Designing Flow Experience on the Web:  
A Grounded Theory of Online Shopping Flow

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Abstract
Flow, the psychological state of deep focus while conducting a fluent activity, has been increasingly examined to explain web users’ post-adoptive behavior. The practical implications of flow on the web are supposed to result in a win-win situation for both users and website operators. However, to date there is little concrete knowledge or advice on how to design a website for flow. This study develops a grounded theory of flow experiences of the users of a large shopping platform, shedding light on the theoretical relationships between concrete realizable website design options, corresponding latent constructs, and the flow experience.

1. Introduction

The point that information systems’ use can be a source of pleasure has been increasingly emphasized for several decades by researchers in the field of information systems research and human-computer interaction [28]. In this context, pleasure or enjoyment addresses “the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated” [7]. In the same vein, the theory of flow has been proposed by various authors as a useful framework to explain user behavior [12]. Flow describes the state of “self reflection-free immersion in a continual activity” [25] in which time, place, and an activity’s original external aim are forgotten and the individual is totally absorbed in the activity. Flow experiences are related to pleasant, intrinsically motivated activities that are usually experienced as very positive [5].

Examining flow experiences on the web seems to be particularly promising, since numerous positive side effects are expected if users surf the web or a website in a state of flow. Between forty and fifty percent of surveyed web users report that they already had distinct flow experiences while using the web [3, 20, 24]. The experience of flow is positively related to the affect towards websites [20], the attitude towards websites [26], satisfaction with websites [15], the evaluation of websites [19], and e-learning success [11]. Flow is associated with a website’s usefulness and ease of use [26], as well as the intention to use a website [26]. Furthermore, the flow concept has been applied by various authors to explain loyalty to websites [14, 15, 17, 19], starting with Hoffman and Novak [12], who postulate flow as “the ‘glue’ holding the consumer in the hypermedia Computer Mediated Environment.” Assuming that these positive side effects are achieved if users surf the web in a state of flow, resulting in a win-win situation for users and website operators, it seems to be particularly relevant to design websites in a manner that enhances users’ flow experiences.

In the literature, however, the determinants of flow experience examined to date were not suitable to provide concrete practical advice on how to design websites for flow. On the one hand, this might be the result of the predominantly quantitative orientation of existing studies, leading to a high degree of abstraction. Examples of examined determinants include the ease of use of a website [27], the feeling of control while using a website [4, 17] or the vividness of websites [12]. As a result, while it could be shown that certain examined latent constructs significantly influence the experience of flow while using information systems, the link between concrete design options, these latent constructs, and flow is still missing. An approach that seeks to provide this link must account for intersubjective variance as well as the specific website context. The subjective perception of equalized demands and skills, which is one of the most widespread latent flow conditions [5], may serve as an example: what constitutes challenging website attributes differs between individuals, since subjects may show different levels of familiarity regarding diverse website functions and might prefer different challenge types and levels (due
to different achievement motivation levels and drivers) in different usage contexts. To shed light on a variety of such complex theoretical relationships, a holistic view of the flow experience on the web is needed. Hence, an appropriate approach to get an in-depth view of design mechanisms leading to flow seems to be a qualitative one, since it can account for specific individuals and the context of the flow activities.

While some existing qualitative approaches to flow on the web provide a good first step, the authors either generically explored “the web” as a whole [3, 4, 21, 24] or focused on broad activities such as information-seeking on the web crossing multiple websites [22, 23], and did not focus on design issues. Therefore, as a next step to get an in-depth view of design principles for flow, it seems to be sensible to focus on a certain website type where subjects repeatedly experience flow. Since prior work suggests that flow on the web is most likely to occur during information-seeking activities [3], and more specifically, likely during the product information process while shopping [18], this research focuses on a large market-leading shopping platform where a variety of information is provided in diverse forms.

The present research seeks to find website-specific concrete design options for shopping platforms that are realizable by website operators, as well as latent perceptual, affective, and cognitive constructs related to the experience of flow. It also wants to shed light on the theoretical relationships between the explored design options, corresponding latent constructs, and the flow experience.

