The effect of constraints in creativity

From the perspective of web designers
This exam work has been carried out at the School of Engineering in Jönköping in the subject area of informatics. The work is a part of the three-year Bachelor of Science in Informatics. The authors take full responsibility for opinions, conclusions and findings presented.

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Abstract

Purpose – Web is no longer solely about functionality and information as it used to be. Nowadays the aesthetic aspects, including creativity, could be considered just as important. However, web designers still need to fulfil the needs of clients and users in the design process which causes various design constraints. Therefore, this study aims to investigate how web designers’ creativity is affected by various design constraints. This is explored by one main research question and a sub-question: 1.) How is web designers’ creativity affected by design constraints?; 1.1) What could cause web designers to break web design guidelines?

Method – This research applied an inductive, qualitative approach with an exploratory view. In order to find answers for the research questions, semi-structured interviews were conducted with 8 participants from the field of web design. The data gathered was later analysed and evaluated through thematic analysis.

Conclusions – The findings of this study suggest that while there are some positive effects, web designers’ creativity is mostly negatively affected by design constraints. Furthermore, it seems web designers break web design guidelines due to finding them irrelevant and/or to get a more creative outcome as well as breaking them unintentionally.

Delimitations – This study only covers how web designers reason regards the research questions and does not include the perspective of web developers. Moreover, this thesis focuses solely on website design and does not involve design for mobile applications.

Keywords

web designer, web design, creativity, constraints, web design guidelines
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Introduction

1 Introduction

This thesis is written as the final project work in a Bachelor of Informatics at Jönköping University. The topic of this paper is regarding how constraints are affecting creativity from web designers’ perspectives. In an attempt to find this out, qualitative research has been carried out. This first chapter covers the background, purpose, research questions, delimitations and outline of this study.

1.1 Background

At first glance, one might think that today’s online world is like an explosion of creativity full of interesting design solutions. However, this is not how it used to be. Over the last 25 years the web has changed tremendously and evolved to become the leading communication channel (Doosti, Crandall & Su, 2017). While the web used to be solely about functionality and information, it is now more than ever, just as important to consider the aesthetic aspects. Some empirical evidence even suggests that website aesthetics is the predominant factor of a website nowadays. To achieve an aesthetically pleasing look of a website, creativity is one of the key elements to consider (Lavie & Tractinsky, 2004).

So why is creativity in web design important? It is believed that being creative leads to better outcomes due to a greater number of ideas (O’Neill & Warr, 2005). Moreover, while creativity is not the only important factor in website design, it is the element that is most likely to attract people’s attention (Loho-Noya & Wei, 2009). Thus, the element of creativity plays a significant role in website design.

Even though the creativity of a website is clearly important, the usability has not become less important. In order to make a website easily usable and accessible several web conventions have been established. Web conventions are a set of guidelines that help web designers to create accessible and usable design. Nielsen Norman Group (2004) describe web conventions and standards as something used in at least 50% of all websites. A previous study by Nielsen (1994) introduced usability guidelines for user interface design which are still widely used by web designers today. Besides usability, another important aspect of web design is accessibility which has increasingly become more important. One of the more known and widespread sources for elaborated accessibility web guidelines is W3C. This organization have digitally published a thorough set of guidelines, WCAG 2.1, for making the web more accessible (World Wide Web Consortium [W3C], 2018).

Guidelines help to improve the usability and accessibility of a website but also results in constraints for the designer. Besides, other types of constraints need to be considered by the designers such as client and user needs. As constraints limit the freedom of web designers, it can affect the creative process in various ways. Since creativity is one of the most important attributes in designing (Lavie & Tractinsky, 2004), the question is if guidelines as constraints hinder the creativity in the web design process. As Caniëls and Rietzschel (2015, p. 184) state: “Constraints could stimulate creativity because they energize employee efforts, or because they reduce the complexity of a problem or task. All in all, however, findings are mixed and inconclusive. Clearly, constraints can hamper creativity, but they can also stimulate it.” The same study also suggests that the relation between constraints and creativity needs to be further studied.
Moreover, a study by Chevalier and Ivory (2003) mentions that the area of guidelines and its influences on designers is not fully clarified, specifically regarding the design process and the quality of the outcome. Similar studies by Chevalier (2007) and Bonnardel together with Chevalier (2007) have further explored the area by studying how the expertise of designers is influencing the final outcome by adding or excluding client- and user constraints. However, the influence that constraints have on designers and how it affects the design process is still not studied enough. In other words, more focus and research should be conducted in the field of the web designers’ design processes. This demonstrates how the field of constraints from a web designer’s perspective could be further explored.

