

---

# Capture Use Experience in the Past: from Retrospection to Visual Gestalt Understanding

**Chung-Ching Huang**

School of Informatics and  
Computing  
Indiana University Bloomington  
huang21@indiana.edu

**Erik Stolterman**

School of Informatics and  
Computing  
Indiana University Bloomington  
estolter@indiana.edu

## Abstract

This research is about the untapped rich resource of information that is previous use experiences. Each person has a tremendous amount of prolonged engagement with interactive artifacts and systems. We believe the understanding of unique individual experience is necessary in retrospective studies, and recommend using visual techniques in user researches. We summarize visual approaches applied in prior longitudinal studies, which representing personal use experience from fragmented retrospective data. We then propose a tentative theory, from retrospection to visual gestalt understanding, as a complementary research perspective toward studying temporality in interaction.

## Author Keywords

Use experience; gestalt approach, temporality.

## ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

## General Terms

Design; Theory.

---

Copyright is held by the author/owner(s).

CHI'13, April 27 – May 2, 2013, Paris, France.

ACM 978-1-XXXX-XXXX-X/XX/XX.

## Introduction

Researchers in HCI have been introducing different approaches and procedures to understand prolonged interaction use experience. Experiments, long term observations and longitudinal studies, conducted within different time scales from seconds and minutes to months or even years, are examples of approaches researchers have applied to gain an understanding of user experience overtime. Inevitably, each research approach has its unique strength and potential weakness.

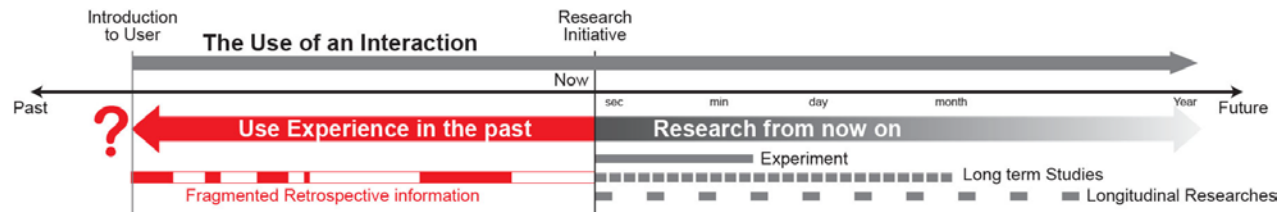
In lab experiments users complete certain defined tasks toward the research questions. Such tasks can be finished in a relatively short time period, such as seconds and minutes. The advantages of a defined task is that, with methodologies such as video recording, observation or software log the interactive use can be well studied and analyzed in a continuous and comprehensive way. However, applying detail logging and analysis to an interaction task which last for hours, days or months might require an enormous amount of research effort and is often beyond the scope of many research projects. Space and time constraints make continuous logging, observation and detailed analysis not applicable in some long term studies.

Considering in-situ interaction use beyond the experiment laboratory settings [4] many research methodologies also aim at studying prolonged use. Some of the examples are experience sampling method [2], day reconstruction methods [6], diary study [17], culture probe [1], or a combination of several procedures like data logging plus online diary [12]. Users report or record their own use several times a day with oral or text descriptions. Such methods allow

researchers to get an overall understanding of long term use without intense logging or observation; however, the collected data is inherently more *fragmented* in time and space compared to data collected in a lab context.

More importantly, it is not applicable to use the same research approaches, such as log analysis or intensive observation, to study *use in the past*. The reason is quite straightforward: *we cannot go back to the previous use context in prior space and time, and study the interaction using approaches we originally applied to understand what is happening right now*. For example, experiments can only be conducted after the researchers raise research questions. Time travel to the past to observe the prior use is also not applicable. Interaction use experiences are often heterogeneous, unique and not always reproducible. It seems that most research in HCI is concerned more with what is happening right now and in the future, and less with previous use due to the potential difficulty.