2. Theoretical background

The flow state was first described by Csikszentmihalyi [5] on the basis of qualitative research. During a large number of interviews with people who performed activities that do not directly lead to extrinsic rewards (e.g., money, reputation) Csikszentmihalyi repeatedly found a state of mind that he called “flow experience.” The occurrence of flow is not exclusive to some unique types of activities, but is a general phenomenon. Humans can experience flow when carrying out virtually any activity. Flow can be experienced in various degrees of intensity, from micro-flow to deep flow [5]. The experience of flow is not limited only to intrinsically motivated activities. Examining over three decades of qualitative and quantitative flow research in psychology, the single components of flow have proved to be remarkably stable and consistent. Based on the findings of Csikszentmihalyi, Rheinberg [25] differentiates six conclusive components of the flow experience: balanced perception of skills and task demands, clear unambiguous demands and feedback to action, activity seems to be guided by an inner logic, high degree of concentration on the activity owing to undivided attention to a limited stimulus field, change in one’s experience of time, and self and the activity are not separated, loss of self-consciousness. If this experience is described in its components, respondents almost invariably indicate that they know this state (e.g., 87% in the context of American flow research [6]).

3. Method

Data analysis and collection in this study is based on the grounded theory approach. Grounded theory is an inductive investigative process in which theory is formulated by iteratively gathering, analyzing, and testing data. The emerging theory and the data collection are incrementally refined based on previously gathered data and tested using actual data. Since grounded theory was first described by Glaser and Strauss [10] more than 40 years ago, its popularity and acceptance has increased significantly in social research as well as in the IS discipline. However, since considerable debate has emerged that has interpreted grounded theory in different ways based on diverse epistemological perspectives, the present approach involves a stable set of key characteristics representing the methodology’s underlying tenets, which have been identified in the literature to encourage high-quality research [2, 13]. First, the present study seeks to develop theory rather than test theory. Hence, theoretical coding is used to identify theoretical relationships between identified concepts. Second, codes are generated from the data itself. The use of specific preconceptions and theories as the starting point for data collection and analysis is avoided. In line with the method, this point is limited in two cases: the phenomenon of flow is initially described, based on descriptions that stem from existing qualitative data, and in a later stage, extant theories are used to relate the emergent theory to the body of knowledge. Third, an iterative process is utilized, whereby early data collection and analysis informs subsequent data collection steps. Hence, there is an inextricable link between data collection and analysis. Fourth, constant comparisons lead to theory development through several data coding iterations, reducing the data, and abstracting out the individual context, if applicable. Fifth, sampling decisions are made with respect to research efficiency (purposive sampling) and theoretical density.
Flow is not a concept equally familiar to all respondents. To ensure that it is evenly apprehended between respondents and the researcher, individuals have to be intensively introduced and guided through the survey concerning the theoretically defined components [24]. This is achieved in individual face-to-face settings conducting semi-structured interviews whereby both the researcher and respondent are able to pose and discuss questions in a flexible manner. Gathering data for the study at hand, problem-centered semi-structured interviews are used. Hereby, the interviewer follows two strategies: On the one hand, broadly differentiated data is produced. In parallel, the respondent’s subjective view is interpreted and the communication towards the research problem is increasingly sharpened. For this purpose, the researcher combines periods of listening and inquiring using a variety of discussion and narration-generating techniques [29]. During this discursive-dialogic process, the respondent is regarded as an expert at his or her activities who increasingly develops self-reassurance of his or her psychological processes and behavior.

The selection of interviewees follows the principle of theoretical sampling [10]. The sample is continually consciously extended until the state of theoretical saturation is reached, meaning that no additional knowledge is expected from including further respondents. In doing so, ideally, a heterogeneous sample is generated to reach a variety of diverse but internally homogeneous comparison groups [10]. All sampled informants in this study are users of a large market-leading shopping platform (Amazon.de). Users are recruited via several sources: The platform’s own fan page provided by a large social network, related forums, and within the network of the author’s institution’s students. Approaching potential informants, individuals are initially presented with brief, widely used [e.g., 3, 20, 24] written descriptions of strong flow experiences (statements by a dancer, a composer, and a rock climber), as borrowed from Csikszentmihalyi’s qualitative work [5]. Users who have experienced flow before are invited to participate. Finally, 32 users were spread over the following six theoretical sampling dimensions: Age, gender, education, familiarity with the website, frequency of use, and previous flow experiences using the website. The informants’ ages widely range from 17 to 79 years (31.9 mean), 38% of the interviewees are female, and their educational attainments vary from completed apprenticeships (9), to undergraduates with university entrance qualification (17), to graduate degree levels (6), to one post-doctoral degree (habilitation). The level of experience with this website ranges from 6 months to 14 years of website usage. The frequency of use varies from twice a year to everyday usage. 53% half of the informants stated that they had already had a flow experience using the Amazon.de website.

