

Ergonomic Customizing of SAP-Software: Results from two Studies

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ABSTRACT

Users have evaluated the ergonomic quality of SAP-HR software installations as unsatisfactory due to deficiencies in the usefulness and usability of SAP-systems. These ergonomic deficiencies can be resolved supplementary ergonomic customizing, i.e. fine-tuning the system using a number of inbuilt "adjusting screws". However, a better solution is to apply the concept of integrated ergonomic customizing (IEC). IEC enables many ergonomic usability demands on the software to be identified early enough to be included in the system design during the introductory phase, resulting in a system that is user-friendly from the outset, more readily accepted, and easier to learn for later users, while avoiding costly subsequent changes due to functions that are either missing, faulty or inefficient. The following preconditions are essential for successfully integrating ergonomic customizing into the introduction of SAP-systems: a) the availability of practical procedures and suitable methods of investigation, prototyping and evaluation, b) the qualification of SAP-consultants in software-ergonomics and ergonomic customizing, and c) creating greater awareness of the concept of software-ergonomics amongst managers, project coordinators and system experts across the company.

Author Keywords

Ergonomic Customizing, SAP, Adjusting Screws, ISO

9241-10

INTRODUCTION

SAP Inc is one of the largest producers of Enterprise Resource Planning (ERP) Software. There are currently around 84,000 installations of SAP software in over 24,000 client sites spanning more than 120 countries, through which the SAP-system touches the daily lives of hundreds of thousands of workers worldwide. However, how many of these users have the opportunity to work effectively and efficiently with the SAP system, and do they actually enjoy working with SAP software? Is it possible for clients to adapt SAP software on-site to improve the ergonomic quality of the system? And if so, what procedures, instruments and methods are most suitable for the work place? These are among the questions that the two studies entitled "Ergusto" (Ergonomic Customizing of SAP) and "ErgoCust" (Integrated Ergonomic Customizing) attempted to answer⁶.

ERGUSTO

The aims of the Ergusto-Project were

To find out how SAP HR (Human Resources) installations differ ergonomically for personnel administrators;

To develop procedures for the ergonomic customizing of productive SAP-systems which are already in use, and

⁶ Ergusto and ErgoCust are two shared projects of three institutes: bao – Büro für Arbeits- und Organisationspsychologie GmbH in Berlin (under Jörn Hurtienne, Anne Jansen, Cornelius Müller), BIT – Berufsforschungs- und Beratungsinstitut für interdisziplinäre Technikgestaltung e.V. in Bochum (under Petra Abele, Stefanie Floegel, Reinhard Linz) and TBS – Technologieberatungsstelle beim DGB NRW e.V. in Oberhausen (under Bernd Stein). The projects are jointly financed by the North-Rhine-Westphalian Ministry for Economy and Labor and the European Union and are supported by SAP® as a dialogue partner.

To use the ergonomic adjustment options within the SAP HR-system to adjust and improve their ergonomic quality.

To achieve these aims, three tests were applied to the SAP HR module of nine companies working with SAP. These were *analysis, customizing and qualification, and check up*.

Analysis

Three steps were employed to achieve a reasonably complete picture of how the clients currently use SAP-HR. Firstly, all SAP users filled in a *questionnaire* covering the ergonomic quality of the SAP software used to perform their tasks (ISONORM 9241/10, [1]), knowledge of user-specific “adjusting screws”, levels of support for SAP users through the system, and the degree of participation in the introduction of SAP systems. Next, the work of three or four SAP users from each company was analysed in depth using *observational interviews* [2] lasting half a day each. On-screen work was videotaped and analysed [3]. Lastly, results from the questionnaires and details of the functionality and usability problems [4,5] identified in the interviews and video analyses were reported back to a *focus group* [6] within the company that categorised and weighted them according to their severity.

Customizing & Qualification

The list of deficiencies identified by the analysis became the basis of concrete interventions during the *Customizing and Qualification* phase. Adjustments to the system were prepared and introduced, while users and system experts underwent further training. Various system settings were adjusted by system experts through the use of so-called software-ergonomic “adjusting screws”. These adjustments were tested and documented, and finally implemented into the ‘live’ system. IT staff and system users were trained in parallel in how these adaptations would impact on daily SAP-system work processes.

Check Up

All participants in the project (users, system experts and decision makers) then completed another questionnaire to measure how successful these changes were at enhancing the quality of work, and where there remained room for improvement.

RESULTS

This paper highlights three areas of *ergonomic customizing* from amongst the numerous results of the study⁷.

