Social Construction of Technology in the Welfare to Work Project

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Abstract

This position paper presents issues that have arisen in the collaboration of computer scientists and social scientists in the Welfare to Work Project. The project's goals are to provide constraint-informed planners to support the work done by case managers in federally mandated "Welfare to Work" *(WtW)* programs such as Temporary Aid for Needy Families. The project is currently in the model-building phase. Social scientists have been interviewing case managers and program administrators to learn how the case managers make their decisions, and to collect the decision variables and constraints.

The actual application raises many questions relevant to this workshop (including privacy issues, and how to represent inferences that should not be subject to subpoena). We focus on issues arising from the radical paradigm differences between social scientists and computer scientists, and between academic research and real-world scenarios.

1 Introduction

Due to the task complexity and specialized expertise needed to develop most innovative technological systems and tools, collaboration is essential to the success of any robust product development and evaluation effort. Sophisticated conceptions of the design process pay attention to relevant participants, from programmers to end-users, throughout the process. The knowledge of both computer scientists and social scientists is needed. The *social construction of technology (SCOT)* approach provides strategies for understanding the complexities of the multiple perspectives inherent in collaborative design team processes, and can result in improved product design. In this case study, we apply the SCOT framework to describe the year-one processes and tasks of our project design team. The project goal is to use decision-theoretic planning with constraint solving to support case manager and client planning in social service coordinating programs mandated by the federal "Welfare to Work" initiatives.

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2 The Application

President Clinton first signed into legislation the "Welfare to Work" programs in 1996. They provide a set of support services to welfare recipients, with the aim of returning those recipients to the paid labor force. Services include financial support, health and mental health services, child care, transportation, literacy and job-skills training, and interpersonal skills training. Each recipient, or *client*, may receive a total of five years of services. These 60 months need not be contiguous; clients strategize how to go in and out of the programs to maintain later eligibility.

The programs are affected by a plethora of mandates, laws, rules and regulations. For instance, agencies must maintain a certain proportion of their clients' time in federally defined"eligible" activities, namely those leading directly to employment. These requirements are often at odds with the needs and desires of the clients. Services offered by a particular agency or even a particular case manager depend on local regulations, preferences, and availability of resources.

Uncertainty arises in every aspect of case management. Case managers must ask sensitive questions (such as, "Do you use illegal drugs,") have significant influence on the success of plans, but could have undesired consequences, such as the placement of client's children in foster homes. Furthermore, factors such as dependents unstable health, physical and mental health issues or

transportation problems, affect their participation in advising or planned activities.

Case managers and administrators admit that it is difficult for them to keep track of changing regulations, availability of services, and preferences. They are very interested in tools that will help them comply with regulations and be supportive of their clients.

3 The Welfare to Work Project Team

The ITR project, "Planning under uncertainty with constraints," has an interdisciplinary research team of five computer scientists and two social scientists with expertise in decision-theoretic planning, constraint solving and nonmonotonic logics, programming languages, database systems and reasoning under uncertainty (on the computer science side), and ethnographic research and cognition and usability (on the social science side).

The ethnographers have interviewed case managers and program administrators. Their interest is to model how managers and their clients make decisions. The collected data provide the computer scientists with decision variables and their domains and constraints. But, it has taken many months to reconcile disciplinary concepts of a decision variable.

Thus, it seems plausible that planning software could assist the case managers and their clients if the software is designed so that they can use and understand it. A significant portion of the client population in the Welfare to Work system is semi-literate or worse. Many do not trust authority, whether human or computer, perceiving it as surveillance. Thus, accessibility and usability are significant design issues.

4 The SCOT Model

SCOT, *Social Construction of Technology* [3], is a method of describing technology that takes into account multiple perspectives of relevant user and development groups. The interactions of these groups construct contexts in which meanings emerge and are negotiated. The social construction of technology framework was developed in the early 1990s as an alternative to user-centered design (UCD) models. SCOT analyses have been applied to design evaluations of various technologies as disparate as bicycles, computers and digital libraries [1]. While the user-centered design approach (UCD) was clearly an improvement over traditional, isolated systematic design, [2] UCD methods introduce inherent biases (of specific users, for example)that skew design requirements, usability, and end-user satisfaction. Both UCD and SCOT do focus on interaction between and among designers and users. However, SCOT is more fine-grained and critical, and can provide a richer picture of design problems as multi-faceted and complex. The resulting multiple design solutions may more aptly meet the needs of identified relevant groups.

