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Work With Display Units
World Wide Work



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Ergusto: Ergonomic Customizing of SAP R/3

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ABSTRACT

Although SAP R/3 is a widely used standard software it has to be adjusted to the organizational structure and working processes in the companies applying R/3. Seen from an ergonomic perspective the result of the customizing process frequently is not optimal. The paper introduces the concept of ergonomic customizing and gives details about the project Ergusto. First results regarding the work with SAP R/3 HR are discussed.

1 Introduction

One of the big players in the market of enterprise resource planning (ERP) software is the SAP AG. More than 17000 businesses run its state of the art software package SAP R/3. Several thousand employees work with SAP R/3 on a daily basis.

Although it might be referred to as a standard software package, companies cannot expect to simply install SAP R/3 on their computer network and be ready to use it. First the software has to be adjusted to the structure and the processes of the business in question. This customizing process may take years to be completed. Since time schedules are tight and SAP consultants are expensive sometimes only the most necessary steps will be taken to adapt the software to the working processes and habits of its future users (Blume 1997).

It can be assumed that ergonomic requirements like those defined by the EC directive on work with display screen equipment (90/270/EEC) and the international standard ISO 9241 (1992, 1996)¹ play an inferior role during the customizing process and also thereafter. Seen from an ergonomic perspective companies might end up with their SAP R/3 implementations not optimally supporting an efficient, effective, and satisfying usage. But how can companies systematically check the conformity of their SAP R/3 implementation with ergonomic standards?

And what can they do if they encounter ergonomic problems? Instead of complaining to the SAP AG and waiting for the next version of R/3 to arrive they might

1. The ISO 9241 includes in its part 10 seven dialogue principles (e.g. suitability for the task, self-descriptiveness, controllability, conformity with user expectations) which refer to the interaction of a user with the software. Additionally, ISO 9241 part 2 takes into account that the properties of a software system can heavily influence an employee's working conditions. It states general requirements for the design of work tasks (e.g. significance, variety, feedback, possibility for personal development).

use the adjustment capabilities of SAP R/3 and start a new round of customizing to alleviate ergonomic problems. But how can this be done and what are the 'adjusting screws' to be used? How can they judge whether they have actually enhanced ergonomic quality?

2 Project Ergusto

A project, publicly funded by the German MASQT (Ministry for Labour and Social Affairs, Qualification and Technology) of the federal state of North Rhine Westphalia, is dedicated to provide solutions to these questions. The project is named 'Ergusto', an acronym for *ergonomic customizing*. Three institutes are collaborating to make Ergusto real:

- bao (Büro für Arbeits- und Organisationspsychologie) with a background on ergonomics, work and organisational psychology,
- BIT (Berufsforschungs- und Beratungsinstitut für interdisziplinäre Technikgestaltung e.V.) providing experience in the field of work oriented design and implementation of organizational structure and technology,
- TBS (Technologieberatungsstelle beim DGB Landesbezirk NRW e.V.) – a consulting agency for employees and works councils on ergonomics and health issues concerning technology at the workplace.

Because of the short time frame of the project and the complexity of SAP R/3 we restricted our research to the R/3 HR module (Human Resources). HR departments of about ten companies from different industrial sectors take part in the project. The project work at each company is divided into three phases: analysis, ergonomic customizing, evaluation. During the first phase (analysis) the current ergonomic state of SAP R/3 is analyzed. Ergusto employs a mixture of existing methods (e.g. questionnaire ISONORM 9241/10; Prümper, 1999) and newly developed methods (e.g. questionnaire ISONORM 9241/2, ergonomic mismatch-analysis). Data gathering is conducted using questionnaires, by observation of daily work with SAP R/3, and by standardized interviews and focus groups with end users.

In the second phase (the actual ergonomic customizing phase) employers, employees and project workers use the results of the analysis to derive and take individual measures for enhancing the usability of SAP R/3. Central to this phase is SESAM, the 'software ergonomic SAP action matrix'. SESAM is a database including known ergonomic problems and their possible solutions, the appropriate 'adjusting screws' to turn, the authorizations needed in the system, the stability of the solution against new R/3 releases and so on. Starting from this database people will get trained to use these options themselves, and agreed-upon solutions will be implemented and tested with the users.

The third phase of Ergusto consists of an evaluation to determine whether the ergonomic customizing in phase 2 had the desired effects – enhancing the efficiency, effectiveness and satisfaction of work with SAP R/3. In order to draw valid conclusions about the changes between Check1 and Check2 we aim at a control group design including companies not receiving the ergonomic customizing (phase 2) treatment.

3 Initial results

As the project is not yet finished, we present some preliminary findings showing that the chosen path to re-customize SAP R/3 HR ergonomically might be a successful one.

3.1 Screening

The following data are obtained by administering a questionnaire to 49 users in four different companies. Users in the HR departments judged the ergonomics of work with the SAP R/3 HR module (release 4.6).

The judgment of ergonomic quality of the R/3 HR system was measured by the ISONORM 9241/10 questionnaire (Prümper, 1999). The questionnaire focuses on the seven dialogue principles of the ISO 9241-10. Each of these principles is operationalized by five items. The questionnaire has a seven-tier, bipolar question format. The answers range from " - - - " (-3) to " + + + " (+3).

