an unnatural way. Instead of receiving relevant information via email they now had to keep themselves updated with news and social arrangements by logging into the conference system several times a day. Moreover, when using the conference system they felt insecure because written communication in a public space felt more committing than communicating verbally. Each message was visible to a large number of people instead of just a few listeners, and the message would remain visible permanently – not just the day or the moment it had been written. One of the employees told us that in the beginning he was often

nervous when writing a message in IntraKom to his colleagues, though normally he was not a shy person.

### 3.4 Externalization and internalization

In an Activity Theoretical context the creation of the conference system can be described as the management *externalizing* their ideas and meaning in the artifact, the conference system. On the other hand, as the employees gradually became accustomed to the use of the conference system and accustomed to using it as a tool to socialize and share knowledge with their colleagues, it can be described as the employees *internalizing* the properties and social characteristics of the conference system.

In fact we witnessed how the conference system became an almost integrated part of the way the employees cooperated and socialized with each other. Instead of thinking *“now I will write a message to my colleagues in the conference system”* they thought *“now I will tell my colleagues my opinion on this topic”*. They no longer considered the conference system an external tool they could pick up and use every now and then - it had become an extension of their own communication skills, a part of their psyche.

Summing up, the management created an artifact to change the use context, i.e. the way staff communicates within the company. But the new conference system not only provided the management with a new communication tool. It also created a whole new social order. Today it is imperative that staff use the conference system in order to maintain, preserve and enforce what is now the "normal" way of relating and behaving within the company.

So when implementing a new artifact into a use context, the impact is not only related to what was initially expected and wanted, i.e. the goals set forth by the management of the company. Since the design of an artifact requires the users to internalize the properties and social characteristics of the artifact, the implementation will always have some additional cultural and social consequences to the intended impact.

## 4. Conclusion and Future Work

Viewed in an Activity Theoretical framework, the design of a new artifact can be described as the designers externalizing their ideas and meaning into an artifact. On the other hand, using that artifact requires users to internalize the ideas reified as the properties and social characteristics of the artifact. Within this dialectic relationship, a designer changes the environment when creating the artifact, but when interacting with this artifact the humans are changed too.

In the future, artifacts based on information technology will increase in numbers. Therefore, it is imperative to

increase focus on the fact that our use of new artifacts changes our psyche, our way of thinking and acting. We believe that the Activity Theoretical framework will increase this awareness, but we also believe that further research needs to be done in this area. HCI would benefit from a widened design perspective, since the introduction of an artifact along with the expected impact has some additional social and cultural consequences.

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