

IT product requirements and certification from the users' perspective

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Abstract

Swedish experience and plans for certification of products for IT support from the end users' perspective are described and analysed. It is based on the Scandinavian tradition of strong involvement of users in all stages of IT development as practised by the trade union confederations TCO and LO. The notable success of the TCO labelling of personal computers and display screens is inspiration for labelling of flat displays, of mobile phones and of IT systems for support of daily planning by the end users at workplaces.

1 Introduction

Information technology (IT) is extraordinarily important at most workplaces in the industrialised world. The question of how well IT tools – which include personal computers, systems and software – are designed to meet the needs of the workplace users is crucial to their ability to use and develop their professional skills.

User-adapted tools create conditions for preventing work-related health problems, as well as facilitating work and keeping production stops to a minimum, thus contributing to the overall financial wellbeing of the company.

In order to create good IT support involvement of end users is required in all stages: innovation, specification, design, purchase, implementation, introduction and further development. This is the basis for the Scandinavian cooperative design tradition, with roots in the 1980s (Bødker et al 1987), (Bødker, Ehn, Sjögren, Sundblad 2001).

Here we specifically look at how certification of IT products, introduced by large end user organisations, Swedish trade union confederations, has proved to be an effective tool for continuously improving overall usability – and environmental aspects. Certification makes it easier for companies and end users to identify high-quality products when purchasing IT support.

2 TCO certification of IT equipment

TCO, the Swedish Confederation of Professional Employees, has worked persistently and methodically for twenty years to develop user and environmental requirements for IT equipment in close collaboration with users and researchers in a range of different fields, see (Boivie et al 1997) and (Hollander 2001).

2.1 TCO'92, TCO'95, TCO'99

At the WWDU conference in Berlin 1992, TCO launched TCO'92 – the first step in a quality and environmental certification programme for IT equipment. The requirements covered electromagnetic fields, energy efficiency and electrical and fire safety. These initial requirements have been developed further into the TCO'95 and TCO'99 standards and ergonomic and ecological aspects have been added. The requirements that must be met for a product to bear the TCO label have proved to match those expressed by the users. The label has become a *de facto* international standard with respect to quality (occupational safety and health aspects) and environmental requirements. Some 4,000 different models have been certified, and about 200 million computer users have thus far benefited from the advantages offered by the standard.

TCO started in the beginning of the 1980s to draw up requirements for displays as a response to the increasing number of reported health problems associated with IT equipment of poor quality. Sight problems, strain injuries and worries about the effects from electromagnetic fields were the most important issues.

At that time there were no reliable methods available to evaluate the qualities of the displays. Employers did not have the power to influence the IT-manufacturers to improve their product nor did they have the will or competence to do so. They had to use the technology that was offered on the market. And that technology was not good for the users.

By developing test methods and user tools making it possible to engage many users in Sweden as well as internationally, TCO was successful in creating a movement that put the pressure on the manufacturers. The Screen Checker was a simple checklist that made it possible for the users to

evaluate the ergonomic qualities of their own displays and keyboards. The Screen Checker was followed by *Screen Facts* in 1991, a brochure that was elaborated in close co-operation with experts and scientists.

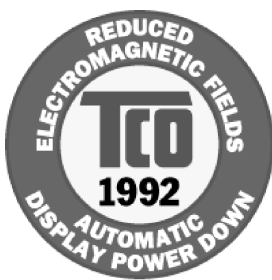
By developing the requirements into more distinct and detailed specifications that could be verified by tests and evaluation by independent test laboratories, a certification system was created. This increased the motivation for the manufacturers to improve their products and thus achieve the TCO certificate as a reward for their efforts. Today the TCO label can be seen on displays all over the world; in French steel mills, Swedish insurance companies, Japanese banks and U.S. car manufacturers just to mention a few examples.

The requirements and test methods for TCO certification as well as a list of certified products are today easily accessible through a web-site (www.tcodevelopment.com). This is an important factor that has influenced the international demand of TCO-labelled products.

2.2 Next steps in display certification

At this year's WWDU conference, TCO Development is pleased to announce the next step in its programme for IT equipment certification. The requirements are mainly concerned with the area of visual ergonomics, where there have been rapid technical developments in the recent years. The final labeling documents will be ready during early autumn.

A draft standard for the next generation of displays (CRT and Flat Displays) was sent out in February 2002 and is open for comment until May 31st.



2.3 Mobile phone certification: first steps

Most recently TCO Development launched the world's first quality and environmental label for mobile phones, TCO'01 Mobile Phones. The labelling has been introduced due to the fact that a lot of people get feelings of discomfort and inconvenience when using a mobile phone. The labeling was developed in close co-operation with external partners with specialist skills and covers the areas emission, ergonomics and ecology. The following example of labelling requirements can be used as a guide when purchasing a mobile phone.