In this paper, we consider another data source of use experience, which is *retrospection of prior use*. Users examine their own use experience and explain it in many ways, such as describing a use scenario in conversation with others, posting an article on a social network, writing an essay or publishing an in-depth critique, or answering questions in a research interview or focus group study. Most of the previous use experiences are “memorized” by users, and memories might not be as accurate as empirical data from formal user studies. For example, we might falsely link a certain user experience to an event of a previous use. In many cases, memory is also fragmented and without an accurate chronicle order or scale. However, many of



**Figure 1:** Research Framing

the retrospective and phenomenological descriptions from users do consist of valuable insights, which can be a rich source for future HCI researchers. Design practitioners can also benefit from user's recall of previous pleasurable experience in order to achieve better use experience in the following interaction design.

In sum, information in users' retrospection that comes with various forms and styles is rich but difficult to analyze. Researchers might need new procedures or aids in the interview or focus group to help the participant recalling their prior use. We also need a way to systematically compare different description from users. Our research can be then framed as:

- *How can we methodologically reach back into past use experiences and gain access to valuable insights?*
- *How we can make a better use of the inevitably fragmented data that past experiences provide? (see Figure 1)*

When we aim at developing techniques that are suitable for capturing previous user experiences, this requirement has led us to focus particularly on *visual techniques*. Among many reasons for this choice, we

see visual techniques, such as sketching and drawing diagrams, to be "natural" and also easier to use. It is also more engaging to users when they are asked to reflect on prior use experiences. We also follow the trend of many previous longitudinal researches in HCI exploring new methods and tools [7], especially the visual ones.

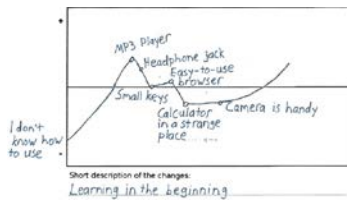
In this paper we first summarize and discuss some visual techniques already applied in prior longitudinal researches. Inspired by those works, we propose a "*gestalt approach*", using visual thinking to gain a holistic understanding from fragmented information, as a theoretical initiative toward use experience in the past. We conclude with reflections on this approach and future implication.

### **Visual approach applied in prior longitudinal and retrospective studies**

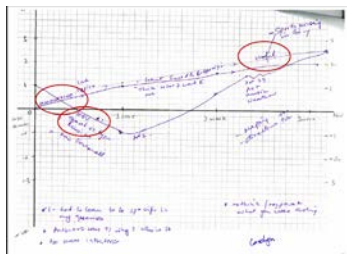
In the following section, we summarize some retrospective studies that to different degrees have experimented with a visual oriented approach toward partial and fragmented data. We also present our own research with similar purpose. These studies all attempt to support and inform an overall emergence of understanding from partial information.



**Figure 2:** iScale



**Figure 3:** UX curve



**Figure 4:** Retrospective reconstruction sketch

### *iScale*

In iScale [9] the participants are requested to “sketch” the use experience from the moment of purchase until now (see Figure 2). With the interface, participants can input an event by specify the days/weeks/months after / more hard to use”. Meanwhile, a text description is recorded regarding the value of the event, including how significant this event influences the overall experience and how confident the participants feel about the detail. As a result, users mark specific events in a chronicle order, and through connecting each events we can now see the trend of use in the past.

### *UX curve*

In the research of the UX curve [10], the template includes first a diagram of one measurement over time, and also a reserved area for participants to write down text description (see Figure 3). In the diagrams, a light grid is provided to imply the level, in positive and negative direction, of measurement of previous use including general relationship, the attractiveness, ease of use, utility, and the degree of usage. Participants are requests to draw a curve on the diagrams. Further they also annotate on the curve and explain the graph.

The tendency of one perspective in use is easy to trace in each diagram. The events on the diagrams also follow a pretty accurate chronicle order; however, it is not represented in a precise temporal scale on the coordination, which is different from the previous iScale example.

