# Tool Support for Task-Based User Interface Design - A CHI‘99 Workshop

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**Introduction**

It is generally accepted today, that knowledge about the tasks the user has to fulfill with a computer system, plays an important role in the design process. Knowing the user’s tasks is essential for the designer to construct user interfaces adequately reflecting the tasks’ properties. We found significant support for this assumption during a workshop held at CHI'98, entitled "From Task to Dialogue: Task-Based User Interface Design" [1,2]. Also, there was one very clear result: Everybody at the workshop wanted tools. It was universally recognised that the user interface design process requires and supports multiple representations at all design stages, and that each representation requires and supports browsing, manipulation, and analysis tools.

We entered the discussion on tool support focussing on the following two points:

1. Given that formal methods are basically claimed useful and should not be explicitly used but implicitly as a basis for tools, what formal methods and tool support do we need for task modelling, dialogue modelling and for the support of the transition from task to dialogue modelling?
2. From the perspective of today's practical design work, in what way are task modelling issues dealt with, what is their impact on the design process, and what is needed for the deeper and more usefull integration of task modelling into the user interface design process?

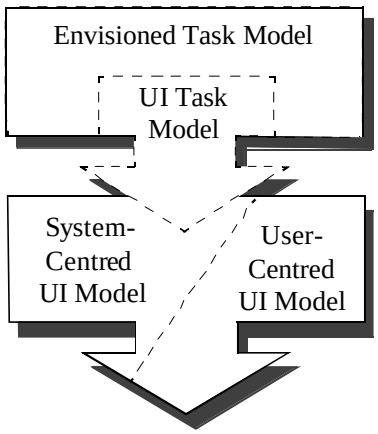
**Participants**

The workshop participants, including the two organisers, formed a group of 15 people from Australia, Europe and the United States, with varying background, perspectives, and experience. A complete list of the participants is available on the workshop web site (URL at the end of the paper). Also the position papers submitted were (and are) available on the Web to be read by the participants before the conference.

**Structure of the Workshop**

We started the workshop with a short introduction of ourselves and a presentation of the workshop topics. We defined the models involved in Task-Based User Interface Design, providing a deeper look on the transition from the envisioned task model to the dialogue model.

Our presentation included a short summary of the results of the CHI'98 Workshop, thus providing a common ground to start off with for all participants. Among others the diagram below was shown to define common usage of the terms in question.




At this point we proposed several topics to be discussed in subgroups. These topics were identified by us influenced by the participants' position papers, reflecting main issues expressed by most participants. We quickly agreed on the following two topics:

• Task Analysis for Task-Based User Interface Design
• Creativity vs. Generation

The group split up into two subgroups, and became engaged in a lively discussion process for the rest of the first workshop day, and the beginning of the second. Then the two subgroups came together and each subgroup reported the results, which was followed by a final discussion in the complete group. After the formal end of the workshop, several workshop participants stayed on creating the workshop poster, which was presented during the following conference days.

In the following we give a short summary of the subgroups' discussions, which were followed, but not directed closely by both of us.

**Group 1: Task Analysis for Task-Based User Interface Design**

The participants had the impression that they wanted to learn more about the task-based user interface design process. They started with questions like "Who will use a task-based user interface design tool?", "How will the future user of such a tool work?", "What are the tasks to be supported?", "What are the elements of models used, why do we need this information, how do we specify the necessary information?" and started an analysis process of the task analysis and design process.

The group organized the task analysis into five phases. For each phase information on "What has to be done?", "What are current tools for this step?" and "What could be future tools for this step?" were collected. (Details can be found in a table on the Workshop Website.) The first two phases ("Getting started" and "Data Collection") were defined in a rather standard way – they were considered to be executed based mainly on human, creative activity, so no special tool support was considered available or even useful. For the third phase ("Data Analysis") the participants found the necessity of model editors: This is basically the task modelling step, and it was postulated that powerful task editor environments were needed for this. Currently this is done with non-structuring tools, such as flipcharts or a word processor – but future tools should support the model and as such should allow e.g. consistency analysis. In this step, details of the data collection step are entered into a tool, elaborated to the necessary detail, informal elements are "cleaned up" and accuracy of information is validated. Editors to be used should be multi-user tools, allowing effective collaboration; the models should be stored in a database, inlcuding a semi-formal information structure for "problems" – a problem database.