- Low emission (radiation), max SAR-value 0.8 W/kg
- A communication ability TCP, of min 0.3 W
- No occurrence of cadmium, mercury and beryllium oxide
- Restrictions for lead and flame retardants
- No occurrence of chromium or nickel in surface parts to avoid contact allergies
- Ergonomic requirements for keys, display and manual

3 LO's Users' Award project

Inspired by TCO's work, the Swedish Trade Union Confederation (LO) – largest in Sweden, 2.2 million members, launched the "Users' Award" project in 1999. While an increasing number of employees are now involved in long-term development of the companies they work for, IT systems do not provide sufficient support for this trend. Thousands of millions of EUROS are poured into installation of IT systems that are difficult to understand and not well adapted to the intended uses.

3.1 Survey: workplace users' satisfaction

A survey by LO of users at 1,200 Swedish workplaces in the industrial sector shows that there is great dissatisfaction with the way IT

- IT support is considered to have improved collaboration and communication at only one in ten workplaces.
- One in ten users receives sufficient training in the use of the system.
- One in five feels that IT support has been and can be easily adapted for use with new tasks or organisational changes.
- Less than half feel that IT support contributes positively to operations at their workplace.

3.2 Users' Award research activities

The "Users' Award" project aims to promote the development of innovative IT support that provides users with a better overview of their company's operations, and facilitates their ability to influence the company's business. The project will help to persuade suppliers to deliver better programs and use better implementation methods. The system innovations that result from users collaborating with suppliers produce better solutions and improved commercial value – both for the suppliers and for the companies that use their products.

Comprehensive survey and development work is carried out in close collaboration with researchers at CID, the Centre for user oriented IT Design at the Royal Institute of Technology in Stockholm. CID is an interdisciplinary competence centre with researchers from technology, human and communication sciences, design and art. Researchers in human-computer interaction, industrial economics and manufacturing technology from research institutions in Uppsala, Gävle and Luleå also participate.

The project activities, in close co-operation with workplace users, include pilot projects on IT support for shop floor visualisation/simulation, for providing an overview of operations and systems in use and for mobility in healthcare. Other studies cover methods for implementing business systems at workplaces and for integration of system components from different suppliers.

3.3 Yearly prize nominated by end users

Yearly from 2000 a prize has been awarded by LO, TCO and CID to IT support nominated by satisfied users at workplaces as good technical and social examples. Each year we got about 25 nominations, of which 10 are selected on basic descriptions for visit and interviews and questionnaires with the users. A jury selects a winner and a runner-up among the 10.

Common qualities that users value in IT support are the opportunity to participate in and influence implementation, to gain an overview of the tasks involved in the company's work, opportunities for follow-up work and training, and to simulate and test different actions. In addition to these qualities we have observed that all nominees save workplace resources, human, material and time.

The first winner (May 2000) was a time scheduling system, TimeCare, at the emergency department at a hospital, Falu lasarett, where the nurses through a clever flexible planning program get work schedules much better adapted to their needs outside work than before. Sick leave has decreased 25% and the employees describe it as 'much more freedom in the whole life'.

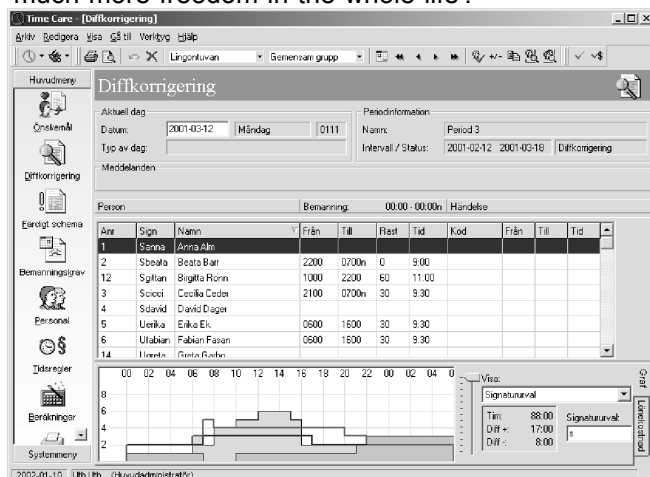


Figure 1. TimeCare screenshot

3.4 User certification

Experience and results from these activities form the basis for the Users' Award quality criteria for user certification of IT support. The list of criteria contains about 40 items under the headings Usefulness, Implementation methods, Technical design, Influence on work-related tasks, Work

organisation and co-operation, Follow-up and development. The first results from the certification process will be published in 2002. The experience from certification, requirements development and pilot projects will also be used in efforts to create a "users' movement" on workplace IT support. UsersAward will influence the system developers to provide better applications and structured implementation methods. The collaboration between users and developers will in the long run prove to give market benefits for both developers and the companies who use their products.

4 Acknowledgements

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