While there is clearly research done in the field of constraints in creativity and website creativity, this study will look into a yet unexplored field to find out how web designers’ creativity is affected by constraints. Moreover, this study will also consider web design guidelines as constraints and its effect on creativity.

1.2 Purpose and research questions

The purpose of this study is to investigate how the creative process of web designers is affected by design constraints. Research in creativity and constraints in the perspective of the web designer is yet understudied and therefore this research aims to fill this gap. The hope is to gain a better understanding of the relation between web designers’ creativity and constraints, and to contribute to the research in this field.

Research questions

1. How is the web designers’ creativity affected by design constraints?

1.1 What could cause web designers to break web design guidelines?

The first question aims to find out more generally the effect that design constraints have on web designers’ creativity. Design guidelines are a type of design constraints; therefore, the sub-question aims to specifically find out what could cause designers to break them.

1.3 Delimitations

This study explores the relationship between creativity and constraints in web design. The focus of this research is in the area of web design and does not cover other web based fields such as application design which could be considered closely related to web design. Moreover, the study intends to focus on the graphical side of web design, not on the field of web development.

1.4 Outline

Chapter 2 covers the theoretical background where previous research and literature will be introduced. Research regarding creativity, constraints, web guidelines and the combination of it is discussed. Chapter 3 includes method and implementation. The chosen method is presented and explained as well as the intended plan for data analysis. Chapter 4 presents the findings and analysis. The collected empirical data is
introduced and discussed. Chapter 5 covers the discussion and conclusions. The method is being discussed, the answers to the research questions are presented and conclusions are made.
2  Theoretical background

2.1 Creativity

A lot of research has been conducted in the field of creativity, and many definitions of the term have been established. Despite this, the concept of creativity is not easy to capture as researchers have different perspectives. However, according to Loho-Noya and Wei (2009) one of the most widespread definitions in literature from previous studies describe creativity as the process that results in an original and useful outcome. Brodin, Carlsson and Hoff (2014) define creativity as the ability to create a product, idea or process which is new and useful and suggest that the same definition could be applied no matter within what area it is used.

These definitions consider creativity more generally but there are several other aspects concerning creativity to take into account from different sources and studies. One of these studies by Amabile (1998) views creativity as three components. These components are expertise, creative-thinking skills and motivation. The first mentioned one, expertise, has to do with one’s intellect; how much a person knows and can do in their field. Creative-thinking skills depend on personality and how flexibly, imaginatively one can approach a problem and come up with solutions. Motivation, which is the third factor, is defined as “an inner passion to solve the problem at hand (Amabile, 1998, p. 78).” This is the component that makes one take action. There are two types of motivation: extrinsic and intrinsic. Extrinsic motivation comes from an outside source. As an example, one can get outside motivation from an incentive, like a monetary reward. The second type, intrinsic motivation, is far more essential to creativity. It concerns one’s internal passions and interests (Amabile, 1998).

While Amabile believes that one crucial component in creativity is expertise, Brodin et al. (2014) suggest that knowledge could instead restrict creativity. By having knowledge, one is more likely to fixate on previous experiences and habitual thinking which could lead to a block in the cognitive process. In other words, one is more likely to come up with the same solutions repeatedly instead of generating new creative ideas.

Another concept by O’Neill and Warr (2005), including three components of creativity, describes them as the creative process, person and product. The concept of the creative process can be explained as an individual’s internal process by which ideas are generated. Being a creative person is another approach to creativity. Earlier studies define a creative person as an individual who is more easily able to explore and transform ideas internally. The third aspect, as mentioned earlier, is the outcome which is defined as the creative product. If an artifact shows distinguishing characteristics of creativity such as novelty and appropriateness it is defined as a creative product (O’Neill & Warr, 2005).

According to Brodin et al. (2014) more recent studies have added more components to this creativity model which is now called the six “P’s” of creativity. These include (besides the creative process, person and product) creative potential, place and persuasion. Creative potential refers to an individual’s’ ability to accomplish creative work (Brodin et al., 2014). Although everyone is equipped with creative abilities, they can be increased through a creative and supportive environment (Saito, Andriani, Pivetta, Ulbricht & Goncalves, 2014). This correlates to the next “P”, creative place, which is defined as an environment with optimal conditions for creating a new and
useful product. Finally, creative persuasion refers to one’s capability to convince others of their creative ability (Brodin et al., 2014).

