

Toward greater quality II: SENSE and how to use it

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Last year, on SQM-'94 in Edinburgh, Scotland we presented the idea how to measure the user interface in dependence of sex of end-user. Then we called our metric SENSE. Now we would like through our paper present our practical experiences and show how to use our SENSE to solve real problems in real world.

In this paper we are talking about results we got and how to use them. We are also talking about what it could happen when we use proper created interfaces suitable for one sex for opposite sex. Results are really impressive.

1.Introduction

Measurement technology serves as a foundation for all scientific and engineering disciplines. The benefits of using measurement are well recognised, as are the costs. Almost all progress in physics, biology, chemistry and other traditional scientific disciplines, has occurred through interaction between measurement of objects and events in the real world and their abstractions in the world of models and explanations. On the other hand, the application of measurement technology to software engineering and science is relatively new, and therefore its benefits are not recognised by most people who work with computers. The development and use of adequate measurement of software and its development process are essential, however, to the production of cost-effective and reliable software.

In last years we can observe a great attitude shift towards end user computing and employment of user friendly application oriented computer languages and software packages. The main feature of these tools is that the user interface is, at least from the end user's point of view, theirs most important part. But according to new findings in "mind and brain research" there are some cognitive variations (Kimura 92) between the sexes. It seems that (Kimura 92) women outperform men at rapidly identifying



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matching items, verbal fluency, arithmetic calculations and in recalling landmarks from a route. Men, on average, have an advantage in tests that require the subject to imagine rotating an object or manipulating it, mathematical reasoning, in navigating their way through the route and in target directed motor skills. Similar findings were also discovered in the computer field by other researchers. For example Canada (Canada 91) reports on different technology - related attitudes, behaviours and skills of women and men; Abouserie (Abouserie 1992) reports significant differences between women and men in achievement in computer assisted learning; Lage (Lage 1991) finds out differences in interests between sexes; and similar results were obtained by many other authors (i.e. Arch 1989; Cambell 1989, Smith 1987). Above variations suggest that man and women may have different interests and capabilities independent of societal influences. Thereafter it seems quite reasonable that user interfaces intended for women should be different from the interfaces intended for men. Such an interface is called a sex dependent user interface (SDUI) in our paper.

2.SENSE metric

The SENSE metric [Venuti 1994-Bled] was developed in last few years with the help of the SSM [Checkland 1981, 1990]. SENSE is defined as:

SENSE should enable the user to analyse selected user interface (UI) characteristics in the manner to transform them into a single number which after a comparison with proposed standard border values (see Fig. 1.) should clearly indicate for which sex the UI is more appropriate and if it is appropriate at all by formal (automatic) examination of UI programming support and the analysis of users feelings about the UI taking into account “state of the art “ in IT, ethics constraints, law etc. in the manner to achieve user satisfaction of both sexes..

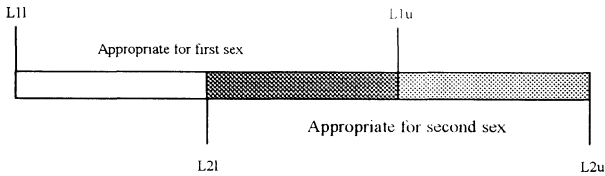


Figure 1.: Standard border values - SBV (L1l, L1u, L2l, L2u)

The use of SENSE metric can be supported by a software package presented briefly in figure 2. [Venuti].

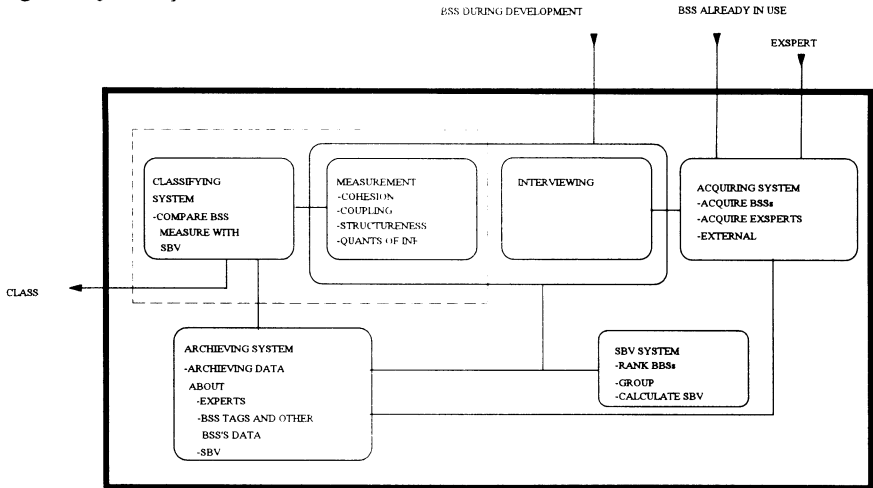


Figure 2. The Conceptual Model

(SBV stands for standard border value - see Figure 1)

The package consists out of five subsystems. The tagging system incorporates two activities: first - the measurement enables one to measure the UI characteristics and represent their "quality" as a single value (BSS measurement); second - the interviewing is used to empirically evaluate the BSS UI by interviewing the BSS users and also independent experts. In the standard border values subsystem empirical marks are applied to rank BSSs separately for male and female users using the Andersons method (Anderson 89). Each group of BSSs (male and female group) is then divided into three percentile subgroups. The first subgroup represents the BSSs from 1st to 5th percentile, the second from 6th to 95th percentile and the third the rest. The average of BSS measures the first subgroup represent the lower border (Lil), the average of the third subgroup the upper border (Liu) and the average of the second subgroup the optimum of appropriateness of the BSS UI. These border values are calculated for male group and female group separately and represent the basis for classifying the BSS UIs into four classes namely appropriate for male users, appropriate for female users, appropriate for both users and inappropriate. In that manner the SENSE can be used for three different purposes:

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- **find equalities:** to design an UI appropriate for both sexes
- **find differences:** to design an UI for women or an UI for man
- **enable free choice:** to design three different Uis - one for women, one for men and one for both. and to leave users to choose her/his favourite one.

