Designing Creative Tools: 
A User-Centered Approach to Ambient Home Design

Abstract. This paper discusses some key findings on user perception of an ambient home design application concept, which combines features of social media, Augmented Reality (AR) and 3D modeling. The two target groups chosen for this study were consumers looking for a new home and pro-users, who have professional or other special interest in decoration or renovation of apartments. In total there were 241 respondents for the scenario-based survey. It appears that there is a demand for easy-to-use design tools for consumers looking for a new apartment and also for professional users.

Keywords: user-centered design, user experience, interior design, ambient media

1 Introduction

At the moment, consumers and professional users have a wide range of different virtual home design tools available on the Internet. Home design services help users to figure out what kind of building products and decoration materials to pick for a home and what kind of furniture, household appliances and home electronics to choose for an esthetically pleasing home environment. Usually, the services allow model rooms to be created using ready-made 2D or 3D models.

From the user perspective, the challenge of virtual home design services is often that many of them are quite difficult to use, especially for users without earlier experiences of these services. Some of the services may also demand heavy installation packages or complex registration systems, which may be an obstacle for a user to start to use the service.

Ease of use is a central question in developing successful web-based home design user-tools. Ordinary consumers do not have professional knowledge about the use of applications and usually lack the time and willingness to start to use complex services, especially when they would need to use them only occasionally.

Social media features such as sharing, commenting, recommending designs and other social actions also bring real perceived benefits and they should be intuitive and easy to use.

In this paper, we discuss the challenges of contemplation of user-creation tools for an ambient home design application. The central idea is to explore users’ interests for the concept to find out what kind of features and specifications are required for the service concept.

Methods influenced by user-driven innovation [1, 2] provide a framework for the design process. We will use different methods, such as scenario-based surveys, to understand different user needs and motivations and possible contexts of use. In addition, we will later use participatory design methods, such as special focus groups, to ideate the service concept and user interface.

With an ambient approach we would like to like to emphasize the fact that a user can be exposed to the actual media application also in their natural environment rather than only from computer interfaces. [3] More specifically, we study what kind of
functionalities and values an augmented reality (AR) system based on digital images could have in addition to those of virtual interior design. The central idea is that with the help of mobile AR technology in particular the information about the surrounding physical world, such as the home environment of the user, becomes interactive and also digitally changeable, [4] so that it is possible to visualize materials and colors in real situations and contexts and link to some additional data, such as product information for objects. (See Fig.1)

![Image of AR in Ambient Home design]

**Fig1.** AR in Ambient Home design.

### 1.1 Concept evaluation and co-creation

We combine different methods to research the user-centred aspects and business prospects of an ambient home design concept. The main methods consist of

1. A *scenario based survey for bloggers and users for early concept development*
2. *Focus groups for bloggers, designers, users, advertisers and professionals*
3. *Advertiser interviews and co-design workshops*

In this paper we focus on user perception by the two target groups chosen for this study, namely consumers that are seeking a new home and pro-users who have professional or other special interest in decoration or renovation of apartments.

Some visualized scenarios were used in the survey part to help users understand the different possibilities of AR and 3D modeling and to inspire ideating of new concepts. Scenarios are fictitious stories which present users with different lifestyles, needs and interests. The scenarios can help to understand the possibilities of AR and 3D technologies, different use contexts and motivations to use the services.
Fig. 2. A fictitious scenario. A couple in their mid-twenties is looking for a starter home from a popular city area. They have many discussions how they are going to fit in their existing furniture and what kind of new furniture they need to buy. They use a virtual home design service and mobile AR to find a solution to the problem.

In the consumer survey there were a total of 205 respondents. In the pro-group there were 36 respondents, 15 of which were studying design and 21 of which were writing a blog on home decoration or a related theme. The survey was done in cooperation with a housing magazine.

Most of the consumers didn’t have any earlier experience of using virtual interior design programs before. Many of those who had tried them had experienced the programs as too difficult to use.

1.2 Virtual Furnishing

The respondents were presented a visualized scenario (see Fig.2) in which a young couple is looking for a starter home and uses home design service to furnish the different apartments they are considering buying. Users were asked if they find this kind of virtual furnishing service as useful.

A clear majority of the respondents felt that this kind of service could be useful, with 80% saying they could use this kind of service in the future and 9% saying they wouldn’t. 11% responded they couldn’t say.

In the first scenario an example of mobile AR was also presented. In this example, the young couple downloads an AR application that makes it possible to see through the phone camera how the furniture looks in the real environment. This was evaluated as a very interesting or quite interesting concept by 46% of the respondents. The consumers thought that this kind of modeling would be useful especially for people who have difficulty in visualizing things otherwise. However, some of the consumers experienced the mobile phone as being not very handy for this and suspected that it would be very difficult to visualize the placement of furniture through the tiny screen of the mobile phone. The pro-group users saw the mobile AR concept as less usable as they are more used to visualizing in their minds, but thought that it could be used on some occasions. One pro-group user explained:
“I would experience this kind of device as kind of strange, because I’m more used to visualizing things in my mind. The benefit would come when considering the location of some heavy, stable object like a fireplace, or a fixed wardrobe”

1.3 Sharing of the Designs

Getting input for the designs from friends and family was seen as important among the consumers. Most thought that it would be very interesting to see the designs made by others. However, the consumers had very differing opinions on if and how they would like to share their interior plans. The most popular way of sharing plans among consumers was e-mail, with 59% saying they would share the plans by sending e-mail. Sharing a printed copy was seen as a good choice by 47% of the consumers, while 34% of the respondents said that they could share their plans through Facebook. Quite surprisingly, 25% of the consumers said that they wouldn’t like to share their plans at all. Sharing through social media was a more popular option among the pro-group users than consumers; half of them were interested in sharing their designs through social media.

![Bar chart showing how consumers would like to share their designs](chart.png)

**Fig 3.** Sharing designs: the consumer view.

2. Discussion and Further Work

The study showed that there is a demand for easy-to-use design tools for consumers looking for a new apartment and also for professional users. In addition to sharing through social media, there should be more discrete and private ways of communicating and sharing designs. Moreover, there are many aspects that need to be discussed and studied further, such as the design implications and priority of different features for the services.
Acknowledgments. Omitted for anonymity

References