One of the first creative process models established by Wallas (as cited in O’Neill & Warr, 2005) explains creativity as being created through four phases: preparation, incubation, illumination, verification. In the first stage the problem is clarified and understood. Data is gathered in order to be prepared for the next stages. The next stage, incubation, happens in the unconscious mind. In other words, one does not consciously think about the problem anymore. In the illumination stage the creative idea occurs. If the creative idea is considered an appropriate and novel solution to the problem, the final phase is reached (O’Neill & Warr, 2005).

Ritter, Baaren and Dijksterhuis (2012) further studied the incubation phase as it is believed to be the phase where ideas are unconsciously generated. By putting the problem consciously aside, new fresh ideas are more likely to occur. Moreover, the unconscious mind is not only beneficial for idea generation but also for idea selection. Ritter et al.’s study showed that after a period of unconscious thought one is more likely to choose the most appealing alternative amidst ideas than after a period on conscious thought (Ritter et al., 2012).

### 2.2 Website creativity

According to Zeng, Salvedy and Zhang (2009) website creativity is an exhibition of novelty and appropriateness that places the user in a state of arousal and pleasure and is suitable for the user's preferences. This means that a creative website should have the characteristics of originality and relevance while delivering a feeling of satisfaction. The satisfactory feeling is created for the website user by users themselves since the website is subjectively assessed by them. Therefore, the main judge for website creativity is in fact, the user.

The previously mentioned study also resulted in seven key dimensions to describe what website creativity consists of. These dimensions are aesthetic appeal, interactivity, novelty and flexibility, affect, importance, commonality and simplicity, and personalization. Out of these, interactivity, flexibility, and aesthetic appeal are the factors that contribute to website creativity the most. By increasing the level of these factors the user's attitude and behaviour will be positively affected. As a result, high website creativity adds further value to the user's overall product experience (Zeng, Salvedy & Zhang, 2009).

Zeng, Salvedy and Zhang also created a checklist for designing a creative website. They suggest that by adding animation or multimedia, the interactivity level will increase and the website will become more dynamic. By making the website relevant for users it automatically increases the importance. Integrating artistic, entertaining, and desirable design components adds to the aesthetic appeal. When the website is tailored for its target audience, it becomes more personalized. An increased level on flexibility as well as continuous evaluation boosts novelty. By making the website more pleasing and exciting, the affective quality will be improved. Finally, in order to achieve commonality and simplicity, rare and sophisticated design characteristics should be incorporated (Zeng, Salvedy & Zhang, 2009, table 4).

However, simply following these guidelines can still lead to issues. These seven factors assure that the website is creative, yet, it does not take technical aspects into
consideration. Zeng, Proctor and Salvendy (2009) have further studied this issue and found that when using the seven factors together with three additional dimensions concerning ergonomic design, this gap can be filled. Moreover, it can also enhance the creativity of the website. The three mentioned dimensions are functionality, usability, and affectivity. According to their study, functionality is related to the performance of the website and how well it functions. Functionality can sometimes be taken for granted by users, but the absence of it could cause great dissatisfaction. The second factor, usability, refers to making the website easy to use. However, these two factors alone are not enough in today's competitive market. By adding the third dimension, affection, the user will get a pleasant overall experience (Zeng, Proctor & Salvedy, 2009).

Another study by Loho-Noya and Wei (2009) mentions website creativity as a set of elements such as aesthetics, fun, and originality. It is also believed that by breaking design conventions while still being creative and original, the aesthetics of a website becomes more expressive (Loho-Noya & Wei, 2009). Aesthetics is not only crucial in website creativity as it can also add credibility. It is suggested that credibility is primarily based on website aesthetics which shows how important this element in web design is. Increased credibility also leads to the user being more likely to use the website (Alsudani & Casey, 2009).

According to O’Neill & Warr (2005) creativity in website design is important since it is believed that a higher number of ideas lead to greater solutions. As mentioned earlier by the same authors, creativity is a process in which ideas are produced. In other words, being creative leads to more ideas and better outcomes (O’Neill & Warr, 2005). While usability and functionality are the basis of a website, the creative aspects of a website attract people’s attention more easily. Therefore, creativity is a crucial criterion for a website (Loho-Noya & Wei, 2009).