Ergonomic Quality of Software

The overall scores of the ISONORM 9241/10 questionnaire from the nine companies are depicted in figure 1. The minimum limit of the software-ergonomic

standard is marked by the line at +1 [1]. Two things are remarkable. Firstly, the software-ergonomic quality of the SAP R/3-HR Module in question varies notably from company to company and secondly, only one company reaches the minimum standard (+1) for satisfying software.

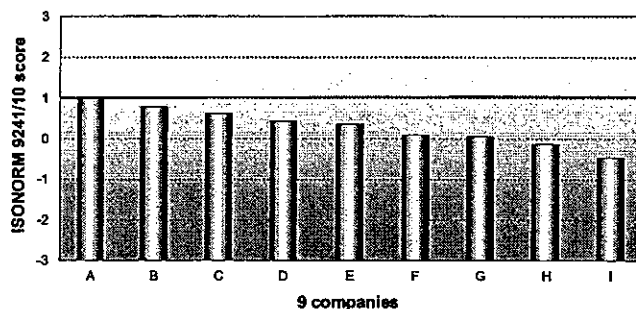


Figure 1: Ergonomic quality of SAP R/3 HR software in 9 companies (N=105)

These results arise from three factors: 1. from deployment processes neglecting software-ergonomic requirements, 2. from lacking knowledge of administrators and users about possibilities for optimisation and individualisation and 3. from different degrees of user-participation in the deployment project and the improvement process [7].

Deficiencies in Software Ergonomics

The observational interviews and video analyses highlighted hundreds of deficiencies and other findings in the software ergonomics. To facilitate the systematic resolution of these deficiencies, they were classified into three main categories; *deficiencies of the SAP-system, organizational deficiencies* and *user-specific deficiencies*; which were further divided into several sub-categories. The companies used these category lists on a day-to-day basis, for example to help focus groups identify common mistakes. They are also helpful for users as an ergonomic diary to continuously report problems.

„Adjusting Screws“

Many of the problems identified in the companies can be solved relatively easily by software-ergonomic “adjusting screws”. These include, for instance, optional settings within the SAP-system that are suitable for both users and system experts to adapt the system to the needs and preferences of the users. A number of these “adjusting screws” were identified during the course of the project.

Amongst the adjusting screws that can be used by *users*, are, for example,

- Allocating default values to various data fields,
 - Creating individual lists of possible values for entry fields;
 - Changing the layout of tables in masks, etc.
- Amongst the adjustment screws that can be used by

⁷ For more information on the Ergusto and ErgoCust projects, see the homepage www.ergusto.de.

system experts are, for example,

- Adding and hiding data fields in screen templates;
- Changing of masks with the help of the tool GuiXT;
- Introducing company-specific definitions for compulsory- and optional data fields, etc.

Knowledge of Adjusting Screws

The analyses highlighted the fact that many of these adjusting screws were unknown to both system experts and users. About half of the people working with the system did not know, for example, how to create individual value lists, or how to allocate default values to entry fields. This lack of knowledge is in the first place due to insufficient training for both groups. Trainings for administrators e.g. enable them mostly to keep the system going from a functional view, but they hardly get to know the various options to design a user-friendly system. Special "Tips and tricks" training courses for both system experts and users could significantly increase the use and awareness of these adjusting screws.

Utility of Ergonomic Customizing

When testing the effect of our measures in the companies using SAP, it became clear that ergonomic customizing could improve the ergonomic quality of SAP software. Statistically significant results for improvements ($p < .05$) were obtained for the four principles "suitability for the task", "conformity with users' expectations", "error tolerance" and "suitability for individualization" across the companies, as well as an increase in the ISONORM-

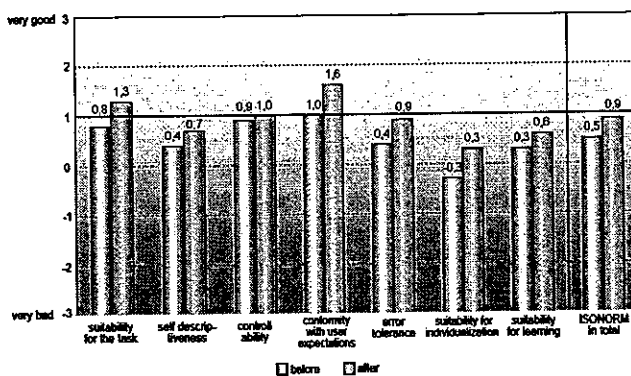


Figure 2: Changes in the ergonomic quality of SAP R/3 HR software through ergonomic customizing

9241/10-total score (see figure 2).

