Methodology of a CASE-Tool Assessment

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Abstract
This paper investigates the efficiency of international CASE-Tools, which were offered on the German market in 1994. In considering a catalogue of more than 400 criteria, which has been developed in cooperation with industry, 17 CASE-Tools are evaluated in the scope of a case study. Both the specific requirements of a CASE user and the common requirements derived from the ISO 9000 are taken into account as well.

1 Introduction
Due to the dynamic of the CASE-market and the complexity of products, choosing a CASE-product in practice is more complicated than at first sight. The following article therefore tries to offer guidance for the practician that reflects the state of the art of conventional and object-oriented CASE-technology.

2 Methodological approach for the CASE-Tool Assessment
The adequacy of a CASE-Tool for a certain company depends on the latter's strategic aims, the implemented hardware and software for development and production, the company's standards, the structure of organization and employees etc., and is therefore specific for each company.

This article thus aims to present general statements concerning the performance of the examined CASE-Tools. A conclusive evaluation of CASE-Tools can only be done including the specific requirements of each company.

Quality standards like ISO 9000 by gaining increasing importance for development processes, so that the requirements that can be derived from these standards are especially interesting. An example such a conclusive evaluation is shown by presenting two case studies. The weighting of the considered evaluation criteria was fixed either by a German insurance company or has been derived from the ISO 9000.

From an entirety of 60 CASE-Tools offered in Germany we selected 17 that fulfilled the following criteria:

- support of several phases of the system life cycle
- the analysing phase belongs to these supported phases
- a common user and data interface integrates the single tool components
- CASE-Tools that presented the largest numbers of installations

The evaluation was carried out by initiating the following exercise. Using the CASE-Tools our institute solved a system development problem that has been derived from the experience of a German insurance company. The advantages of this exercise stemmed from its scope as well as how representative it was. Due to its scope, the CASE-Tools could be evaluated for their concrete effectiveness throughout all the different phases of development. The essential part of the exercise was to design a data base application using modern presentation techniques (ERM, SA, OOA, OOD, etc.) and to transform it into executable code (SQL, C, etc.), including different user interfaces.

The CASE-Tool evaluation is based on a catalogue of criteria. This catalogue is founded on the experience that was gained between 1991-94 during the selection of CASE-Tools for education in business computing at the University of Cologne. The result is a check-list, containing more than 400 criteria that focuses on the support of methods of system development.

3 Results of the CASE-Tool Assessment
A complete list of all the strong and weak points of the examined tools is not possible within the remit of an article such as this. The complete results are in [1], a paper of 2500 pages that can be ordered at your institute. An overview of the essential information and the strong and weak points of the evaluated CASE-Tools is show by [2].

However, some general tendencies in the results can be pointed out. In comparison to Workstation-based tools the tools for Personal Computers have the advantage of a high user-friendliness at a low price. Also, PC-Tools extensively support the early phases of systems development. The weaknesses of PC-Tools are the low response time and the lag of functionality for code generation and qual-
ity assurance. WS-based tools are clearly superior to the PC-Tools in this sense. However, the prices are relatively high.

According to the support of methods, conventional tools have a greater degree of maturity than object-oriented tools. Almost every tool supports standards like ERM, SA/SD, although conventional tools are less efficient in the completeness of the development, which is due to irregularities within the underlying methods. In contrast to the conventional tools, no standard of methods exists for the object-oriented tools at the moment. The support of object-oriented methods (OOA/OOD by Coad/Yourdon, OOSA by Shlaer/Mellor or OMT by Rumbaugh) is limited to inheritance. Extensive re-use concepts, which are surely indispensable to planned and company-wide re-use, have not been discovered among the evaluated CASE-Tools. There are no functions available which systematically support the storage and tracing of classes or results of analysis and design.

The final evaluation requires a weighting of the results with the corresponding criteria. This weighting should be done in an individual way for each company. It might additionally follow the established quality standards as the ISO 9000. Multiplying the degree of fulfillment with the assigned weight of each criteria and then building a total only allows the possibility of putting the examined tools in an order of precedence. Figure 1 presents an example of both, a weighting by a CASE-Tool user (an insurance company) and a weighting derived from the ISO 9000.

As regards the CASE-user, the CASE-Tools of Softlab (MAESTRO II, 79%), Westmount (I-CASE, 64%) and Sterling Software (ADW, 63%) are of special interest, because they meet for the most part the requirements set. In the case of ISO 9000, it is completely different. The requirements for tool support of the software development process emphasize the point of supporting the documentation and quality assurance. But these demands are only met by a few CASE-Tools (e.g. MAESTRO II), so that in the overall placing, the ADW tool loses some of its importance (63 % to 44 %). This kind of approach illustrates the impact of individually weighted evaluation criteria on the ranking of CASE-Tools, that have been taken into account for an investment.

4 Conclusion

The evaluation shows that there are considerable differences within the various CASE-Tools that indeed require careful selection. The present data further allows broader examinations or benefit-value-analysis on the question as to which CASE-Tools meet the requirements of quality standards like SPICE, CMM or ISO 9000 at best.

Independent of the environment and method of development, recent approaches concerning modeling of tasks and business processes / business reengineering, have not yet become established in the examined CASE-Tools. The authors’ opinion is that the contextual and organizational aspects of business process modeling, possibly using reference models, are an important factor in the future success of CASE.

Fig. 1: Fulfillment of requirements of the 
evaluated CASE-Tools according to a CASE 
user and the ISO 9000

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