### *Retrospective reconstruction sketch*

In the final stage of a three phases user study, the retrospective reconstruction sketch template (see - Figure 4) are provided when doing an in-depth

interview [5]. After the first stage impression of use and second stage of three weeks use with diary, the diagram is provided toward retrospection of specifically three issues: innovativeness, ease of use, and usefulness. Since users have been involved in prior three week use study, the temporal scale is fixed and evenly distributed in three weeks on the diagram. The diary from users themselves, gathered in phase two, is also served as memory clues for sketching the curve. Annotation is also allowed on the diagram.

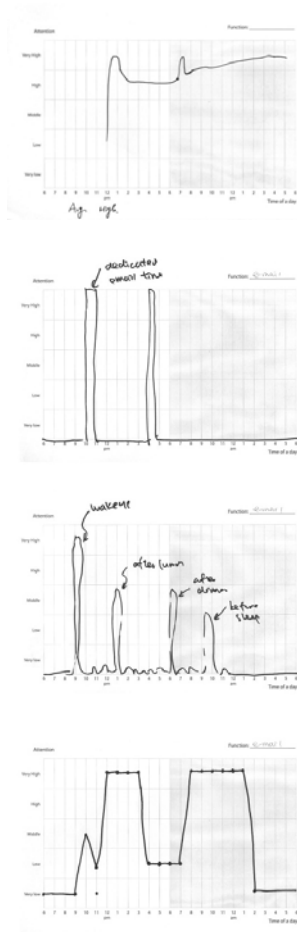
### *Sketch for a common use in a day*

In our early research [3] we concern how users think about their common use of email. Before we conduct the interview, we ask the participants to recall how they pay attention to email usage in a particular weekday. The participants have to think first about their previous use scenarios, choose one day in a week such as weekday or weekend, and draw the level of attention on the diagram (see Figure 5).

The various results are beyond our expectation even with a small number of subjects in this preliminary research. Meanwhile, the research facilitator asks the participant, in the following interview, to explain their sketch of email use on the diagram. The diagram becomes an aid for the participants to recall and think why the attention level increase or go down in that moment in an ordinary day. The interview protocols are then analyzed.

### *Discussion*

In the previous four examples, we see a visual fashion of sketching, thinking and recording of the previous use experience. Different diagrams are designed and applied toward various *measurements of use*



**Figure 5:** examples of drawing email usage attention level

*experience*. In the examples we have presented researchers have focused on one or more thinking perspectives when conducting retrospective studies. An aspect of measurement is purposely chosen for each diagram, for example, *easy or hard to use* in [9], *general relationship, the attractiveness, ease of use, utility, and the degree of usage* in [10], *innovativeness, ease of use, and usefulness* in [5], and *attention level using email* in [3]. All of the diagrams maintain a continuous chronicle order, but *the scales of time* in the diagrams are quite different, such as from purchase to now, exactly in the past three weeks, in a common week day, or generally in the past.

Overall, the visual form of retrospective record is an alternative way, for both participants and researchers, to see a trend in the past. Discrete events on the diagram can be discussed and annotated, and the linkage of events represents an emerged trend, *a gestalt*, of previous use.

### Theoretical Proposal: a gestalt approach

Based on the visual approaches applied in those prior user studies, we would like to explore and propose *a way of thinking*, which can be applied to many other retrospective studies in order to obtain a different understanding.

Since retrospective studies inevitably produce fragmented data in various forms, we have primarily focused our research on the question of *how to utilize heterogeneous and fragmented information in a better way*. In the design and psychology field, we find one concept that has been developed to understand wholeness from partials--the concept of "*Gestalt*".

