

# Alternative to Technology-Driven Development: An Approach Based on Authentic Needs

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## 1. INTRODUCTION

It is difficult to design and build systems that address the users' actual needs. In fact, it is already difficult to get to know what those actual needs are, especially when the users' knowledge, habits, experiences, and sociocultural backgrounds differ greatly from those of the designer. During more than ten years of project-work in developing countries, especially in Tanzania, we have gradually grown to understand the complexities and subtleties that ICT-oriented development projects entail. In this position paper we do not propose another novel approach—quite the contrary. We suggest that established, approved, and widely-used methods from anthropology should be utilized in cross-cultural ICT-oriented development projects in order to gain a broad understanding of the local communities and people. We argue that a thorough understanding of local culture and society is a sine qua non of successful and sustainable ICT-oriented development. Technological development should not necessitate social and cultural changes [11].

The three main traditions of computer science—the logico-mathematical tradition, the scientific-empiricist tradition, and the engineering-design tradition [4]—are focused predominantly on finding and solving problems. The aims of those traditions are, for instance, coherent theories, investigating and explaining phenomena, and constructing ICT systems within budgets and time frames. None of those traditions implicitly or explicitly aims at sincere understanding of societies or individuals, their lives, their beliefs, or their actual needs. None of those traditions explicitly maintains the idea that culture or society would have any influence on technological decisions, either.

## 2. RELATED WORK

In the past, a number of human-centered approaches to design have been developed as alternatives to the problem-solving oriented design. Current (software) design practices divert from the technology oriented approaches and emphasize the early involvement of users in design process and the iterative nature of design. For instance, the standardized User Centered Design model [6] is now a de facto state-of-the-art approach in interactive software development. UCD framework, however, does not prescribe how each of the stages shall be implemented. The actual methods of its implementation can be found in user-centered design approaches such as Contextual Design (CD) and Participatory Design (PD).

Contextual Design [1] has been used successfully in many software projects. It involves users at the beginning of the development by using contextual inquiries. In addition, at the end

of each interaction the CD suggests to test the prototypes with users. One of the work models used in Contextual Design is a cultural model which includes values, influences, general feelings, and other characteristics and entities that come up during the contextual inquiries. However, the idea of culture in Contextual Design is limited to the organizational culture only: CD does not offer any advice on how the designers could learn to understand users whose cultural reality differs drastically from their own. Instead, it relies (rather optimistically) on the idea that any significant cultural matters will surface and will be understood by the designer during the two-hour contextual inquiries.

Participatory Design, on the other hand, advocates active user participation throughout the design process. Participatory Design acknowledges that there is no single best practice that could be used in all situations and offers thus a wide variety of different methods for designing. In fact, its fluidity and ambiguity has been regarded as one of its strengths [5]. On the other hand, Participatory Design is based on Scandinavian ideals of workplace democracy, and until recently, much of its research and discussion has been limited to the Western working life [8]. Exporting Participatory Design outside Nordic countries has made it clear that not everywhere local participation is appreciated (see, e.g., [2]), and that the local notions and ways of participation may vary [5].

None of the user-centered approaches does, however, take cultural differences explicitly into account. While the various user-centered design approaches provide sets of guidelines and methods from which a developer can choose, it seems particularly hard to successfully implement any of the methods in the developing world. For instance, the traditional participatory methods for defining the "needs" for new software product might not give the right view of the needs. The situation can be defined and interpreted wrongly by an outside expert who lacks cultural understanding. The monitoring of the future users might also affect their behavior; for example, it can evoke the feeling of an inspection being conducted at the work place.