The individual interview procedure starts with a further introduction to the flow phenomenon on a general level, to ensure evenly apprehension. After presenting the written descriptions of flow experiences, the respondent is introduced into the two factors of flow: absorption and fluency, and the respective items of the flow short scale, a common flow measure in psychology [25]. Furthermore, the interviewee is asked to briefly describe one past individual flow experience. In the following main part of the interview, the examined website is available to be operated by the respondent as well as the interviewer to facilitate memory and for demonstration purposes. First, available prior flow experiences using the considered website are discussed at a general narrative level. Second, the respondent is asked to think about attributes of the website that enhance or inhibit flow, and to consciously connect these attributes to the holistic flow experience. Third, to further concretize the subsequently discussed relationships, the interviewer asks the informant to repeat the last step in a more differentiated way, for each of the two factors of flow, and (optionally if helpful) each of the various single items of the flow short scale. Whenever applicable during the interview procedure, constant comparisons are enhanced by relating informant statements to existing insights that emerged from past interviews and discussing their confirmatory or contradictory nature. All interviews are audio recorded with the informant’s permission and transcribed to provide accurate records for data analysis.

3.2. Data analysis

The first data analysis stage involves early concept identification, usually called initial or open coding. Here, categories and properties are identified from distinct events (incidents) in the data and attached
with meaning labels. As concepts emerge, they are a) constantly compared with other incidents for verification purposes and development of their properties, and b) compared with other concepts to enhance fit with the data. As a result, coded concepts finally represent abstractions of the statements of many informants. To enhance this procedure, each time a new concept is created, a memo is linked to that code, recording ideas designed to capture the present specification and stimulate the further specification of the concept. In the early phases of analysis, concepts usually emerge at a low level of abstraction, but as concepts are compared to each other, it is realized that they can be grouped under more abstract concepts. Hence, as more concepts are identified, codes are organized in a node structure (a tree with branches). The final higher-order tree node structure thus consists of broad categories. In the concrete example: a category called design options, with the subcategories content, layout, design, and navigation, and distinct categories for mediators, moderators, flow experience, and flow effects. Sorting concepts in the tree structure already involves thinking about their possible positions in their conceptual network. This leads to the second stage of analysis, called theoretical coding.

Theoretical coding focuses on uncovering potential relationships between the concepts created during initial coding. Codes are reassembled with propositions about their relationships that can be derived from the data. To facilitate the development of an integrated theoretical framework, a model-building tool is used to visually examine the proposed relationships. This is especially helpful to further drive abstraction of similarly aligned effects and to identify mediating and moderating relationships. These models are linked with explanatory memos, which together are used to stimulate questioning in subsequent interviews, directed at further refinement of the concepts or addressing gaps of understanding.

As the theory develops, selective coding is applied, where further coding is delimited to concepts and relationships closely connected to the core category – flow. Moreover, still faced with high model structure complexity, the visual analysis of relationships is conducted incrementally, examining theoretical relationships around central emergent categories step by step (content, curiosity, flow, etc.) and finally reintegrating these stepwise towards a comprehensive model.

The end of the grounded theory process is achieved by examining theoretical saturation. This helps identify knowledge gaps in earlier data analysis steps, while the transparency provided by the use of models also provides a good indication of saturation, reviewing the evolving model versions and connected memos.

The complete data analysis process is facilitated by the qualitative analysis software NVivo 10, which is used for coding, memo writing, as well as dynamic and static visualizations of models.

4. The grounded theory

Figure 1 shows the resultant grounded theory, using circles (latent concepts), rectangular boxes (design options), square boxes (moderators), arrows (directional (+ and -) relationships), and lines (associations).

![Figure 1. A Grounded Theory of Online Shopping Flow](image-url)
4.1. Goals

The terms “goal-direction” and “goal-orientation” are often used by the interviewees to describe that they have very specific goals when they are surfing the website. On the contrary, users with subjectively broad goals often do not consciously recognize that they have existing goals during their flow experience.

I definitely was in flow when I was searching for holiday offers. I was absorbed, always comparing, then I found something, and then I was searching further and further to find the optimal one, the best price-quality ratio. On Amazon, however, I have not been in flow, since I am very goal-oriented. I know what I want and that's what I search for.