### The background of introducing the concept of Gestalt

The German word "*Gestalt*" indicates a form or shape, and in English refers to a concept of wholeness. Gestalt principles, such as principles described in [21], are widely recognized in the visual design field or also applied in many interaction design cases, such as in [14]. Gestalt theory has developed a set of *principles*. For example, the more objects look similar to each other, the more they are perceived as a group (the principle of similarity). Continuation occurs when eye moves through one object and continues to another object as a tendency (the principle of continuation). If a shape is not completed but enough contours are revealed, human tend to close the shape (the principle of closure). When shapes are placed close together, there are perceived as a group (the principle of proximity). The core concept of the gestalt rule is to see the *emergence of a whole from the parts*.

Meanwhile, *gestalt therapy* is applied as a phenomenological dialogue, between therapists and patients, to help understanding experiences in the past. Through retrospection, the therapy helps the patients "to become aware of what they are doing, how they are doing it, and how they can change themselves, and at the same time, to learn to accept and value themselves." [20] We find the consultation and dialogue has a lot in common with the interview and focus group research methodologies, which researchers try to restore a holistic understanding through the self-description of experience from research subjects.

The concept of gestalt has been applied in prior music research [16] and narrative studies [15]. In both these areas, the sequence of basic elements in relation to the overall temporality has been the research focus. We

believe the idea of gestalt understanding can be also introduced to our field to explore similar temporal issues, such as the change of use experience in the past. Meanwhile, the idea of gestalt is already welcomed not only by practitioners but also design researchers in various design fields [11]. We expect this approach can be intuitively integrated into future researches.

#### *Visual gestalt understanding*

Here we further explain the core concepts of gestalt understanding. As we mentioned above, in various retrospective studies, text description is the main type of data, usually as a way of describing prior use. Text, as a form of data representation, is then less intuitive when it comes to developing an overall understanding. We might need to jump back and forth in the text, seek relevant descriptions and compare similarities or differences. Researchers have introduced customized coding schemes, which are often derived directly from users' protocol or extended from previous research, to analyze those text records and see the overall tendency. Meanwhile, visualization of information is already a well-established research discipline [19], and we can take user's protocols or descriptions and present in an engaging visual way such as word cloud or diagrams of statistic data. We can also display the data in a run-sequence plot, where all the information is displayed in a proper time sequence.

However, in our proposal *we consider beyond only the visualization of data*. One of the crucial aspects of gestalt is that visual images are extremely helpful in supporting emergent understanding. We then, therefore, propose: *beyond only visualizing statistics or temporal trend from text data, we can, through*

*retrospection, represent past use experience directly in a visual fashion*. One possible way is to allow users to draw a line or note some events as points on a dimension to show the change of use experience over time in the past. We already see some examples of techniques where this approach has been to some extent tested in those prior longitudinal researches mentioned above.

Applying the idea of gestalt into the human thinking process, Gestalt psychologist Max Wertheimer argues that the thinking toward a problem happens in two ways: productive thinking and reproductive thinking [18]. Productive thinking is solving a problem with current insight, and *reproductive thinking* is solving a problem with previous experiences and what is already known. It is a different way of thought, not carefully considering the rationale behind all possible causes and results but a leap in thinking, finding the relationship among already known information, and finally landing in an "Aha!!" moment when understanding emerges. Since we already suggest conducting retrospection of past use in a visual way, can we also analyze this visual information with a reproductive way? To do this would mean to deal with the question: *How to find the relationship among visual information, and see the emergence of a particular trend or pattern of past use experience?*

We propose *reconstructing* the use experience from fragmented visual information with various forms of *visual concepts*. Visual Concepts can be defined as components in the visual diagram. The meaning of the raise, the decline, or a specific turning point of the line draw by users, might reveal specific understanding in users' previous use. In the meantime, researchers can

also develop an overall analysis or argument of previous use experience, which we define here as concept or schema. Concepts can be also presented in a visual way, for example, researchers can describe one aspect of use experience and draw visual schema or representation, which is easily understandable by other research fellows, design stakeholders, or users themselves.

