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Publication date:
2012

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Rodil, K., Eskildsen, S., Morrison, A., Rehm, M., & Winschiers-Theophilus, H. (2012). *Unlocking good design does not rely on designers alone*. Paper presented at ACM SIGCHI Conference on Human Factors in Computing Systems, Austin, United States. <http://cs.swan.ac.uk/nuisworkshopCHI/>

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Unlocking good design, does not rely on designers alone

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Abstract

This article describes on-going research in the design of sustainable systems to support transfer of indigenous knowledge between rural elders and city living youths in Namibia. Specifically we here address the importance of co-design and highlight some of our findings through experiences gathered from in-situ dialogues with village elders on designing NUI's.

Author Keywords

3D visualization, NUI, indigenous knowledge

ACM Classification Keywords

H.5.2. *Graphical user interfaces (GUI)*

Introduction

Being users and designers in Western countries we utilise, interact and create towards a wide array of differing available technologies. The jump between these fluxing digital innovations is smooth and although methods of interaction change, the graphical interfaces constructed often rely on previously learned *western ways of doing* and principles of design. When designing for indigenous groups or users with a different cultural background to the domain of Western principles, development immediately faces barriers on extensive levels. These obstacles can range from choosing the type of device to designing the interface and include

problem-solving on how to evaluate the prototypes in order that they infer and incorporate acquired in-situ knowledge into the development. Even though we have experienced much progression in going from laptop driven prototypes with textual interfaces to tablets with strictly visual GUI's and touch interaction, we constantly face issues with the design of visual metaphors. Through Participatory Design with indigenous groups other overarching problems arise in our process of co-designing usable and intuitive interfaces. It is evident that the choice of platform and design choices for these systems we wish to develop also embody discussions on ethical and sustainable areas, which we in the Western world don't face to the same degree. In this article we provide an overview of some projects we are working with that need to address these issues. We describe a shift in the way we design prototypes embedded in our experiences and that includes current research on developing cultural interfaces to facilitate indigenous knowledge transfer/management.

Overview

In order to preserve and convey Indigenous Knowledge between Namibian community groups separated by age and location, this research project aims to develop an indigenous knowledge management system, which villagers (especially elders) can use naturally-enough (without assistance) to manage IK digitally. A major concern and design challenge is the fundamental difference between the African indigenous knowledge systems and the western knowledge system governing designers and technology. Subsequently, it is important to investigate under what conditions this corpus of knowledge can be mediated and represented for city living youths with a minimal loss of IK content and

meaning. Previous work in the project has shown the inadequacy of text-based interfaces to facilitate knowledge management. Based on ethnographical field observations and reflections a number of design options, including speech output, picture-based input and tangible prototypes were explored, as described by Kapuire & Blake [1].

Since 2010, we have investigated the potential of 3D visualizations as supportive metadata in sense of creating context for IK content recorded as rich media by village elders, and investigating how 3D worlds can mediate the knowledge transfer between youths and elders. To support this approach we create a context around the videos as a 3D environment (see Figure 1), thus widening and adding to the information stored in them [1, 2].



Figure 1. Video plane with recreated cultural context

In our early pilot studies we conducted in-situ dialogues with the community's elders and youths to investigate suitable design solutions, which based on in-situ design dialogues have directed a shift between laptop driven prototypes and tablets.

Experiences and thoughts on going from 'Click' to 'Touch'

Various arguments can be mentioned regarding the choice of device, when planning to develop new interfaces for indigenous groups or cultures. What actually makes sense is that we in the western society are switching out the old traditional interaction, with touch interfaces as this allows designers to create interfaces for a direct interaction method – meaning no need for design consideration regarding external input devices. Touch interfaces have now become a more common method of interaction especially since the arrival of smartphones. If we then argue in our project context, that touch devices have a more direct interaction path than what we might experience with the older concepts of a mouse and keyboard, where usage first can occur when the concept of all buttons and ext. devices has been conveyed. It would seem more likely that any future attempts in a traditional setup will become obsolete compared with newer interaction technologies. The overall goal is to, with the creation of NUI's, limit the amount of training required in order to receive, in our case, knowledge from the prototype or creating the visual context surrounding it. Naturally, differing devices embody differing pros and cons. A short-lasting battery driven laptop with vulnerabilities towards sand, dust and heat is obviously difficult enough to imagine in the bush. In addition, if 50% of the physical interface is filled with 'unrecognizable' buttons, the necessity to find a different device and interface becomes apparent. We need also address that without sharing various devices and prototypes, we would not understand the strengths and weaknesses that each embodies. It has been obvious throughout the process of designing with indigenous elders, that we could not have predicted all