There are several key concepts in the SCOT framework. First, the notion of *relevant social groups* is broadened to include multiple user groups in addition to end users such as affected or peripheral groups, programmers, evaluators, or funders. Second, *multiple perspectives*, even within the relevant groups, are acknowledged. Third, *interpretive flexibility* is considered. Findings from usability testing, under even slightly differing conditions, are acknowledged to effect outcomes and perceptions of the product. Fourth, *mediation* the influence of one group over another is acknowledged. Understanding how and why the mediation occurs is important. Finally, *closure* is resisted. In other words, at all stages of a SCOT analysis findings, impressions and insights are questioned rather than accepted. The choice to resist closure is an attempt to address the inherent biases of holding a particular perspective; the lens one looks through always transforms the view.

5 Applying SCOT Analysis to Our Work

The application of the SCOT model to the WTW project has been occurring in two parallel planes. In one plane are the end-users, those in the WtW program. In the other plane are the project team members, a group of academics from various disciplines who have been developing tools and negotiating mutual understandings of project work as the year has proceeded. This report on the utility of the SCOT approach focuses on the latter project group. In the following examples, we use the SCOT framework to foreground the realities of multiple perspectives on the assembled team of computer and social scientists.

Language, Communication and Misunderstanding: The negotiation of meaning and understanding of terms and acronyms has been a consistent theme. For example, "plans," "actions," "goals" have technical meanings in CS that were virtually unknown to the social scientists on the team. During weekly team meetings, repeated explanations of terms and meanings occurred. As the year proceeded the social scientists achieved functional comprehension CS terms. These negotiations are integral to, and ongoing in, our design process. Project documentation, especially diagrams of tool designs and processes, has helped bridge these two sharply defined vocabularies.

Mediation: Mediation is related to the process of negotiation but specifically concerns how (and why) one group influences another. Clearly, the researchers have a vested interest in achieving the project goals. To accomplish this, the team must bridge disciplinary differences. Influences are evolving as a function of intellectual teamwork and mutual respect for the expertise of each team member. Interestingly, this parallels the process of the team learning WtW language [4].

Resisting Closure: In the SCOT model, "findings," preliminary or otherwise, are subject to continued scrutiny and reinterpretation in order to achieve multiple perspectives on an issue. The impulse is to resist accepting the first understanding of, say, a decision-making process as described in a manual and to consider interviewing participants in that process to ascertain the actual complexities of the decision-making process. Resisting closure, in other words rushing to judgment, is a development issue in the design process. Naturally, there is ultimately closure. However, resistence is the SCOT response to "systematic design" methods that tend to have prescribed processes and "stages" that yield data participants accept as "facts").

In the course of group problem-solving, there have been interesting contrasts in how arguments are warranted. These differences relate to the use of causal vs. interpretive logic. The computer scientists seek causal explanations and want to compute probabilities from the qualitative data presented from interviews. The ethnographers resist these quantitative assessments despite the acknowledgment that the decision theoretic framework relies on these very probabilities. Ultimately, through the triangulations of multiple data sources, these probabilities will be elicited, but the interviews are designed to assist in other aspects of model-building.

5.1 Ethics and SCOT

A final highly illuminating example of resisting closure concerns the ethical issues that arise from the elicitation and accumulation of personal data regarding the WtW clients. Who will have access? Where will these data be stored? How will clients be informed? What rights will clients have or surrender as part of the process? The team has discussed these ethical issues in depth. Several computer scientists insist privacy can be respected. Others, both computer and social scientists, are skeptical. The ethics questions remain open. However, the team is now working to 'construct' a system, both socially and technically, that incorporates the multiple perspectives of each group. These groups include end-users whose interests are interpreted and presented by the social scientists, and database developers whose interests are interpreted and presented by the computer scientists. Through the dialectic of these evolving perspectives we endeavor to achieve the ethical position that both groups have come to value.

6 Conclusions

Three themes emerge from our insights from our application of SCOT to the WtW collaboration case.

1. Approaches that bridge computer technology and social constructs are essential to this decision-theoretic planning process. The SCOT model lets us address the complexities of the different languages related to project work.

2. In order to design effective GUIs and address other HCI concerns, our team must interact with each other and a variety of users.

3. The SCOT model provides a useful analytic framework for understanding the complexities inherent in the design teams' interdisciplinary, socially constructed understandings of the project goals, models of the end-users, highly functional and flexible tools and products.

Although the primary focus of our study is the WtW decision process, we have also come to study each other on the design team and to learn about each other's disciplines and methodologies. Ultimately, we hope that this will yield not only better researchers, but stronger analyses and more usable software.

References

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