There is however a contradiction in research regarding the most important factor of a website: usability or aesthetics. Previous research mainly focused on the usability aspects of a website while research by Lavie and Tractinsky (2004) show the importance of visually appealing websites. There is empirical evidence suggesting beauty to be the most important factor for attracting users to a website, however many studies emphasise the importance of making the website easy to use rather than visually pleasing. This could be explained as two different website ideals: the artistic ideal and the engineering ideal (Lavie & Tractinsky, 2004).

2.3 Constraints in creative work

A constraint is a complex construct and different types of constraints can lead to fundamentally different outcomes (Caniëls & Rietzschel 2015). To define constraints, Rosso (2014) suggests that constraints place an individual in a state of restrictions and limitations. This could be viewed as something negative or positive (Rosso, 2014). According to Caniëls and Rietzschel (2015) constraints can reduce the complexity of a task which can stimulate creativity in a positive way. However, from another perspective having constraints can decrease the freedom of the designer (Lavie & Tractinsky, 2004). Another way to define what constraints are, specifically in design tasks, is to divide it into three categories: external, internal and task inherent constraints. External constraints are defined as economic factors such as time, capital and resources. Internal constraints are related to one’s expertise in a particular field, experiences and mental capacity. Thirdly, task inherent constraints encompass
characteristics that are relevant to a design problem (Savage, Moore, Miles, & Miles, 1998).

To explore the different meanings of constraints, Onarheim and Biskjær (2013) made a study on constraints in creativity. The reason for this was to clarify the term “constraint” in the field of creativity as it previously seemed too broad and confusing. Constraints are perceived in different ways such as guidelines, rules, or requirements depending on what area they are used in. Therefore, Onarheim and Biskjær coined a new term “creativity constraints” to explain specific constraints in creativity. They define this as “explicit or tacit factors governing what the creative agent/s must, should, can, and cannot do; and what the creative output must, should, can, and cannot be (Onarheim & Biskjær, 2013, p. 8).” In other words, this implies that there are clear rules of what can or cannot be done when it comes to the creator and the creative outcome. The term creativity constraints together with Elster’s (as cited in Onarheim & Biskjær, 2013) basic model for the origin of constraints make it possible to understand where the constraints originate from. It is suggested that constraints could be either imposed by others, inherent in the material or self-imposed. These concepts correlate closely to the study by Savage et al. (1998).

Moreover, in an attempt to describe the total sum of creativity constraints, the term “constrainedness” was established (Onarheim & Biskjær, 2013). Constrainedness measures the intensity of constraints in the creative process, thus, it states the recognized level of freedom. This concept describes how free or restricted a creative practitioner feels at a specific time in the creative process. However, there is no fixed number to how many creativity constraints are needed to reach high constrainedness.

2.4 Creativity under constraints

As mentioned in the study by Rosso (2014), constraints could be viewed as something negative or positive. Research has been conducted in the field of creativity and constraints and the results show that there are many perspectives to consider from different authors. When figuring out if constraints are helping or limiting, Caniëls and Rietzschel (2015) divided creativity into two concepts: creative potential and practised creativity. Creative potential refers to one’s own belief that they can be creative. On the contrary, practised creativity is characterized by creative performance, i.e. one’s confidence in the ability to execute creative work. One of the hypotheses of the study predicted that constraints would be positively related to creative potential, meaning that individuals might feel more creative under constraints. Another hypothesis envisioned that practised creativity would be negatively affected by constraints. In other words, constraints as a form of not having enough resources could lower one’s creative performance. The results of this study turned out to be as hypothesised. However, this study mainly focused on constraints in the sense of not having enough resources.

A study by Bonnardel (2000) has taken a different approach. She suggests that creativity is created through cognitive constraints. This is a contrasting view compared to other studies explaining creativity as an expression of freedom. The different types of constraints that evolve during this creative process are both from unconscious and conscious nature. The unconscious processes usually come in forms of intuitive acts and therefore are not consciously noticed. When defining conscious constraints, there are two aspects, external and internal context, to take into consideration. Certain constraints such as budget or time are considered as external context while knowledge is considered as internal context. Since internal context is personal and subjective,
everyone constructs their own unique constrained cognitive environment. In other words, there are initial constraints in one’s mind which inhibits or stimulates the creative process (Bonnardel, 2000).