However, it turns out that goals are always present in the flow state, but that they can have different qualities. Some informants describe that even very broad goals (such as passing time) lead to the more specific (sub)goals (such as looking at recent books) that the flow experience is based on.

I just looked at this and that, very different things, for very long. And time passed very quickly. Normally, you don’t know exactly what you are searching for. For example, I realized that this field contains further articles, and I thought: “Aha, why not take a look at recently published books?”

Some respondents recognized the existence of these (sub)goals, while others did not. This might be explained by deep absorption in the flow state, resulting in unconsciousness of goals.

First I was searching for a PlayStation, and then I discovered thousands of things that interested me, and time flew, and then my friend appeared, asking me: “What are you doing?” and I realized that I had done something completely different than I originally intended to do.

In past studies, different qualities of goals led to two distinct web user types, who either follow goals with high or low specificity, for instance, “goal-directed” vs. “experiential” activities [21] and “directed searching” vs. “explorative browsing” [22]. There is evidence of flow regarding both types of behavior. Both types also seem to be closely interrelated, since many informants report switching back and forth between existing goals and formulating new goals.

I searched for a certain product, and when other matching products were displayed, I looked around. Finally, I strayed further and further away from my original goal.

Hence, explorative behavior requires, on the one hand, that the website makes for the receiving of subjectively relevant information.

It’s fun when you find something new, if you come across it more or less by chance. For example, unknown electronic music, because it is always linked, or people write in reviews that this is similar to that, etc. Then you check it out.

It hinders the flow when I can’t jump from one step to another, because I first have to think about what I like.

On the other hand, explorative behavior implies openness towards the formulation of new (sub)goals, which is influenced by self-imposed time limits and user budget.

I know how much time I have and I am very strict with time. When I realize that the time is almost over, I simply complete the task.

I always try to complete the task quickly and I try to be focused, not to get distracted.

I normally don't have enough money for shopping. If I don't have money, I visit the site in a very goal-directed way and I don't browse it.

Theoretically, the site is so large. I can imagine that if I had plenty of money and if I would spontaneously happen upon kitchens or whatever, I could spend weeks surfing.

Regardless whether users visit the website with a specific goal or an ill-defined goal, what seems crucial for motivated behavior is either the ability to maintain motivation towards an existing goal for a long time or the openness to formulating new goals (or broaden existing goals) during the visit.

4.2. Motivation

Goals are found to be essential to achieve sufficient motivation to engage in an activity in a way that leads to absorption. The importance of goals for motivated behavior is a commonly accepted tenet of psychology, reflected by a variety of motivational theories, for instance, expectancy value theory [9]. Motives fall into one of two types: curiosity motivation and achievement motivation. Achievement motivation is activated by perceived challenges, which means that there are sufficiently high demands compared to personal skills. In the literature, achievement motivation is seen as a primary precursor of flow [5].
For me, flow happens when a product exhibits a certain complexity, when a lot of text is involved, and a higher mental effort is necessary.

For me, the demands could be higher, because I like complex things, even greater search and filtering functions, as offered by eBay.

Depending on how intensively you like to be involved, you can search on the surface or you can search for three to four hours until you make your decision.

However, an additional motivational type – curiosity motivation – is identified, which relates to an enthusiastic interest towards the content offered on a website. The emergence of curiosity motivation in this study reflects recent perspectives in psychology that show that achievement motivation does not necessarily have to be present for one to experience flow [25].

It was interesting. I like technology and I am always enthusiastic about new things. That’s how I got into flow.

I’ve been in flow when catching up on the Kindle because I’m very interested in the technology. I compared the devices and read all the information.

Flow arises when I am really enthusiastic, when thousands of things are really interesting to me.

Regardless of the shopping site, some items are interesting to me, but too many items are not interesting. As a result, I can’t get into flow. I was interested, maybe it was an early stage of flow, but I was not concentrating fully.

4.3. Absorption

Sufficient motivation leads to the first flow factor absorption, representing a focused state of mind, blinding out irrelevant stimuli, leading to dissociated experience of time.

You somehow black out the whole website and focus only on the product you want. The site serves only as a “support” and this does work so well that it puts me in flow state.

I am a CD collector, and there was this special offer on three CDs for 15 euro, so I put about fifty CDs in the shopping cart, and an hour later I realized that I can’t buy all these CDs. I was definitely in flow state. I was totally focused, and I took my time surfing. Many times I am so absorbed that I do not hear my wife talking to me.