2.1. Proposed procedure of measuring

Through our work now we can propose five necessary steps for our metric. That procedure is clearly shown on the figure number 3 and as you can see. no questionnaire is needed any more. This steps are as follows.

1. First it is to make graph of all screens of measured application.
2. Then it is necessary to choose input screens and analyse them
3. From analyse results factors COU asnd COH are to be computed. Also on this step we should count the number of input fields on each screen.
4. Now the hybrid equation is to be used to compute our result which we should compare with proposed standard border values (figure 4).
5. As we are not satisfied with gotted results. we should return to point one again (when we are trying to develop new interface).

In case of developing new interface. we should repeating this procedure from pointone to five. otherwise. when we are only measuring existing interface we need to follow only steps one to four.

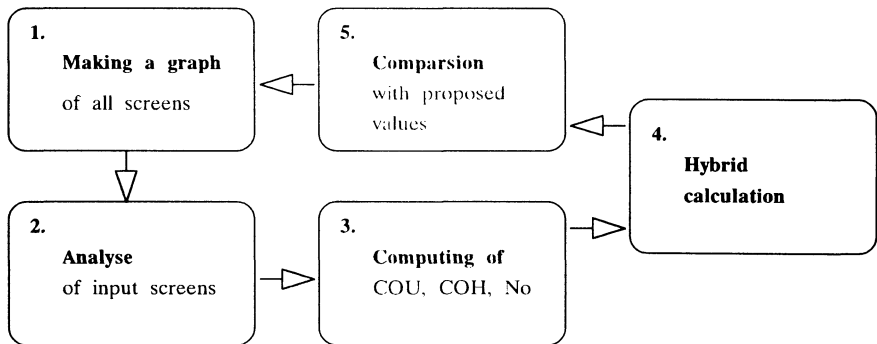


Figure 3. Graphic presentation of proposed steps



Results of majority of known metrics are usually presented as tables, but here results are pure numbers. That is mainly for easier use, because gotted number is only need to compare with proposed SBV.

3.Calculation of standard border values - SENSE in action

After some years of work we could finally compose a SBV diagram shown in table 1 and on figure 4.

SEX	LOWER BORDER	UPPER BORDER	OPTIMAL VALUE
MEN	2,5	6,4	4,6
WOMEN	5,0	9,6	6,6

Table 1. SBV

From the picture (figure 4) we create out of results from table 1 we could see, that in central part of measuring area are results suitable for both sexes, but results in both edges are more suitable for one or another sex

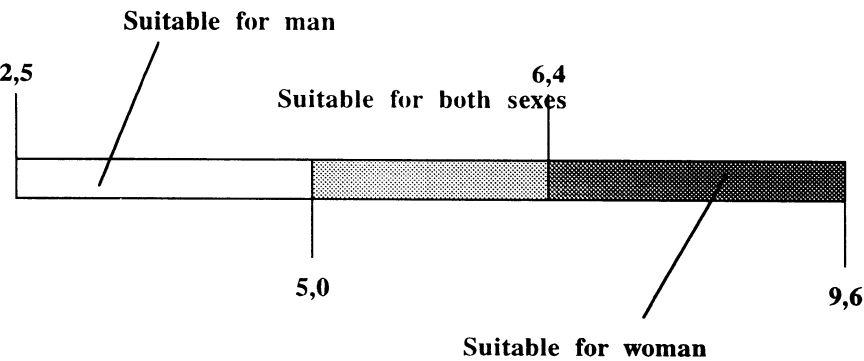


Figure 4. Graphic presentation of SBV

With the use of this new developed SENSE metric we have controlled the development of the software in our company KVIK. This software is developed mainly to control the financial flow of data through all stages of process from incoming of goods to

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selling them. Most important in this process is to input proper data on very beginning, when goods came in. This job is done mostly by women. But anyway we had to design two different kinds of interfaces for data input. That was possible only with use of our new developed metric. With such approach we have enormously improved the data input process. The consequences of this improvement are mainly that the error rate at the input point has dropped from early 11.4% down to 3.9% and the time needed for input is shorter nearly for one quarter. But that are not all of the improvements we reached with use of our method. The whole software development process is done more efficient, effective, with less resources needed and with lower error rate.

4.Conclusion

In the SENSE design process the SSM was used as the main intellectual tool. It is natural to ask question such as: *Does it work? Is it good? Is it more usable then approach X?, etc.* But, as Checkland (Checkland 1981) pointed out such questions can not be answered. There is in principle no way in which it could be proved or disproved that using the SSM was "the best" way to design SENSE. However, the success of our work in KVIK and some other companies show that the use of SSM and SENSE was successful.

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