Similarly to how Bonnardel (2000) believes that creativity is generated through cognitive constraints, Kaufman and Sternberg (as cited in Onarheim & Biskjær, 2013) describe how constraints are the base of the construct of creativity. In other words, without constraints, creativity cannot exist. If the description of a task is too vague and does not have limitations, it might lead to confusion and lack of creative ideas. Constraints can help in this sense as they could make the creative practitioner shift focus and come up with new creative ideas (Onarheim & Biskjær, 2013).

2.5 Constraints in web design

According to Chevalier and Ivory (2003), web designers see constraints as being part of the design process since restrictions satisfy different needs. By satisfying these needs, several possible issues are being solved which ultimately leads to the solution of a problem. Chevalier and Bonnardel (2007) have suggested that when performing a design task with prescribed constraints, previous knowledge can contribute to the consideration of additional constraints. These additional constraints are really important in the process of solving any design problem (Chevalier & Bonnardel, 2007).

Two factors that are considered to cause constraints in web design according to Chevalier and Ivory (2003) are the clients and the future users of a website. Client constraints refer to requirements that typically involve a need for improved sales, coherent branding design and/or a specific budget. User constraints on the other hand, are mentally constructed limitations that the designer themselves acquire through the experience of being a web user. These particular constraints could also include ergonomic constraints such as logo placement or navigation on a webpage and other aesthetics aspects. In other words, website usability and aesthetics are factors that designers need to consider to please users. To improve website usability several web design guidelines have been developed, therefore, they could be considered as part of user constraints (Chevalier & Ivory, 2003). Even though constraints are considered to be a part of the problem-solving process, according to Chevalier (2007) web designers encounter noticeable difficulties with user constraints. This could be due to lack of interaction between the designer and the users. Although web designers are users themselves, they are considered to be above-average web users (Chevalier, 2007).

In order to find out how web designers’ expertise and client design constraints influence the final website design outcome, Chevalier and Ivory (2003) conducted a research. They arranged an experimental study where novice- and professional designers were given a task to design an initial website sketch. While half of the participants were given client constraints, the others were given free rein. The final result showed that all the participants implemented ergonomic constraints into their design without these being given to them. As an example, the implemented ergonomic constraints provided specific information to the user about their location on the page to improve the usability of the website. However, the participants who were not given client constraints implemented more user constraints than the ones who were. Overall, the study shows that constraints affect the designer in different ways (Chevalier & Ivory, 2003).
Theoretical background

2.6 Web design guidelines

Ever since user interface design became relevant, people have tried to invent rules regarding how it should be best applied. One of the first set of guidelines was established already in 1976 by Cheriton. Since then several more guidelines have been published (Johnson, 2014).

Web design guidelines are according to Johnson (2014) described goals. Generally, design guidelines are very broad in order to be easily implemented in design and therefore, give the designer a chance to interpret them differently. Often, design rules contradict each other in a way that the designer has to choose which rule to prioritise. Due to these complications, design guidelines are best implemented by people with prior knowledge in the field of web design (Johnson, 2014).

According to Nielsen Norman Group (2004), once certain design elements are seen and become common enough in websites they can be categorised into three standardisation levels. When design elements have been seen on at least 80% of the websites, they are considered standards. It is studied that four out of five websites have the logo placed in the upper left corner, which makes it a web design standard. When design element has been seen on at least 50% of the websites, they are considered conventions. An example of this is seen in e-commerce where every other website has the shopping cart in the upper right corner, which makes it a web design convention. If fewer than 50% of websites use elements in the same design approach, they belong to the third level, which according to Nielsen is called confusion. To explain this, elements that are placed differently in more than half of websites, are considered confusion (Nielsen Norman Group, 2004).

Guidelines are created and used for different purposes. While Nielsen’s guidelines have the main focus on usability (Nielsen, 1994), W3C provides guidelines (WCAG 2.1) for accessibility issues (World Wide Web Consortium [W3C], 2018).

2.6.1 Usability guidelines

According to International Organization for Standardization the concept of usability is defined as “the extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (ISO, 2018a, ISO 9241-11:2018). Usability is a complex concept which includes more than just user-friendliness. This concept is applicable in situations when trying to achieve specific goals effectively, learning a new system or service, and to minimise risks for errors.