Analysing the results achieved by correcting deficiencies in the system shows that ergonomic customizing has an effect in the following domains:

- Increased effectiveness: tasks that the system was previously unable to perform satisfactorily can now be fulfilled more completely and with greater accuracy.
- Increased efficiency: obstacles and complications are circumvented.

- Reduced effect of mistakes: costly errors are avoided.
- Reduced strain: stress and mental strain from working with SAP are reduced.
- Increased productivity: Ergonomic customizing is a return on investment.

Preliminary conclusion

The results of the Ergusto project show that post-implementation improvements in the usability of SAP-systems that are deficient in ergonomic quality are possible, sensible and advisable. However, from the point of view of costs, efficiency and user satisfaction, it seems much more prudent to guarantee usability from the outset. It is therefore necessary to familiarize the consultants, experts and companies who use SAP with the concept of ergonomic customizing, and to provide them with the necessary tools to apply them to SAP. The ErgoCust project suggests one way of achieving this aim.

ERGOCUST

The ErgoCust project aims to integrate ergonomic needs and targets into the introductory process: in short, Integrated Ergonomic Customizing (IEC).

The conditions for successfully integrating ergonomic customizing into the introduction of an SAP-system, the IEC model, the implications for training SAP-consultants and customizers, and the importance of a parallel campaign of software ergonomics are detailed below.

Conditions

Certain conditions are necessary for the successful integration of ergonomic customizing into the introduction of SAP-systems:

- Practical procedures must be in place and adequate data collection, prototyping, and evaluation tools available (procedural model);
- IT-consultants specializing in SAP-products (SAP-consultants) must be familiarized with software-ergonomics and trained in Integrated Ergonomic Customizing;

An increased awareness of the importance of software-ergonomics must be created in the companies at management, project coordinator, and IT-staff levels.

The integration of ergonomic customizing into the SAP-introduction process on a broad basis can only be achieved in companies that satisfy these criteria.

Procedural model for IEC

In the first phase of the project, in cooperation with experts from SAP Inc., a procedural model for Integrated Ergonomic Customizing was developed and harmonized with SAP Inc.'s methods for introductory processes (ASAP Implementation Roadmap). This model considers the process of integration from an ergonomic standpoint, from initial planning using demand analysis, aim development and prototyping up to continuous improvements after the SAP-system has been

implemented. Ergonomic foci and suitable tools and methodologies for ergonomic optimisation were developed for each phase of the integration project. During this process some additional project tasks were identified using the SAP-method, but more frequently steps that had been foreseen were extended to include ergonomic aspects; for example, the integration of usability aims and indicators into anticipated project aims. However, contrary to SAP-methods, the procedure of the IEC-model is more user- than process oriented. As a result, one focus of the procedural model of IEC is early and extensive qualifying user participation, going beyond the Key-User-Concept as foreseen by SAP. Many options are opened by this approach, such as users being able to participate in the evaluation of aims and in prototyping. Since the procedural model for Integrated Ergonomic Customizing is conceived as a modular optimal model, it incorporates comprehensive options for ergonomic optimisation. To successfully integrate IEC into an implementation project, the elements of the procedural model that will be included must be specifically agreed at the outset.

Training

After testing our procedural model in SAP-introductory courses for companies working with SAP, a qualification unit in software ergonomics and in using IEC was developed for SAP-consultants, customizers, and project coordinators in companies using SAP. In addition to the classical use of seminars for instruction, the qualification includes software-ergonomic coaching in a real introductory project. Depending on the project-specific demands, the training can range from supporting the development of measures for a company, expert consultation regarding concrete problems that came up during the introductory process, to supervising the use of software-ergonomic instruments.

Campaign for Software-Ergonomics

In parallel to these activities, companies should develop a higher awareness of the importance of software-ergonomics in companies on a wide-ranging basis. Company decision makers should see it not only as an important factor in productivity and health-promotion, but according to legal regulations as an indispensable measure for those who work with computer screens. Only then can a long-term preventive strategy for the creation of company-specific user-friendly adaptive standard software, as propagated in the IEC-model, be developed in the work environment. For this reason, public relations work to raise awareness of the topic of software ergonomics forms a continuous, integral part of the ErgoCust project. In addition to company representatives, members of clubs, societies, associations, unions, professional trade associations, and so on are informed and motivated to spread the word.

CONCLUSION

There is room for improvement in the integration of

ergonomics into current practices of SAP installation. The potential offered for the ergonomic customizing of SAP software is barely being tapped. The ones who suffer in this situation are end-users and companies who encounter restrictions in effectiveness, efficiency and satisfaction. The solution for these problems can be found in the concept of Integrated Ergonomic Customizing (IEC), since it explicitly considers software-ergonomic user demands from an early stage in the process and factors them into the system.

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