

User-Driven Innovation in the Future Applications Lab

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ABSTRACT

User-driven innovation regards users as a resource in the innovation process. Taking prototypes of novel technology as a starting point, a dialogue with users becomes a springboard to generate new ideas. The user group is often highly specialized, and not necessarily the intended end users of the technology. The Future Applications Lab has successfully used this approach in several recent projects. In *Pin&Play*, we pushed the development of novel surface-based networking in collaboration with the staff of a film festival. In *context photography* we engaged a group of photographers with a unique outlook on the process of picture taking.

Author Keywords

European HCI, user-driven innovation.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

How can a research group create innovative computer-based artifacts and products, without falling in the trap of making technology for its own sake? The Future Applications Lab (FAL) is aiming to develop prototypes that embody novel concepts in computer technology, yet still fill deep and relevant user needs. To accomplish this, we are developing advanced technology in a dialogue with potential end-users. Users are not considered as a reference group that sets the specifications of a system, but as a source of inspiration that can foster innovation in its own right. The process is inspired by, but different from, human-centered methods such as participatory design. We call this approach *user-driven innovation*.

HISTORY AND STRUCTURE

The Future Applications Lab was started in January 2000, as a new research group at the Viktoria Institute in Göteborg, Sweden. It has its roots in the PLAY Research Group, which was formed at the Viktoria Institute in 1998, and later moved to the Interactive Institute [3]. PLAY became known for an unorthodox but successful approach

to HCI research, which emphasized the rapid development of novel prototypes and an openness to new ideas. However, while PLAY successfully incorporated influences from entertainment, art and design, in some ways the success of the group relied as much on pure inspiration and luck as on any carefully thought out philosophy.

The creation of the Future Applications Lab represents an attempt to take a systematic approach to the process of innovation, while retaining the freshness of ideas that characterized PLAY. FAL currently consists of a senior group leader (Holmquist) and five Ph.D. students in various stages of completion. The backgrounds of students include informatics, cognitive science, computational linguistics and physics. The technology areas under investigation can be broadly described as mobile services and ubiquitous computing. While no member has formal training in art- or design-related disciplines, creative fields such as music, film, photography and visual art are an important component in most projects. Funding comes mostly from public research sponsors, including the Swedish Foundation for Strategic Research and the European Union's commission for Future and Emerging Technologies.

USER-DRIVEN INNOVATION AND "EXTREME" USERS

To be relevant outside the research lab, new technologies must be compelling and useful for others than the developers themselves. Often, HCI research concerns the *post-hoc* evaluation of computer systems, i.e., the systematic investigation of how efficient a system or interface is when in use. As a complement to evaluation, users can also be a valuable resource before the construction of a system has even begun. For instance, *participatory design* was introduced as a way to involve users as co-designers at a very early stage when developing a system. Here, mock-ups and scenarios are often used in a dialogue with users to better understand the real-world implications of a proposed system [2]. Another popular approach has been to use *ethnographically inspired* methods, such as participant observation. Here, researchers observe and document the current work practices of a group of users, taking this information into consideration when creating a new system. This can help to ensure that the system is anchored in an existing work practice, rather than imposing a completely new way of working.

Our approach, *user-driven innovation*, is closest in spirit to participatory design, in that potential users are regarded as a resource in the design process. However, there are some

important differences. One is that our projects are often already well on their way in the prototype stage when we start to involve users. We are interested in cutting-edge technology, and in many cases, the initial idea for a project will be based on technical possibilities rather than any particular user need. Furthermore, unlike participatory design and most ethnographic approaches, we do not (necessarily) regard the groups we work with as the final users of a proposed system. Instead we see them as a springboard that will help us to push our ideas further.

For this reason, we are interested in finding users that have very particular and perhaps peculiar requirements. We believe such specialized groups are more likely to put our technology in a new light, thus giving rise to interesting ideas. We can think of them as “extreme users”, an analogue to the concept of “extreme characters”, which are persona that are created to generate ideas in interaction design [1]. As with extreme characters, the purpose is to inspire novel ideas that can be generalized for a larger audience. In several instances we have seen how the insights gained from working with specialized users has pushed the original technology and concepts much further than would otherwise have been the case.

SAMPLE PROJECTS

In the following we will highlight two projects as examples of user-driven innovation: *Pin&Play* is a novel interaction technique based on networking surfaces, and *context photography* is an exploration in new ways of creating digital images.

Pin&Play

Pin&Play is a technology for surface-based networking, originally developed by Lancaster University. A conductive surface acts both as network and power source for active components. A pushpin has been developed that is essentially a self-contained computer, which when pinned to a Pin&Play surface becomes connected to the network and can communicate with other pins. The technology itself is intriguing, but the applications created to demonstrate it failed to provide a truly compelling use-case.

To explore the technology, we decided to look for some heavy pin board users. We found them at a local film festival [5]. The staff of the festival use large pin boards to schedule the program for the festival, by collaboratively attaching numerous small notes to the board, each representing a film screening. After performing a small ethnographic study, we proposed a Pin&Play-based system that could help the staff in the scheduling process. Our ultimate goal was not to make a system just for film festivals, but to find general tasks that can be supported by the Pin&Play technology. For this purpose, the dialogue with the festival turned out to be very fruitful. In working with the festival staff we realized that there are many other scheduling tasks that are performed in similar ways, which could benefit from Pin&Play support. In this way, the film festival case pushed the technology in directions it would not otherwise have gone.

Context Photography

Digital cameras are becoming increasingly popular, but despite technological advances a digital photo is still created in basically the same as an analogue image. We are trying to find novel ways to extend the photo-taking process, for instance by attaching different sensors to a camera. The readings of the sensors can then affect the image, so that for instance a picture taken in a loud environment looks different from one taken when it's quiet, or an image from a hot day looks different from one taken when it's cooler – even if the scenery is exactly the same.

We created a first prototype of such a camera, and then found a user group with a very particular approach to photography [4]. *The Lomographic Society* favors an outdated analogue camera, produced in Russia, which creates unpredictable effects when a photo is taken. Most photographers would consider these cameras defect, but lomographers celebrate this uncertainty. In workshops, we let lomographers use our prototype and discussed how it would affect their way of taking pictures. They found the technology interesting but also had many objections – for instance, the fact that you can see the results on the camera display goes against the unpredictability that lomographers are striving for. Here, the user group constituted a way to generate new ideas in an exploratory project. We do not believe that a camera developed for lomographers would necessarily be appealing to a general audience. However, we found that their approach inspired us to think in new ways about digital photography, which will eventually lead to ideas for new products for ordinary users.

CONCLUSION

With this approach, we believe there is less risk that technical innovation is limited by the demands of a specific user group – yet we should not run the risk of developing “technology for its own sake”. Therefore, we have found user-driven innovation to be a fruitful way of joining “the best of both worlds” in experimental HCI research.

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