The term usability has been defined by many and according to Krug (2014), it is usually broken down into attributes like useful, learnable, memorable, effective, efficient, desirable and delightful. He himself however, defines it simply as something usable. The meaning of this is that the average person should be able to figure out how to use something with their previous abilities and experiences without encountering any trouble.

“Eight Golden Rules of Interface Design” is an example of a set of usability guidelines (Shneiderman, Plaisant, Cohen, Jacobs & Elmqvist, 2018). These guidelines were presented for the first time in 1987 (Johnson, 2014) and have been refined several times since then (Shneiderman et al., 2018). Another well-known list of user interface
design guidelines was created by Nielsen (1994). Two of these guidelines, reoccurring
in both Nielsen and Shneiderman et al.’s set of guidelines are “the attempt to reach
consistency” and “error prevention”.

2.6.2 Accessibility guidelines

As stated by International Organization for Standardization, accessibility is defined as
the “extent to which products, systems, services, environments and facilities can be
used by people from a population with the widest range of user needs, characteristics
and capabilities to achieve identified goals in identified contexts of use (ISO, 2018b,
ISO/IEC 29138-1:2018).” By identifying accessibility needs it becomes easier to
understand and improve the accessibility for users (ISO, 2018b).

Accessibility takes into consideration an immense range of disabilities: visual,
auditory, physical, speech, cognitive, language, learning, and neurological disabilities.
W3C made a comprehensive list of accessibility guidelines that help to make the web
more accessible for people with different disabilities. The first version of these
guidelines, WCAG 1.0, was published in 1999 and have since then been refined many
times. The most recent version, WCAG 2.1, was released in 2018 (World Wide Web
Consortium [W3C], 2018).

These accessibility guidelines consist of a thorough list of suggestions for making the
web accessible for everyone. Not only are these guidelines good for solving accessibility
issues, they also contribute to making the web more usable in general (World Wide
Web Consortium [W3C], 2018). As Horton and Quesenbery (2014, p. 10) explain it:
“Designing a web for everyone combines good design and usability with accessibility
to create inclusive design.”

2.6.3 Advantages and disadvantages of web design guidelines

It is clear that creating an accessible web is important, however Saito et al. (2014) have
emphasised that not all websites have yet implemented accessibility guidelines. A
possible reason for this could be that web developers associate inclusive web design
with unattractive aesthetics. Another suggested reason is that accessibility guidelines
are viewed as limiting. This makes the professionals more reluctant towards the
implementation (Saito et al., 2014).

Similar problems are also seen in the implementation of usability guidelines. According
to Krug (2014) web designers generally want to come up with new
innovative ideas instead of following simple guidelines. Some professionals feel like it
is part of their job to be creative and invent something new, therefore the reluctancy
to use guidelines is even greater (Krug, 2014).

However, there are many benefits of using web design guidelines. Shneiderman et al.
(2018) claim that guidelines help web designers in the starting phase of the design
process. Web design guidelines did not just evolve from someone’s personal opinions;
they have been practised and tested out over a long period of time. Eventually people
knew about them without needing an explanation (Krug, 2014). According to Krug
(2014), when web guidelines are applied successfully it ultimately helps the user to
understand the website’s features and how they are supposed to be used. Nielsen
(2006) explains the importance of using web design standards in a way that users
become more likely to stay on a web page if they immediately understand it. On the
contrary, when users have to take extra time to understand how the website works, they might lose focus on the actual content of the website. Nevertheless, guidelines alone do not assure that the website will be successful (Shneiderman, 2004).

2.7 Related work

Previous research has contributed to an understanding of the topic of this study. Chevalier and Ivory (2003) present an experimental study about web designer’s level of expertise in combination with design constraints. Their study aimed to find out how the expertise level of a designer and the given client constraints are affecting what design constraints are being articulated in the final design of a website. In the conclusion of their study, it is mentioned that they planned to further examine different styles of guidelines and how it influences the designer and the quality of the outcome. It seems that no such study has been published yet, although studies within similar topics has been later conducted. One of these studies by Chevalier (2007) further investigated the role of stakeholders and its influence of user- and client constraints during website design. Similarly, the purpose of a study by Bonnardel and Chevalier (2007) was to gain a better understanding of how web designers articulation and satisfaction is affected by the design task and level of expertise. The commonality of these studies is that they compared expertise level of designers in combination with certain client- or user constraints to find out how the outcome would be affected. In comparison to what these mentioned studies aim to find out, this study has a different focus. While the mentioned research papers have the purpose of investigating how the outcome is affected by the designers’ expertise level and certain constraints, this study has a greater focus on how the designers’ creativity is influenced by constraints.