The activities of the fourth phase ("Evaluation") aim at identifying problems in the task model created in the preceding step. The main tool for this should be a simulator, allowing the designer to observe task models executing and checking for ineffectiveness and invalidity. No tools used nowadays were identified for this – this work is currently done completely "by hand". The following fifth phase ("Envisioning") enhances the evaluation step by adding more "reality", more visual information to the task model structure. The goals for this phase are improvement and optimization of the developed model, the main tools requested were "story boarding tools" – so a visualization of the task model simulation is requested. The goal is to make the task model accessible to the future user, without presenting him the formal model structure, which would overburden him.

**Group 2: Creativity vs. Generation**

When discussing tool support for the transition from task to dialogue model, there was a general feeling that some parts of this transition could or should be automated, while other parts need the creativity of the designers. This problem is generally known, but the development of an appropriate tool support for the creative parts is a challenging problem. There is still a need for providing tool support that does not automate creative parts of interface design, automates or facilitates tedious or mechanical parts, and offers flexibility to users that allows them to make changes or to proceed in a number of different ways for each particular design. Formal models should not be equated with attempts to automatically generate a usable user interface.

The group attacked the problem by thinking about the goals first: The designer has to do a lot of work, with a large part of it being non-creative, mechanical work. The goal would be to take this burden off the designer's shoulders and let him focus on creativity. Also, a tool should help designers in their creative tasks, by identifying options and helping him in establishing elements in the models to be mapped onto each other, helping to bridge the gap between task model and dialogue model. The group tried to identify work pieces which necessitate creative activities and others

which do not. The creation of the model, filling them with current information, and refining this has been identified as creative process, whereas consistency checks between and within models has been identified as mechanical work. The creative potential of the design process was enlightened by looking at the "model space", and the designer's path through this space. The participants stated that design decisions are influenced by several domains, such as the current task model, the metaphores used, the interaction styles, external guidelines or heuristics, and experience from previous designs. All these together form the creative design space with the open question of how to represent this space and how to control the process.

When thinking about the "task model – dialogue model" gap, the group discussed the mapping of elements from one domain to the other. The designer has to identify patterns in the models used for systematic reuse and consistent mapping between the models. More generally spoken, mapping "candidates" have to be found in both models – i.e. information from one model, represented in some way or other in the other model. The mappings have to be performed, executed, and documented, and the results have to evaluated. When contemplating this, the question remains which parts of this mapping process can and should be automated, and in which way. If there were some automation process, the group claimed that it should be iterative, just suggesting, not forcing, and should allow the designer to perform easy experimenting. Then the group tried to do a small case study, but ran out of time.

**Coming Together**

At the end of the workshop, we found that the workshop had created concrete results for both topics. The task analysis subgroup came to a clear common understanding of the task-based user interface design process, although the feeling was expressed in the end that more investigation should follow towards the design of the tool. The other group had taken a close look at the automation-creativity dichotomy, and had developed a good understanding of where creativity was needed, and where automation would make sense. Overall, the complete group had the feeling that the task analysis and the creativity discussion together would be a sound basis for the design of a realistic and useful tool to support the transition from task model to dialogue model. So, look out for the follow-up workshop!

Please feel free to check the workshop web site to find more information (URL below, or via the CHI'99 Conference link).

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**About the Authors**

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**References**

1. Bomsdorf, B; Szwillus, G: From Task to Dialogue: Task-Based User Interface Design, SIGCHI Bulletin, October 1998
2. Website for the CHI98 workshop
   http://www.upb.de/cs/
   fachbereich/AG/szwillus/
   chi98ws

**Workshop WebSite**

http://www.uni-paderborn.de/cs/ag-szwillus/chi99/ws