we learned without actually putting the devices and interfaces to real use.

Kapuire, K, G & Blake, E. provides in [1] an overview of the progression and shift in device and interface/interaction methods that has occurred throughout the various project stages. The device progression clearly detaches constraints like the need for a fixed power source and keyboard, leaving the residual left as a surface for touch interface design. But choosing a tablet comes with a price of smaller screen size. This may in certain cases not benefit the system, since some cultural groups and settings within is based on community sharing and co-design.

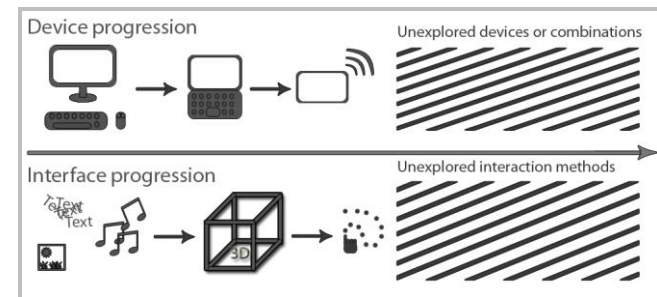


Figure 2. Overview of a parallel shift in both GUI and device.

The interface progression has; as described in the next section, increasingly focused on visual cues and more minimal interfaces and interaction paradigms. Many western knowledge databases are based on searching with key words and in return the users receive text, images, video clips and audio. As previous work described by Kapuire & Blake has shown, this approach does not optimally fit into a non-western cultural context [1]. Therefore we implemented an approach where a 3D environment hosted the knowledge as a

'visual' (not text-based) database. Figure 3 simplistically depicts the common layers of a system, which regardless of the device have to be reckoned with before receiving the core value from the system. Navigating 'easily' through these layers is a challenge, but these layers' friction can be reduced by removing unnecessary obstacles like a physical interface or minimizing Western-style GUI concepts, especially where for example, the supposedly generic metaphors do not translate into an indigenous context. Providing the user with fewer concepts to familiarize themselves with assists in retaining their focus and improves the interface design according to the needs of the specific user group.

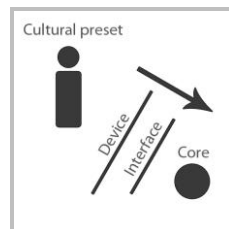


Figure 3. Many traditional systems embody several layers, which the user must penetrate in order to decode the core of the system.

Experiences from traditional and minimalistic GUI's to interfaces with culturally derived metaphors

During the development of our prototypes, it became increasingly important for us to understand the interfaces which we communicate through. It became evident, that we had to start slowly and subtly in order to gain a shared platform of understanding before we could delve into designing and building more complex interfaces. We had positive results with transforming IK

content into using digital visualizations as bridges for co-design, but to realize it as a core for a potential end product; we need to backtrack to investigate the role and impact of the device and GUI. Consequently, our modus operandi then became one of creating smaller prototypes with two separate aims. The first was to ask or begin questions and dialogues about the performance of 3D visualizations as contextual support for IK. The second was through discussions around the performance of 3D, to investigate the appropriateness of the device, how successful the interactions were in relation to currently developed tasks and relating it to previous prototypes. Finally, we investigated the GUI, the level and intuitiveness of metaphors derived from the specific cultural context and how these could be optimized. We packaged the first prototype in a clean minimal interface to create an unobtrusive and hopefully less intimidating user experience than prior examples. We used a Motorola Xoom tablet as the device. In order to evaluate the device's potential as a portable and touch based prototype, the GUI was kept to a minimum.