Caniëls and Rietzschel (2015) investigated how the impact of constraints affect employee creativity. This study did not focus on one specific field of work but had a more general outline. Therefore, their research contributes to a better understanding regarding creativity under constraints but does not specifically cover the effect it has on designers within the field of web design. Also, in the conclusion of Caniëls and Rietzschel’s study, it is mentioned that the relation between constraints and creativity is still understudied.

Another research in the field of creativity and constraints was conducted by Onarheim and Biskjær (2013) who investigated the relationship between constraints and creativity. They aimed to clarify the concept of constraints specifically in creativity as the term constraints in general can have different meanings in various disciplines.

While above mentioned studies help to understand constraints, a study by Zeng, Salvendy and Zhang (2009) gives an insight to a different focus of this study, website creativity. They developed an instrument to find out, based on user-assessment, what elements make a website creative while exploring the impact of website creativity on user behaviour. Another research by Zeng, Proctor and Salvedy (2009) further studied website creativity and proposed a new framework for it. Yet, the two last-mentioned studies only focus on website creativity and do not include web designers’ perspective.
3 Method and implementation

This chapter includes the approach of the study, chosen use of method and analysis of data.

3.1 Approach

This study intends to find out how the web designers’ creativity is affected by design constraints. This subject is yet unexplored, therefore this research is of exploratory nature. An exploratory approach is applicable for gaining an understanding in an area where there is no or little knowledge (Björklund & Paulsson, 2014).

As the study is exploratory and aims to collect new data, an inductive approach was used to discover patterns which helped to summarise the collected empirics. The reason for using an inductive- and not deductive approach is because there are not enough already existing theories about this topic (Björklund & Paulsson, 2014).

3.2 Chosen use of method

Since the aim of this study was to find out how web designers reason regarding the proposed research questions, the research is of qualitative nature. The chosen method for this research was interviews. Blomkvist and Hallin (2015) suggest to use an interview methodology to discover new dimensions and perspectives of the subject. The reason for choosing interviews over surveys was due to the reason that the latter is more suitable for quantitative studies, where the data collected would be more general. Another considered method was focus groups, which is a variant of interview. However, in this study, not being influenced by others during the interview was of great importance. Therefore, individual interviews were more suitable. The qualitative data was collected through semi-structured interviews as the opportunity to explore the subject further was possible (Blomkvist & Hallin, 2015). Semi-structured interviews also gave possibility to adapt the questions to each individual and ask relevant follow-up questions. Moreover, body language and other signals could be detected (Björklund & Paulsson, 2014).

3.2.1 Interviews

To gain new insights, interviews were being conducted. Through interviews, primary data was collected, meaning that relevant empirics in regards to this study were gathered (Björklund & Paulsson, 2014). The chosen subjects for this were professionals in the field of web design. This included for example user experience designers, web designers and graphic designers. Despite the various titles of the participants, it was made sure that they all had enough web design experience. The number of participants was dependent on when data saturation was reached as it implies there is enough information for analysis.

The interview questions were primarily open-ended as this gave the interviewees a better chance to express themselves. Therefore, there was also a possibility to ask follow-up questions during the interviews. Moreover, according to Kings and Horrocks (2010) it is important to avoid asking leading questions, meaning, already suggesting a certain response. The reason for this is to make sure the answers are valid and unbiased. Another important aspect to consider when formulating questions is to keep
them simple and clear as in case of the contrary, the quality of obtained data can be affected. Another example of what to avoid when preparing for interviews is making multiple questions into one. This could cause the interviewee to become confused which might result in them only answering one part of the question (Kings & Horrocks, 2010).

With the intention of making the interviewees feel comfortable, they were asked what the preferred place of the interview would be. Half of the interviews were carried out at the participants’ workplaces while the other half chose to come to Jönköping University for the interview. It was important to hold the interview in a quiet and private place to create a calm and safe environment (Kings & Horrocks, 2010). Therefore, the interviews were conducted in private rooms, where no disturbance could happen. The interviews were approximately 25-45 minutes long depending on each individual. In addition to taking notes during the interviews, audio was recorded in order to not lose valuable information. The interviewees were informed about this.