### Examples of visual gestalt understanding

In this section we introduce two related examples using visual gestalt thinking to reconstruct prior use experience.

Karapanos et al. have identified, from user's sketches, the segments of previous use [8]. Those segments are coded into three different *types of report* (discrete experience, overall evaluation with reasoning through the experience, overall evaluation with no further reasoning) and four different *types of sketches* (constant, linear, non-linear, and discontinuous) (See figure 6). They have developed micro use concepts regarding to each segment of sketch from users.

In our early research of email usage in [3], we also use a similar approach to define the visual elements and concept on the visual diagram. For example, we have defined a graphic annotation to analyze users' sketch of email using trend. Each raise of attention of email usage can be described as a *session* of using email, and each session has its *duration*. There are *intervals* between different sections, and the number of section in the duration of time means the *frequency* of use session (see Figure 7).

We also provide coding theme for users' interview, such as elements of time, focus, attention, action, notification, and intention of use, which is derived directly from users' protocol. With both visual based concept coding and text based concept coding, we analyze the protocol and diagram of attention level. Through the analysis, we conclude with two main trends of using email: with plan and no plan (see Table 1).

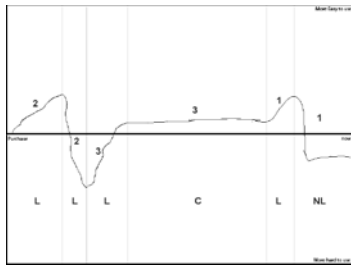


Figure 6: free hand sketch and identify the segment

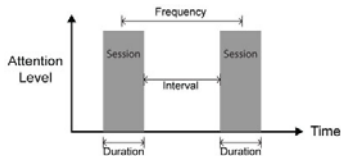


Figure 7: graphic annotation

Pattern A: with plan	Pattern B: no plan
User preplans 2 sessions of email usage with high focus	User does not plan for email usage
Unfinished work will be postpone to next session	The email notice will trigger the attention and a session.
During the interval, he will turn off the notice and warning to stay off-focus	He judge weather to start a section by <ul style="list-style-type: none"> <li>Review mail title</li> <li>See current schedule</li> <li>See current activities can be interrupted or not</li> </ul>
If he finds some empty time beyond his daily schedule, he will engage in an opportunistic new session	The length of each session is short

Table 1: two email use patterns [3]

Those are examples researchers carefully define concepts and analyze the previous use with those concepts. It is a bottom-up process, which has many similarities with text coding scheme in protocol analysis basing on ground theory. What we propose here is

defining different form of concepts, in both text and visual ways, to think and reconstruct the previous use.

### Reflecting on the gestalt approach

In the next section, we reflect on the potentials of using gestalt approach to understand user experience in the past.

#### *Filtering Information when Choosing Perspectives in Visual Retrospection*

We have been highlighting in this research that retrospective research often lead to fragmented information. Therefore, one possible solution is seeking as much information as possible through multiple research methodologies, with the expectation that taken together the data will lead to a comprehensive understanding of use in the past. As a result, we get more and more research data which is still fragmented information, and unfortunately, we still encountered difficulty finding proper use patterns or insights. Through our proposal of gestalt thinking, we examine use experience in the past with a different direction: instead of comprehensively collecting every piece of information, we recommend taking some perspectives first, and purposely omit irrelevant information.

In the examples we have presented, researchers have focused on perspectives such as easy or hard to use, general relationship or degree of usage, which reflect on each diagram in a retrospective study. For participants, each diagram is related to just one aspect in the previous use experience. The subjects can then stay focused, identify the related use scenarios as points on the diagram, link those points to show a trend of use, and reflect directly with the visual retrospection.

With the belief of gestalt understanding, we can still be satisfied to see the emergence of patterns from fragmented but related information in user's visual retrospection.