## 3. PROPOSED APPROACH

In our work in developing countries, we have experienced the above mentioned problems. We have learned that understanding the local culture and context is a significant factor in technologically oriented development projects. Our research group has implemented the first contextual ICT projects in Tanzania in late 1990s, starting with very basic infrastructure in a local secondary school. Later, we noticed that the infrastructure development projects are far too optimistic about the usability of

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the Western technology and about the speed of the development. This kind of approach can easily lead to non-sustainable development [13]. The global, theory-based approaches to ICT education rarely produce applicable background for further development, given the local circumstances and the state of society [9]. The goals of the joint development projects are often shared between the stakeholders, but in the implementation phase the commitment of each partner might be weak. A contextual understanding might be missing from both sides [12]. Based on the lessons learned and on the problems we have experienced we have defined a CATI approach (Contextualize, Apply, Transfer, Import) for sustainable ICT education development projects [13].

As an alternative to the user-centered approaches, in particular to the initial phases of their cycles, we suggest an approach we have labeled an *authentic-problem approach*. Our approach is based on interpretive methods and it is aimed at gaining an in-depth understanding of specific sociocultural settings [7]. One of the cornerstones of our approach is reliance on ethnographic fieldwork. That is, we maintain that one cannot isolate single problems in a community or society and "solve" those problems, but the dynamics of those sociocultural systems must be understood thoroughly before sustainable positive changes can be made. Hence, our approach demands our researchers and the developers to live in particular communities and societies for extended periods of time and to observe, for instance, daily routines, beliefs, relationships, hierarchies, and interactions of the community's members. We aim at understanding the relationships between language, logic, society, arts, aesthetics, tools, design, artifacts, symbols, and ICT [10]. Although we indeed do begin development and prototyping very early in our projects, our work is at all times instructed by cumulative, holistic understanding of the particular culture and community we are living and working with.

Our viewpoint is that the starting point of any ICT development ought to be *what matters to the users*. Many user-centered design approaches include observation of, e.g., daily routines of users; in addition to that, we emphasize that when such observations are used to inform technology design, those observations are intertwined with the designers' own ideas, beliefs, and values. A deep understanding of the sociocultural surroundings gives the designers a wider frame of reference than many other user-centered design frameworks do.

#### 4. CONCLUDING REMARKS

Our approach resonates in a number of ways with what Cockton [3] has now called *Worth-Centered Design*. Cockton's worth-centered (originally value-centered) framework presents three initial activities: value identification, value delivery envisionment, and value impact assessment. In our development work we have emphasized the role of users as not only being active participants in the projects, but also the fact that the results have to be worth it (in Cockton's terminology), and are built on what really matters to the target users. Thus, in any of the three activities (the value identification phase, the delivery envisionment and impact assessment), the users in our projects play an important role as designers. Cockton also stresses that the evaluation of the impact shall not be done only during the interaction, but shall be approached with a long-term effect in mind. Similarly in our

projects, we have emphasized the long-term and sustainable effects of the interventions.

It becomes clear, however, that what constitutes a problem (or a value or a worth) in one context might not be a problem in another context. As a consequence, we identify a number of shortcomings, challenges and limitations of our approach. Firstly, our approach is time-consuming, as the problem/value/worth identification phase has to be done on a context-by-context basis, while the specific contexts change. Secondly, the costliness and non-generalizability are issues to be concerned as well. Thirdly, the approach is incommensurable and ambiguous, because the need analysis is done on the spot and in a contextually relevant manner. Finally, we rely on the main assumption that there is the willingness of the target users to collaborate and focus on the contextual development in the globalizing world of the standards.

We have presented here a number of aspects of our research that, through participating in several projects, we have found to be important for cross-cultural technology design. One of the main motivations underlying those aspects is to understand the authentic needs, wants, expectations, wishes, and hopes about technology, as well as fears and anxieties about technology. Our approach explicitly acknowledges the cultural differences there might be between the end users and designers, and explicitly aims at understanding and appreciating those differences. We admit that our approach can be criticized for being not entirely effective in traditional sense. We do not claim to present a novel approach in this paper, but we argue that the established, approved, and widely-used methods from anthropology should be utilized more, in order to bring the user-centered views already to the pre-project planning phases.

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