When I shop for music, and discover more and more unknown bands or DJs whom I did not know before, I often forget about the time, and suddenly realize that I’ve been sitting in front of the PC for two to three hours.

However, some users imply that entering the site with specific goals might hinder flow. This might be explained via perceived importance’s moderating effect on absorption. Evidence for this effect is already given in psychology [8].

I only visit Amazon when I want something specific. I concentrate because I need it; it’s somehow different. I don’t consider it enjoyable, like, say, reading a novel, where you are absorbed. It is more a “business” to me.

In my opinion, the activity is not important enough. If it’s a matter of life and death, then I am concentrate totally, but not if it’s about an annoying product.

It depends. When I am buying entertainment products such as books, I am not one-hundred percent absorbed, but if it is about expensive electronic products such as a laptop, I am completely into it.

4.4. Fluency

When absorption coincides with the receiving of goal-relevant information provided by a website, the second factor of flow – fluency – comes into play; it includes a sense of potential control, knowledge of what do during each step, and attention focus that is easily maintained.

It is fluid, because different products are displayed that you can scroll and click through, and you have many possibilities to click further if you look at what other people were interested in or similar products. And so you go on and on...

I know exactly where to look when I need some information or want to do something. And as long as I know what I want to do, I feel in control of the process.

The site’s system is good; it leads you easily through the site. You know where you have to click and what happens next.

The process of using the site is fairly easy and is almost automatic.

Fluency goes along with progress towards user goals, leading to higher expectancies towards goal achievement, and higher motivation. The effect of higher expectancies on motivation is the core of expectancy value theory in psychology [9]. On the other hand, if the receiving of goal-relevant information and therefore fluency are not given, this leads to distraction and frustration.

This is good usability. Because I can access what I want with a few clicks. So I don’t have problems getting disappointed or desperate.

It was annoying. I was searching for a netbook, and netbooks were relatively new, so the information situation was very poor, and the reviews were all contradictory.

And now I realize that the book is not available. And here it says that is even unclear if it will ever be available again. This is frustrating.
The receiving of relevant information potentially provided by a website is moderated by the experience with the website. This might be explained by an expertise effect that can be applied to web activities, which is necessary to orientate oneself on a specific website.

7 Up here I got the search field, and as an experienced internet user, I type in “chess” after selecting the category “books.” Now I get beginners books that I am not interested in. I like to have it structured by topics. I only get that if I type in an additional space up here. I have to do everything using the input field. It is not optimal, but you are used to it.

12 If it is in the usual Amazon structure, it is easy to surf, because you already know what comes next. The headline comes first, then the price. You know the order.

7 I don’t think it’s hard to concentrate on all the unnecessary information, because I am used to blocking it out.

15 The advertisement does not disturb. You’re used to it.

4.5. Information organization

Information organization includes aspects of arranging elements (content elements, navigational elements, etc.) on the website. Appropriate information organization for flow includes the concept of proximity through hierarchy, which seeks to reduce the eye movement distances, the cursor and scrolling movement distances, and the number of clicks towards the receiving of relevant elements. Proximity can be implemented through different hierarchy types. In a vertical hierarchy, the most important elements are displayed at the top of the page.

3 It is very helpful that everything is already described in the title bar.

1 All the important information is already available in the title bar: if it’s used, how much it will cost; everything that is important for a mobile phone, how large it is, the operating system, etc.

7 On Amazon you have pictures, and then product information and reviews. And that’s what’s good about it.

Using level hierarchies, important elements are provided at high levels in the website structure. Generally, few levels should be used.

12 This is too confusing and too much effort for me. If I want to buy a song, for example, I get a list with all the CDs, and I want to immediately listen to each one, but I first have to click on each CD, then I can push play, and to listen to another song I have to go back again.

21 I definitely like it when I don’t have to click on “More” after five products, also because of the loading times. Everything is there; you just have to scroll. When I have to click, this is a barrier that brings me out of flow.

20 You have to click thousands of times to finally get to interesting things, if you don’t know what you want and if you don’t type in the exact search term.

A size hierarchy highlights important elements by increased relative size.

1 This is easy. Navigation is easy. The size of the search bar, the size of the shopping cart, I like this. It is not hidden, as with many other websites.

Consistency means providing information organization consistently over time. This enhances expertise effects that lead to a better orientation on a website. Consistency implies both a consistent layout (arrangement of elements) and a consistent design (colors, fonts, etc.).

