Chapter 11

DIALOGUE-BASED DESIGN OF WEB USABILITY QUESTIONNAIRES USING ONTOLOGIES

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Abstract Questionnaires are nowadays widely used usability evaluation instruments, and several generic usability questionnaires are available. But these generic artefacts are not always appropriate to evaluate a given setting, and constructing a questionnaire from scratch is a complex task requiring both expertise and resources, so that discount-usability approaches to questionnaire-based evaluation can make a good option in many cases. In this work, a novel knowledge-based approach to design Web usability questionnaires is described. The questionnaire model comprises different ontologies including concepts regarding questions and questionnaires, the different measures that can be obtained and the tasks that have to be carried out by users in order to evaluate a specific kind of Web application. As a proof of concept for the model, a prototype questionnaire design application is also described. The application demonstrates how facts can be gathered through a guided dialogue with the user, and how the system can use this information to tailor the resulting questionnaire to the concrete situation.

Keywords: Computer-aided questionnaire design, Ontologies, Usability evaluation, Usability questionnaire.

1. INTRODUCTION

Usability can be defined as the capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions [15]. Developing usable Web applications entails significant costs, since usability must be considered in all the phases of the development
life cycle [18], including evaluations at different process stages. Evaluations can be carried out using different methods, like testing, inspection or inquiry, which in turn comprise different techniques, like user testing [8], heuristic methods [21] and questionnaires [23], respectively. In this work, we focus on the use of questionnaires as a usability evaluation technique. Questionnaires can be used not only to collect factual information about users, but to obtain their likes, dislikes, needs, and understandings of the system by asking them about some concrete interface aspects. Questionnaires are widely used instruments in usability evaluation for many reasons, e.g. they are reusable, they can be used remotely, and they are a convenient vehicle for massive administration and so on. But the correct construction and configuration of a questionnaire may increase evaluation costs in terms of time and resources, because previous experience is needed in order to develop an appropriate questionnaire with a minimum figure of validity and reliability. If the questionnaire is not well-designed, biased results will be obtained, because it would not collect data about what testers really want to measure. Nonetheless, as pointed out by Brooke [4], the use of “quick and dirty” questionnaires – i.e. with no demonstrated validity and reliability –, is justified to allow low-cost assessments of usability in the evaluation of industrial systems. Several existing predefined questionnaires with good scores in validity and reliability measures can be used for that purpose, e.g., QUIS [14] or WAMMI [16], but they are not always directly applicable. Depending on the application domain, these questionnaires may not cover all the desirable aspects that must be evaluated, as occurs in educational Web applications, where a very specific set of parameters must be taken into account to obtain useful measures [6]. This fact points out to the necessity of constructing some kind of questionnaire-tailoring tools that could be used as “discount-usability” artefacts [22]. As a matter of fact, some tools that allow the construction of generic questionnaires are available, but very few ones are concerned with the specifics of usability evaluation. An exception is Perlman’s user interface questionnaire page (http://www.acm.org/perlman/question.html), a Web-based tool that reads questionnaires and options from files and form data, administers a questionnaire, and e-mails data to the administrator. However, this system has limited applicability, since it’s based on a generic, predefined questionnaire, and it does not provide guidance for the evaluators in the definition of the tasks that participants would have to perform to carry out the evaluation.

In this paper, we approach a computer-aided design process of usability questionnaires using a logic-based knowledge representation, in an attempt to overcome the just described limitations. Concretely, we use ontologies to represent both the concepts and the concrete information surrounding the design of a usability questionnaire. The integration and use of ontologies pro-