

# 사용자 리뷰 분석 방법론 : 빅데이터로부터의 디자인 요소 추출

## User Review Analysis : Extracting Design Factors from Big Data

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### 1. Abstract

A user centered design process comprises of several techniques to understand user needs, user experience and to test design concepts with real users. Many of these techniques require qualitative studies with small groups of users based on set guidelines and are time and resource intensive.

In this paper we propose a new technique: “User Review Analysis” that makes use of big data to uncover user needs. The technique consists of collecting and analyzing online user reviews on shopping sites such as Amazon.

The basic idea is that because of the fast and cyclic nature of consumer products development, the reviews of Today’s products inform the next product generation. The data is based on real experience with similar products; the aggregated insights provide us with design factors of the product that users deem important and attractive.

We report of a first study and compare the results with known techniques. The results indicate that the analysis of user reviews is a currently untapped and readily available resource to inform a design process.

### 2. Introduction

Currently, the relationship between designer and user is getting closer with increasing speed [Sanders&Stappers]. In order to convey the end-users’ experiences and thoughts into the design, various design research techniques based on user-centered approach are widely used [Mugge]. Among them, most well known techniques conducted early in the design cycle are Focus Group Interview, Contextual Inquiry and Cultural Probe. Those methods allow researchers to collect information about certain environment or product and also to provoke inspirational issues in User Experience Research. However, major purpose of these methods is discovering inspirational issues, user needs and information of specific product or situation. Extracting general insights from the user experience with products of the same category is still not commonplace.

With online shopping becoming increasingly popular, the opportunity to apply shopping usage data to user-centered

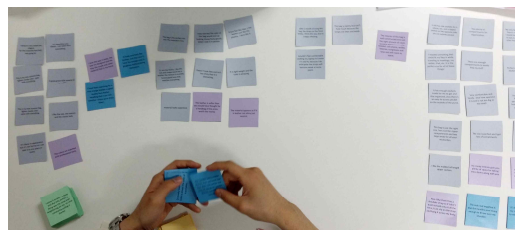
approach presents itself [Zhu. F], and allows the development of new research techniques. In this paper, we propose a new technique “User Review Analysis” that makes use of big data as the technological tool. Our technique is inspired on “after sales feedback” [Van Kuijk] as it is sometimes used in ergonomics design. Although any user review repository can be used, Amazon was selected for the implementation. Amazon is one of the largest online shopping sites in the world and has large amounts of user reviews and ratings. Note that in this paper, only fraction of big data is used because of limitations in current machine learning technology, but even this portion of data shows enough usability, pointing to its potential.

Furthermore, the development of this technique and its advantages over existing techniques are presented and discussed. It is hoped that ‘User Review Analysis’ will support in getting general insights in the context of usage for specific product categories faster compared to other techniques.

### 3. Study

We selected the Women’s bag for analysis because it is both fashion and functional, and bags generate a lot of reviews. Seven bags with more than 300 reviews were chosen for this research (total 2485 reviews). The reviews were scraped from the Amazon website, sorted, and quotes from the reviews were printed on colored paper cards, as shown in [Figure 1].

[Figure 1] Categorizing the review labels



Six design students were recruited and asked to group those cards individually and the results were compared. They grouped the cards according to similar issues (e.g. material, texture, color, harmony with wardrobe. etc.) to find out general

insights. Final grouping results shows meaningful design factors which should be considered when designing that product group. Based on those characteristics the key design factors were extracted and grouped again into 4 criteria: Environmental Harmony, Aesthetics, Functionality, and Social, as shown in [Table 1]. The Environmental criteria covers the factors that are related to other products or spaces, for example harmony with wardrobe. The material looks, feels, colors and overall feelings can be combined into Aesthetic criteria and represents the appearance of bags. Also, we could find considerable functional factors of bags and details are shown on the table. Social criteria covers the factors people think and react about the products. The criteria are varied according to each product groups.

The initial results [Table 1] show that it is possible to extract design factors from user reviews and to provide user insights with quotes that could inspire designers, not unlike cultural probes.

[Table 1] Example data as a result of the hundreds of reviews for six women's bags. Design parameters emerge including quotes of reviews that might trigger new ideas regarding redesign.

Criteria	Design Factors	Review Examples
Environmental Harmony	Harmony with wardrobe	<i>"It is very simple and elegant, for the corporate look that I was looking for"</i>
Aesthetics	Material Looks	<i>"Doesn't look fake and isn't too shiny"</i>
	Material Feels	<i>"It is soft as butter..."</i>
	Overall Feelings	<i>"It's classy in appearance but it's not formal..."</i>
	Colors	<i>I was worried the color of this bag would end up looking cheap/gaudy ..."</i>
Functionality	Material Functionality	<i>"Easy to clean even though the surface has a slight woven texture"</i>
	Functional Accessories	<i>"...no zip to the top"</i>
	Opening Functionality	<i>"It is good quality, but the opening is narrow."</i>
	Size,	<i>"I was able to store almost everything I needed... enough room for a small water bottle."</i>
	Strap/Handle Functionality	<i>"Feels very durable-strong handles..."</i>
	Weight Functionality	<i>Light weight, comfortable and handy."</i>
	Inner Compartments	<i>"Enough compartments to easily find my stuff. Handy inside pockets"</i>
Social	Social Factors	<i>"You can't attract more attention than you wanted...icebreaking..."</i>

#### 4. Discussion and Further Work

'User Review Analysis' complements existing user research methods due to three reasons. Firstly, user reviews are volunteered opinions, purely from the end user's vantage point. So the given data is not affected or polluted by researchers. Secondly, Steve Jobs said 'people don't know what they want until you show it to them.' The reviews report of user experience using real products in their daily lives, therefore extracting general experience-based insights of each product category is possible. Thirdly, the sheer amount of reviews and the fact that it is readily available and easy to access makes using this resource convenient.

Two limitations exist in our research method. To begin with, compared to qualitative studies such as focus group groups, it is hard to retrieve the demographics of the review population. As Amazon users are spread out globally, user review data are mixed culturally and socially. Additionally, it is hard to filter out Fake User Reviews. As more people depend on reviews while shopping, sellers hire users to write attractive reviews, regardless of the truth. There is no way to pick out these reviews.

In this study, we have demonstrated a starting point to explore user reviews as a useful design technique. For future research, holding workshops with related professional designers may reveal how valuable the factors we extracted are. Also, by comparing the research data of different product groups like bicycles (performance product, but contains life style elements) or shoes (aesthetic criteria, but is most of all a fashion item), we can figure out distinctive design factors of each group. Also, cultural and social trend analysis can be gathered by further study of nation-specific shopping sites. eBay Hong Kong and GMarket Korea are some examples. When geographical and cultural data are obtained, specific design considerations for each customer group can be tailored.

#### References

- Mugge, R, Schoormans, J.P.L., Hendrik N.J. Schifferstein, Incorporating consumers in the design of their own products. The dimensions of product personalisation. CoDesign. Vol. 5, Iss. 2, 2009
- Sanders E.B-N. & Stappers P.J, Co-creation and the new landscapes of design, CoDesign: International Journal of CoCreation in Design and the Arts, Volume 4, Issue 1, 2008
- Van Kuijk, J, Kanis, H, Christiaans, H, Eijk D. V, Usability in Product Development Practice: After Sales Information as Feedback, Proceedings of IASDR 07 November 12-15, 2007, Hong Kong
- Zhu, F. and Zhang Z. 2010. Impacts of online consumer reviews on sales: The moderating role of product and consumer characteristics. J. Market. 74, 2, 133-148.