12 The Kindle site is very confusing; pictures on the left, pictures on the right, text on the left, text on the right. The style changes constantly. The fonts are changing. Colors are also changing. This is something I find disturbing. These are obstacles to flow, because you have to pay closer attention to get an overview.

Lucidity involves an intuitive – hence clear and unambiguous – structure of site elements, which helps to avoid information overload. Lucidity is achieved by a low number and clear delimitation of displayed elements, a low font variety, as well as a low number of modest colors.

7 Here on Amazon, everything is clear, not difficult. It is clearly arranged. On eBay, it is too much for me. Too many things. Too much information.

20 It is so confusing. I don’t know where to look. Nothing catches the eye, but all at once.

7 I don’t know. My mind is obstructed. It is because of the pictures and the fonts. Everything is very close together. I don’t understand anything.

9 This shopping cart is clear to me, but yet here are other shopping carts. OK, I know what I have to do, but for the “diagram” I have in my mind, this is confusing.

9 Here for example. When I look at this bag, there is the name, four to five different colors, several font sizes, and prices. This is like a jungle.

1 The colors, blue and orange, are good. There are other sites where I would say, this is too much, too many colors, too many impressions. Here it is not like that.

14 I think the colors are good. They are not aggressive or disturbing.
4.6. Information quality and quantity

*Information quality* is crucial to support the potential reception of relevant information. In addition to factual quality, users particularly report that *user-generated content* shows a certain social proximity, which is important to satisfy individual interests.

- I trust the reviews, because the reviewers control for each other, so it's an independent user opinion written by an amateur I possibly can identify with.
- Sometimes you can lose yourself in the reviews if you feel there is a dialogue, if they interact with each other. One of them writes total nonsense and I don't understand what he is writing. It's happening when I form an opinion. Particularly if it's like a dialogue, then I shut out everything else.
- Because you like to be further informed about a product and you like to know what other people think about it.

To enhance the factual quality of user-generated content, control mechanisms seem helpful.

- The evaluation of reviews is helpful. If you get evaluations like “This camera makes great pictures” and you see that one of twenty users thought that this is helpful, I am certainly not one of them.

Furthermore, factual quality might be directly enhanced by offering *edited content*.

- There is information and reviews on Amazon, but I first search for product tests on other websites and when I know what I want, I come back to Amazon.
- I think it would be cool to cooperate with test institutions, to include the top ten list of each product type.

The affective quality of information leading to flow can be enhanced by offering *media richness* – providing images, audio, or video previews of the products. Prior evidence of media richness' impact on emotional responses and flow is present in the contexts of e-commerce [1] and e-learning [16].

- I was definitely in flow buying DVDs, but with clothing, for example, it is not attractive enough, like on other sites where you see a model wearing the clothes or see her in a video walking on the catwalk.
- Other sites have a very emotional image, because they work with very many photos, models, etc.
- When searching for the PlayStation, every time there were no pictures, I just did not look at that. Pictures definitely play an important role. You first check all the pictures.

Information quantity is necessary to increase absorption and explorative behavior. Concretely, information quantity is provided through *product range variety*.

- You have no exact idea what you want, you visit the site, and then there are so many offers that you go on and on.
- It is about product portfolio completeness. Even if Amazon doesn't have it, there are offers from external suppliers on the Amazon platform. The product selection is enormous. And I would rather limit it on my own with a few clicks than go to other sites where they have only one shelf of DSLR cameras, one shelf of compact cameras, etc.
- Great offers lead to flow. In principle, everything is available on Amazon. There's almost nothing you can't get.

Equally, information quantity is driven by the offering of complex products and the information depth provided by user-generated content.

- I am very mindful, thinking about purchasing decisions, and very often I can go into such an experience. Particularly if a product is a bit more complex and I compare different types of this product. Then I also often use multiple windows.
- For example, when I bought my mobile phone cover, I spent hours, because I came across ten-thousand things and information, and you click and click.
- If you want to buy a mobile phone and you are not well informed, you read through all the information, what other people are saying about the product, you read further and further.
- It's an effect of mass. There really are a lot of reviews.

4.7. Information filter accuracy

The provision of potential information quantity and quality turned out to be a necessary but not a sufficient prerequisite of flow experiences.