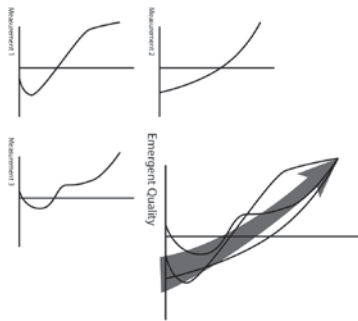
#### *Emergence of properties from synthesizing various gestalt thinking of prior use experience*

Various trends of use experience toward one interaction can be collected, in a visual way, from unique measurement and perspectives. If we synthesize those trends, such as simply overlay the diagrams, we might see the emergence of an overall quality regarding this interactive use experience (see figure 8).

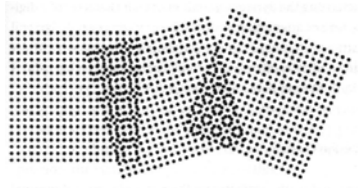
The synthesis and observation of the emerged quality is quite similar to the concept of *dynamic gestalt* [13], when a new pattern suddenly emerges in the process of overlaying existing patterns with various angles (see figure 9). In other words, through constantly review not only one but multiple perspectives related to use experience, we can see if there is an *overall character* emerged in this interaction.

### Implications: A complementary research perspective

We do not intend to argue that many current user study approaches should be replaced by our proposed visual gestalt understanding. In fact, each research method and procedure has its unique strength toward a specific desired research goal. Instead, what we would try to suggest is a complementary research perspective that could be added to those in experiments, observations, and longitudinal user studies of future use. By recognizing that retrospective information is always fragmented but also rich, we can apply gestalt thinking and research with discontinuous and less



**Figure 8:** overlay of visual trends and emergent character



**Figure 9:** a metaphor of dynamic properties



empirical data. Through exploring the visual trend and concept understanding, we can be more confident that the gestalt understanding of prior use experience can be as equally significant, to all the design stakeholders, as research outcome with various other current approaches.

Because of spatial and temporal research restriction, we still encounter the problem that the information gathered is fragmented in current longitudinal studies toward future use. We also suggest applying equivalent gestalt thinking and understanding, which is finding visual trend or analyze with elements and concepts, to interrogate data in the future long term longitudinal studies. A possible implication is introducing visual aids, such as diagram in a diary or culture probe study. With various forms or record in a visual way, our research participants might reveal their trend of use and in the same time also better reflect on their own trajectory of experience.

#### *A theoretical initiative*

An unspoken but core call in our proposal is the attempt to initiate a discussion of appropriate theoretical grounding regarding retrospective and reconstructive use experience. When mentioning people's subjective ideas or opinions in the prior interactive use, it is not easy to prove or verify the previous use experience with any research procedure. Since many experiences are not reproducible in current space and time, the prior use might be considered less significant than an empirical verified user research conclusion.

With our proposal of visual gestalt understanding, we are not providing a way to add empirical validity to

retrospective information; on the contrary, we demonstrate a way to systematically show the tendency of use in a visual way and the reconstruct the experience. We expect this new way of thinking can be a theoretical initiative, especially toward a better understanding of use experience in the past.

### **Conclusion**

In this paper, we propose the gestalt approach to understand fragmented information of use experience in the past. We have also aimed to raise awareness toward a more holistic understanding of interaction use experience. We have argued that there is a possibility to consider user experience not only from present and future use, but in prior use.

We have proposed a gestalt understanding as a theoretical initiative to study overall temporality in many interactions. We have also shown that, with prior examples of studies based on similar gestalt thinking and with results from our own studies, taking a holistic consideration of use experience over time can be beneficial to design research and design practice.

