

Collaboration-Based Usability Training for Developers

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Abstract

Applying user-centered design methodology, we developed a usability training workshop for beginning developers which has remarkable impact on participants' attitudes towards the collaboration with non-technical professions. Mainly through a simulation game we let course participants experience typical pitfalls of and opportunities for collaboration with non-technical professions in the development team, with the primary focus on User Interface Designers. Rather than teaching abstract high-level usability principles we induce learning by insight and social forms of learning.

1 The Challenge: What & How to Teach Developers?

Computer science curriculum studies are still slow to embrace user-centered development methods (Kaasinen & Clarke 1998). Consequently, much of the usability training and education for developers is left to corporate training organizations. In their specific context, corporate instructional designers need to address a set of typical problems in order to create effective usability training for developers.

Because tasks related to usability are not the professional focus of a developer, the allotment of time and resources for training is limited. As usability and interaction design experts, we face the problem that boiling down our expertise to a 2-day course runs the danger of resulting in commonplace statements. Additionally, developers are not and will not be usability specialists, no matter how much effort we spend on instructing them.

The variety of products which is common in a large software company, as well as the context of rapidly evolving technical platforms, make it hard for instructional designers to develop focussed training content. Meta knowledge on how to access and use standards is often more useful than knowledge on specific product standards.

Furthermore, user-centered development being a multidisciplinary activity, trainees need to acquire cross-disciplinary collaboration skills. Consequently, social and motivational aspects are much more important to convey in a training than encyclopedic, principle-oriented knowledge.

In this paper we present an approach which exemplifies the integrated application of Usability and Instructional Design expertise to the problems outlined above, and we would like to discuss it within the professional community.

2 User-Centered Instructional Design

The authors' professional background lies both in the fields of HCI and Instructional Design. While the User Centered Development approach to Software Engineering and the Instructional

Design methodology (Leshin et al. 1992) bear striking similarities for the purpose of our course design project they complemented each other extremely well (in terms of subject matter expertise and methodological conduct).

2.1 Needs Analysis

2.1.1 Organizational Setting

SAP favors a User Centered Development approach as introduced in the Enjoy initiative which resulted in the SAP R/3 “Enjoy” release 4.6. In the recent years SAP has built up a strong inhouse network of usability and user interaction design professionals (User Interface Designers) a developer can expect to have in his/her team.

SAP’s corporate culture treasures customer orientation, continuous learning, and teamwork. The training situation must respect and foster this.

Due to SAP’s world-wide operations, usually a multi-cultural audience needs to be addressed. In fact, we had people from up to 18 nations in a single course.

2.1.2 Job & Task Analysis

Since a developer at SAP can expect support from usability experts, he/she does not need to make User Interface (UI) design decisions on his/her own, but rather to cooperate with UI experts and other professionals, such as product or quality management specialists. This cooperation requires enough basic knowledge on user centered development methodology to participate in the process, and a basic motivation to do so. Since user centered development activities are better accepted, if they visibly speed up the development process, the training situation should take the opportunity to demonstrate this.

There is a vast amount of usability resources available at SAP Design Guild (SAP Design Guild), as well as various SAP intranet resources. A developer needs to know how to use and navigate within these resources in order to quickly find standards, guidelines, tools, and methodology support.

2.1.3 Target Group Analysis

We built on a database of interviews with beginning developers, and a collection of contextual work models (Beyer & Holtzblatt 1998) on typical development practices in the company. We also created two primary personas (Cooper 1999) as archetypical participants in our training. From these analyses, we identified the course goals and additional requirements with implications for the course design in terms of guiding ideas.

Beginning developers are eager to demonstrate their skills in the teams they are going to join. Consequently, they need to acquire skills which can be readily applied. User Centered development process knowledge might foster the demonstration of project management skills, fostering the participants’ career.

2.1.4 Training Constraints

For years SAP had been offering an introductory usability course for newly-hired developers. The course used to be a 2-days introduction into usability principles & techniques, which was exactly what developers and management expected.

Beginning SAP developers go through several months of training - Usability is one course among many others.

2.2 Course Design

2.2.1 Definition of Learning Goals

Based upon the needs analysis, we set the focus of our training & education efforts towards effective collaboration with the professional User Interface Designers a developer can expect to have in his/her team. According to our analysis, a developer needs to:

- (1) accept and understand the division of labor with User Interface Designers, entailing the cross-disciplinary collaboration among professionals. This requires a certain amount of attitude or mind change towards a better acceptance of and cooperation with non-technical professional roles.
- (2) be able to participate in an User Centered Development Process, including specific UI design activities.
- (3) know where to find and how to use relevant usability resources at SAP, such as contacts, guidelines, infrastructure, learning materials & text/web resources.

2.2.2 Designing Learning Tasks

In order to achieve the learning goals we needed to design appropriate learning tasks (Schott & Latzina 1995). For this purpose we had to break down the learning goals into specific learning objectives. Besides goals in the cognitive domain we needed to address skills in the domains of problem-solving, motivation, as well as individual and social action. Learning methods would need to accommodate these various domains.

E.g., to accomplish learning objectives in the motivational domain, the learning task needs to be intrinsically motivating. Or, in the social action domain, the learning situation needs to involve a collaborative situation combined with social reinforcements.

Therefore, as the core learning method within the 2-day training course we devised a theme-oriented process simulation game of about one day duration. Though not purely computer-based, as this is often being implemented in the case of simulation games (Oh & van der Hoek 2001, Pfahl et al. 2000), we heavily rely on the use of networked computing for the participants to accomplish the learning tasks.