Most of the results in figure 1 show a weak positive judgment of the SAP R/3 users. Still, none of the seven principles reaches the score +1 which is regarded the minimum acceptable ergonomic score (Prümper, 1997). These results clearly indicate a potential for improvement.

Especially one score does not even reach mark zero – it is the one of the principle *suitability for individualization*. It also scores significantly lower than most of the other principles¹. The mean score is -0.5. Users said that SAP HR is not easily adjustable to new or varying working tasks, to the expertise level of software users, to individual visualization and working preferences.

1. paired comparison with ST, CO, UE, ET: $p < .05$; SD: $p < .10$, SL $> .05$, Bonferroni correction for multiple tests applied.

However these results are in contrast to the vast opportunities SAP offers for customizing. Several customizing tools have an impact on ergonomic quality to the individual user. These have been collected in the SESAM database. Some of the SAP 'adjustment screws' can still be used by end-users including adjustments in colours and fonts, the SAP table controls, the favourites ("bookmarks" for SAP menu entries), variants for reporting, setting defaults of data entry fields, the individualization of the list of possible entries.

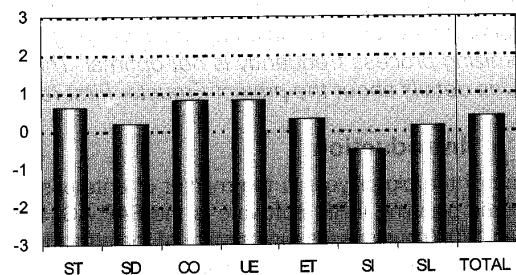


Figure 1: Results of user satisfaction rating with the ISONORM 9241/10 questionnaire. ST = suitability for the task, SD = Self descriptiveness, CO = controllability, UE = conformity with user expectations, ET = error tolerance, SI = suitability for individualization, SL = suitability for learning, TOTAL = ISONORM 9241/10 total score.

So why do users perceive only few possibilities for individualizing the software according to their own needs? Whereas this issue needs further investigation first results indicate that users sometimes simply do not know that these possibilities exist, how they are to be used, and how they are to change the usability of the system. Again users might not be allowed to adjust the systems through restrictive system authorizations or company policy prescribing standard SAP interfaces for everyone.

3.2 Working task analysis

Looking at figure 1 again we will find that also the score of *suitability for the task* is quite low (+0.6). In contrast, *suitability for the task* is regarded as the most important ergonomic principle by (our) users and ergonomic experts alike. This finding calls for action. In order to find out where problems lie and how they might be solved, we need to look at the real work users do with SAP HR.

Typical results from our visits to the user's workplaces are usage scenarios and error descriptions which can be fed into the ergonomic customizing phase. Three of these scenarios shall be illustrated here:

- (1) When a pensioner dies, his widow will receive part of the company pension in future. Even if she has never been employed by the company, some personal data like name, birth date, birthplace, name at birth, nationality are stored with her husband's data in the mask *Family/Related Person*. After the husband's death a SAP HR user enters the pensioner's leaving into the system.

However, in order for his widow to get the pension her data must be entered into the system as if she was newly engaged as an employee. The information will not be automatically transferred to the new infotypes. It is now necessary not only to enter her date of birth, name, address etc. but even to fill compulsory data fields about daily working hours, day of joining and separation from the company. Thus also the default value for the period of continued payment to sick workers has to be deleted in an extra step. The procedure lasts 10:58 minutes of which at least 2:04 minutes could be avoided by task-centered customizing.

(2) A user administering time data for people acting as substitutes for other workers has to enter four data items for each substitute (personnel number, time of beginning and end, position number of the worker they are deputizing for). Three of the items can be entered on one mask, then another mask is called and the fourth item can be entered after stepping through 18 entry fields. None of these 18 fields are ever filled by that user. By placing all four data entry fields on one mask the user could save eleven seconds on each such transaction.

(3) Some fields have drop down list boxes for the selection of the correct value. Earlier releases of SAP R/3 used to accept two-digit codes. Users badly miss the use of codes since they now search for the appropriate item in the list to select it. Very often these lists are not ordered in a sensible way for finding items. For example a list of dates (beginning with the day) is ordered alphabetically instead of chronologically.

These three examples make it plausible, why users consider the suitability of SAP HR for their tasks to be rather poor. The facilities offered by SAP R/3 HR, on the other hand, to adjust the system are multifaceted and could alleviate these deficiencies mostly without too great an effort. In examples 1 and 2 a task-oriented definition of compulsory and optional data fields as well as a re-ordering of masks and entry fields can save time. In

example 3 a re-ordering of the list items can be easily done. Even quasi codes can be integrated into this list. How this can be done is stored in the SESAM database.

4 Conclusion

The ergonomic quality of the SAP R/3 HR standard system is neither good nor bad. SAP R/3 HR *must* and *can* be adjusted to the specific needs of the users and their working tasks in the company. To be successful, this adjustment process has to be organised in a proper manner, i.e. it must integrate the know how of experts in ergonomics as well as the knowledge, wishes and experience of the users. We are confident that the Ergusto way of 'ergonomic customizing' can meet these requirements.

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