### **References**

- [1] Gaver, W.W., Boucher, A., Pennington, S., and Walker, B. Cultural probes and the value of uncertainty. *interactions* 11, 5 (2004), 53–56.
- [2] Hektner, J.M., Schmidt, J.A., and Csikszentmihalyi, M. *Experience Sampling Method: Measuring the Quality of Everyday Life*. Sage Publications, Inc, 2006.
- [3] Huang, C.-C. and Stolterman, E. Temporality in Interaction Design. *Proceedings of the 2011 conference on Designing pleasurable products and interfaces* Publisher: ACM, (2011).

- [4] Ishii, H., Wisneski, C., Brave, S., et al. ambientROOM: integrating ambient media with architectural space. CHI 98 conference summary on Human factors in computing systems, ACM (1998), 173–174.
- [5] Jain, J. and Boyce, S. Case study: longitudinal comparative analysis for analyzing user behavior. Proceedings of the 2012 ACM annual conference extended abstracts on Human Factors in Computing Systems Extended Abstracts, ACM (2012), 793–800.
- [6] Kahneman, D., Krueger, A.B., Schkade, D.A., Schwarz, N., and Stone, A.A. A Survey Method for Characterizing Daily Life Experience: The Day Reconstruction Method. *Science* 306, 5702 (2004), 1776–1780.
- [7] Karapanos, E., Jain, J., and Hassenzahl, M. Theories, methods and case studies of longitudinal HCI research. Proceedings of the 2012 ACM annual conference extended abstracts on Human Factors in Computing Systems Extended Abstracts, ACM (2012), 2727–2730.
- [8] Karapanos, E., Martens, J.-B., and Hassenzahl, M. Reconstructing Experiences through Sketching. arXiv:0912.5343, (2009).
- [9] Karapanos, E., Martens, J.-B., and Hassenzahl, M. On the retrospective assessment of users' experiences over time: memory or actuality? Proceedings of the 28th of the international conference extended abstracts on Human factors in computing systems, ACM (2010), 4075–4080.
- [10] Kujala, S., Roto, V., Väänänen-Vainio-Mattila, K., Karapanos, E., and Sinnelä, A. UX Curve: A method for evaluating long-term user experience. *Interacting with Computers* 23, 5 (2011), 473–483.
- [11] Lim, Y., Stolterman, E., Jung, H., and Donaldson, J. Interaction gestalt and the design of aesthetic interactions. Proceedings of the 2007 conference on Designing pleasurable products and interfaces, ACM (2007), 239–254.
- [12] Liu, N., Liu, Y., and Wang, X. Data logging plus e-diary: towards an online evaluation approach of mobile service field trial. Proceedings of the 12th international conference on Human computer interaction with mobile devices and services, ACM (2010), 287–290.
- [13] Löwgren, J. and Stolterman, E. Thoughtful Interaction Design: A Design Perspective on Information Technology. The MIT Press, 2004.
- [14] Paay, J. and Kjeldskov, J. A Gestalt theoretic perspective on the user experience of location-based services. ACM Press (2007), 283.
- [15] Reinhartr, T. Principles of gestalt perception in the temporal organization of narrative texts. *Linguistics* 22, 6 (1984), 779–810.
- [16] Reybrouck, M. Gestalt concepts and music: Limitations and possibilities. In M. Leman, ed., *Music, Gestalt, and Computing*. Springer Berlin / Heidelberg, 1997, 57–69.
- [17] Rieman, J. The diary study: a workplace-oriented research tool to guide laboratory efforts. Proceedings of the INTERACT '93 and CHI '93 conference on Human factors in computing systems, ACM (1993), 321–326.
- [18] Sternberg, R.J. *Cognitive Psychology*. Wadsworth Publishing, 2005.
- [19] Ware, C. *Information Visualization: Perception for Design*. Morgan Kaufmann, 2004.
- [20] Yontef, G.M. *Awareness, Dialogue and Process: Essays on Gestalt Therapy*. The Gestalt Journal Press, 1993.
- [21] The Gestalt Principles. <http://graphicdesign.spokanefalls.edu/tutorials/process/gestaltprinciples/gestaltprinc.htm>.