- Amazon is always connected with doing research in advance. I don't go to Amazon searching for inspiration, as I do on other websites such as H&M [a fashion store]. They just have to send me a newsletter, and I go clicking. Amazon is too big for that. I think, if you don't know what you search for, Amazon has too many offers. It is like a department store where you can buy everything.
- If I buy more expensive things, such as a smartphone, I need other websites. On Amazon, I can perhaps limit the results regarding the price, but then thousands of devices are offered. That's just too much.
- I would not say that I feel overstrained, but I feel unsure. If I have no clue about a topic, where should I start? You first have to check out camera comparisons. Without additional information, you have no chance on Amazon. Variety is too high.
The receiving of relevant information is only achieved if a broad base of potentially relevant information is individually limited via filtering mechanisms, avoiding information overload.

4 It is the completeness of the product portfolio, but also good usability, hence the different possibilities to sort and filter it.

The reported information filtering systems can be classified into pull and push types, depending on the need for action by the user. Pull filters, such as search and filtering functions where users can limit search results stepwise, support flow by providing goal-relevant as well as inspiring information, whereas push filters such as recommender systems foster flow mainly through inspiring users to pursue new goals.

6 The filters are good. You can limit via price, brands, etc. I use them extensively when I am searching just in a particular category and I don’t know exactly what I want, I go in the right direction stepwise.

13 These recommender systems definitely support flow. When you find good stuff you didn’t know about before, it is great fun. I can listen to an album, and then, at the bottom of the page, I see “customers who bought this, bought similar music.” I don’t know this music and just click on it.

11 You start with the most popular or most recent products. This is well structured. There is always something you would buy.

However, accurate results are critical for both systems.

14 Occasionally, there are obstacles to getting into flow. For example, the search function, when there are irrelevant results.

16 Recently, I was searching for a receiver. Let me see, I typed in “DVB Receiver WLAN HD Kathrein” and now it should display the Kathrein ones. But it doesn’t. And I can’t filter the other [receivers] for DVB-C. This, for example, disturbs flow. The filter categories are not good. I feel annoyed. You should be able to search for additional information.

14 However, if you don’t like the things that are offered, that others bought, that kicks you out of flow. Then you have to go back again and search for something else.

5. Summary and recommendation

To enhance online shoppers’ flow experiences, it seems to be sensible to pursue two strategies: a) enhance the user’s ability to maintain motivation towards an existing goal, and b) inspire him or her to pursue new goals. To maintain motivation, continuous progress towards the existing goal must be ensured via providing information quantity and quality as well as optimizing search and filter mechanisms. This strategy seems to be particularly important to motivate users and regarding products of high importance for users. To inspire users, recommender systems accuracy is decisive, particularly aiming at users motivated by curiosity. In both cases, appropriate information organization is useful. All proposed measures are particularly important for users with insufficiently developed expertise effects.

Applied to the concrete example, information quality could be improved by offering edited content (e.g., product tests), providing a decision aid for users in the early decision stage. Filter mechanisms might be improved by providing more detailed categories. Higher recommender systems accuracy might be achieved by including more explicit user information (e.g., via dislike statements) and implicit information (e.g., already performed purchases). Regarding information organization, consistency could be maintained regarding all website pages (e.g., the Kindle page), and level hierarchies could be improved by providing endless scrolling pages when displaying product lists.

6. Conclusion

The grounded theory developed in this paper provides a comprehensive view of online shoppers’ flow experiences. For the first time, the examination of flow experience on the web is driven towards integrating concrete and realizable website design choices. A grounded theory has been developed that provides new theoretical insights into the flow experiences of web users engaged in shopping activities; it manages to integrate several existing findings of psychological flow research. Practical implications of the theory presented in this paper concern website operators, web designers, and users who benefit from a design, encouraging flow. Optimizing flow, this study can be seen as an alternative user experience design approach that includes cognitive as well as affective aspects of holistic user experience to provide a design beyond traditional usability criteria. Since websites and devices that are offering multimedia-based user interfaces are increasingly capable of inducing complex interactive user experiences, such approaches are likely to gain significant importance in the future.

The main advantage of this study, which focuses on an existing website to provide a detailed view of the experience but also the design, implies a limited
extent to which the results can be generalized. However, starting with shopping platforms, this paper is seen as a first step towards general design principles and theoretical effect mechanisms that lead to flow experience on the web, which might be revealed by comparing the results of a variety of different websites and website types; I encourage researchers to examine these in the future, following the approach at hand.

7. References