The reasoning behind the first tablet experiment was to investigate the touch device's ease of use compared to the traditional laptop setup. In parallel to have the simplest interface possible, without predefined concepts. As Figure 4 shows, the user touches on a virtual house, which is then placed under the image reference. By clicking the green button a new selection based on premises important for the research of 3D visualization is required (this particular experiment investigates relationships between camera angles and colour versus black-white virtual models). The simplistic nature of the tablet prototype embodied our expectancy of a frictionless and better user experience.



Figure 4. Minimal interface of the first tablet prototype.

For the prototype, designed without obstructing western designed 'alien' concepts (search fields, icons and symbols), we obtained promising feedback, which spawned interesting discussions on how to create a metaphor for the green button. From these discussions, we realized that our end products would require more elaborate and nuanced controls for e.g. an IK management system that would potentially house a plethora of videos and audio clips. Several elders; with no previous experiences with tablets, stated that if computers work like the tablet, then they must be easy to use. The touch interaction showed as promising, but as stated earlier, the GUI was very limited – close to non-existent.

Designing icons with culturally derived metaphors

The next logical step was to create cultural metaphors as substitutes for the traditional interface elements, but also fusing these with touch interaction to avoid previously described disadvantages with laptops, and to build on the previous success with touch interaction. Heukelman's research on designing cultural interfaces [3] inspired our initiating design, and from excursions to the rural villages we sought to find a replacement for an, to us, important action; the deletion of virtual

objects. As the elders in the village are the holders of the IK, we wanted to facilitate their designs and recreation of the contexts supporting the videos. We developed a prototype where the user could spawn virtual objects on a 3D terrain, thus allowing him to re-create his homestead virtually. With gestures, the user could move objects (one-finger touch interaction), translate the camera (two-finger drag interaction) and zoom (two-finger pinch). In this way, we were deliberately opening up for dialogue around the remaining/missing gestures. The long term concept is that whenever an elder uploads a video, s/he can design the context surrounding it, in this way ensuring that we don't interfere on that level of knowledge transfer.

Another member of the research team, originating from the village acts as a facilitator; when we conduct our design sessions with the locals, has close to his house a hole in the ground to dispose garbage in. It is partly covered with worn metal plates to support the sides of the hole, and immediately attracted our attention as the metaphor we were seeking. This decision illuminated our lack of local knowledge and from an intentional 'good design idea' proved to be functionally 'a bit off'. Village elders told us through our dialogues about the prototype, that the metaphor did not make much sense to them. The locals never just dispose things –they reuse them or find storage for later use. Was this wrong metaphor a product of western thinking? Maybe, but we can conclude that without the honest feedback from our co-designers in the village, this metaphor would carry on into following phases of the product/other prototypes. On the other hand, it is a good example on what we have since come to learn. That sharing of ideas with prototypes is concretizing

something that might be too abstract for both parties to design towards, thus it creates discussions on ways to move forward.

Conclusion

We agree to a certain extent with Chetty & Chetty when they in [4] state: "First, and foremost our participants' lack of experience with computers made it hard for them to co-design interfaces. Explaining our design required setting much greater computing context than it would in the developed world." It is by our opinion dangerous to increase training and emphasize the focus on computers due to a number of reasons. The first reason is that our indigenous co-designers are representing a larger group of individuals without Western IT training, thus the developed prototypes/systems should target them, not to convince our co-designers of our principles. The second reason is that we seek new ways of designing interfaces – it is time to be inspired, thus we should facilitate - not control the flow.

Naturally, we do not approach the elders with ideas we see cannot work as this would violate the trust built and maintained through many excursions. Without honest feedback from the co-designing community, we would of course never have learned from our mistakes. Through experiences from our prototypes we can say that good design relies on many factors, and finding the appropriate combination is not a trivial task (see Figure 5).



Figure 5. Unlocking good design

Acknowledgements

We would like to thank all indigenous groups and locals; who willingly have helped with participation in our studies.

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