This decision was guided by the overall goal to come up with an adult-oriented training method which would be suited for professionals. More specifically, we wanted participants to experience typical situations which would be very similar to real situations during a development project, and to have them develop solutions to typical problems on their own (rather than instructing them directly which solutions to apply).

In order to accept and participate in UI design activities, participants need to be motivated, and the effectiveness of the respective techniques has to be demonstrated. We chose short introductory lecturettes, and immediate hands-on experience with slightly simplified interaction design and usability methods to achieve this objective.

Participants expect to be taught on basic usability principles and solving design problems, but encyclopedic completeness is not required. Self-guided problem solving in the context of the simulation game, assisted by trainers, is our chosen approach here.

As an introduction to SAP Usability Resources, and how to find and use them, we chose to conduct a simulated low-fi usability test of usability-related intranet sites and other resources. This approach enabled us to combine the demonstration of a usability technique with research and navigation training. We also regularly make use of this opportunity to collect feedback for our own intranet subsite.

3 Course Outline

The final course design is a two-day workshop for 18-36 participants. During the course of learning events the group is split in several subgroups who need to coordinate their activities. Here is the overall course outline:

3.1 Preparation of the Learning Setting

We begin with a self-assessment of learning styles and ask participants to enter their scores in an (anonymous) group chart. Participants learn about the large diversity in the training group, and are told that the course is set up to accommodate each of the various styles with different learning tasks at various points of time.

3.2 UI Design Evaluation

We introduce Personas (Cooper 1999) as a tool for evaluating the interaction design quality of websites. This block is a lot of fun; it activates participants and motivates them for the experience-based learning in the next block.

3.3 Simulation Game: Pizza Service Solution

The Simulation Game is the core learning experience of the course. Participants design a pizza service solution, which includes three different but related user scenarios and technical platforms: a web scenario for the consumer, a mobile/handheld solution for the delivery driver, and a client-server platform for a pizza manager/dispatcher. Three ("development") groups design and develop paper prototypes for these scenarios under time pressure. A fourth group ("Task Force") does research on user scenarios, styleguides for the various platforms, and terminology issues. This group is also supposed to coordinate the development groups. In the final phase of the game, the Task Force tries to give support to the design process based upon their own results. Finally, each

team's achievements are evaluated by user tests, styleguide reviews, and terminology reviews, comprising both assessments by peers and by the trainers.

In a dedicated reflection phase, participants state which lessons they learned from the game. They spontaneously discover and state key factors for implementing a user-centered development process. We just collect these statements without interfering.

3.4 SAP Usability Resources

Participants form groups of three and conduct a simulated low-fi usability test of usability-related intranet and web resources (SAP Design Guild). We introduce the method and provide task descriptions. Results are collected on a voluntary basis.

3.5 Transfer of Knowledge Preparation

In order to transfer participants' learning achievements to their job and daily work practice, participants are motivated to form intentions, and to build commitment. Participants form small "buddy" groups, among which they negotiate and sign a learning contract (Schmidt & Wahl 1999). The contract states usability-related goals the participants have defined for themselves, how they intend to pursue them, and how they plan to deal with obstacles.

4 Evaluation

4.1 Goals of evaluation

Our training activities at SAP are explicitly embedded in a larger knowledge management strategy, aiming at the dissemination of usability knowledge to the larger communities of User Interface Designers and developers, by means of trainings & education (including self-study materials), intranet and web publishing, and toolkits. Consequently we continuously evaluate our activities with regard to benefits, redesign needs, and residuary training needs. Results are reported to management, the UI community, and also course participants to provide them with an overall picture of the course group's learning achievements.

4.2 Data gathering

For the overall course, we used the computer-based standard SAP University course evaluation questionnaire each course participant is required to fill out.

For the simulation game, we collected anonymous, voluntary statements from participants, what they liked or disliked about themselves, their team, and the simulation game. During the reflection phase of the simulation game, we additionally collected informal minutes of the participants' "lessons learned" statements.

4.3 Data Analysis

Data were analyzed qualitatively, partly with enumerating, by clustering statements in terms of evaluative feedback. We focused on identifying factors fostering or inhibiting learning achievements, and indicating opportunities for course redesign and training needs.

4.4 Results

Participants' feedback ranges from enthusiasm (~80%: "great simulation, great techniques, great fun") to disappointment (~20%: missing "usability theory/principles"). The key differentiator whether participants like or dislike the course is whether or not they understand the connection between project management problems in the simulation game, and usability problems. Those who understand the connection like the course, the others often don't.

However, even participants who disliked the simulation game as such, make interesting statements in the simulation game reflection phase. Based upon our evaluations of a number of courses we conducted, we find that participants repeatedly state the same insights which turn out to be in accordance with our learning goals. Here are some samples:

- time & proper project management are required to roll in user/task information, and usability standards
- the user perspective has advantages when compared to a purely technical perspective
- data-based design is a necessity
- developers feel bothered by task force - task force is disappointed by lack of interest in their results
- development teams become aware of their autistic behaviour
- task force members become aware of communication needs
- everyone sees the cost of communication, and that you need to look beyond your team to see the benefits
- Participants also develop own solution ideas (which we expect them to remember later at work):
- Task Force needs a coordinating role in the development process
- development teams need coordinators talking to adjacent teams
- network communication structure; a task force member switches between groups
- internal design reviewer role

In terms of redesign and residuary training needs, participants often request more specific training in UI design for specific platforms, such as web or handheld devices. We take this as an indicator that we achieved a strong motivation for further participation in usability training.

5 References

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