The participants of the study were chosen in a non-random sampling method also known as convenience sampling. Thus, the interviewees were selected dependent on their location. To get participants, emails were sent out to people within the work field of web design located in Jönköping. Besides this, some interviewees were chosen in the method of snowball sampling. Hence, they were found through other participants who provided with contact information of the new interviewees. All together, eight participants were found and interviewed. Since the participants were all within the same work field, the sample group was homogeneous. Therefore, the chance to dig deeper into the research questions was greater. However, this might have caused the study to take a narrower perspective as the participants might have had similar opinions (Blomkvist & Hallin, 2015).

3.2.2 Ethics

When doing research, according to Blomkvist and Hallin (2015) it is necessary to think about the ethics of the study. There are a few aspects to consider to make sure the study is conducted in an ethically correct manner. Firstly, the participants should be fully informed about the purpose of the study. To follow this requirement, the interviewees were told in advance what the study was about and the purpose of it. The second aspect is regarding consent. All participants had to agree to be part of the study before being interviewed. The consent of the participants of this study was therefore assured at first contact. Another requirement is to keep the material collected confidential. To make sure of this, no personal information was used or exposed. Finally, the last aspect “the good use requirement” entails that the collected empirics are used only for the stated purpose (Blomkvist & Hallin, 2015).

3.2.3 Structure of the interview guide

The questions for the interview guide were carefully considered before conducting the interviews. The interview guide consisted of several sections. The first part contained the introductory questions as well as a brief presentation of the thesis topic and purpose. Moreover, the structure of the interview was introduced and explained to the interviewees. The reason for asking introductory questions, such as age, job title etc. was gain background knowledge of the interviewees. Another reason was to give the participants an easy opening to the interview. The sections that followed were questions regarding the web design process, constraints, web design guidelines, and creativity & website design. All sections followed the same pattern of starting with more
general questions, to later move into more specific questions. The intention was to
introduce the interviewees to the new topic before digging deeper into the subject. The
sets of questions regarding constraints and web design guidelines were accompanied
by an explanation of certain definitions of terms that were being used in the questions.
Not all asked questions aimed to answer the research questions of this study. However,
they were helpful to get a better overview of the participants’ opinions as well as to
warm up the interviewees for the coming questions. Furthermore, it was thought to be
beneficial to ask a greater variety of questions to be sure that the research questions
would be answered while also giving an opportunity to gain new unexpected findings.

3.3 Analysis of data

The data collected was evaluated through thematic analysis. According to Kings and
Horrocks (2010) the term “theme” itself implies that there is some kind of repetition.
In other words, patterns in the data can be found that demonstrate something of
interest regarding the topic (Kings & Horrocks, 2010). By categorising the empirical
material collected, the possibility to understand the patterns connected to the research
questions became easier (Blomkvist & Hallin, 2015). By looking through the data
collected from the interviews, similar answers could be grouped and categorised. Once
all raw data was collected, the list of themes could be produced. The list of themes was
dependent on the findings from the interviews. After discovering the patterns, the data
was organised in a way that showed how the themes relate. Often the themes have a
hierarchical relationship which implies that there are main themes and sub-themes
(Kings & Horrocks, 2010).

Thematic analysis includes three stages: descriptive coding, interpretive coding and
overarching themes. The first stage includes finding relevant material out of everything
collected. The main focus of this stage is not to interpret the meaning of the data, but
rather seek what is of interest. The way that this was carried out in this research was to
listen to the audio recordings and write down the most relevant material. In the second
stage, the findings from the first stage is interpreted in order to understand its
meaning. In this research the relevant material was used to interpret and try to make
sense of the interview answers. In the last stage of thematic analysis, the overarching
themes are identified. The themes in the last stage should derive from the interpretive
themes, however, they should be more generalised. This usually results in fewer
number of themes than in the second stage (Kings & Horrocks, 2010). For identifying
the themes, the interpreted answers were examined and related answers were grouped
together. By doing this, the overarching themes became evident.
4 Findings and analysis

Below are presented the findings from the research method used, and the analysis from the results. The collected data was categorised into four overarching themes seen in Figure 1. Themes: origin of design constraints, importance of creativity, constraints in creativity and web design guidelines. The last-mentioned theme was further split into two sub-themes: the effect of guidelines on creativity and breaking guidelines. Eight interviews were carried out and Table 1. Overview of interviewees, presents the overview of the interviewees.

Figure 1. Themes
Table 1. Overview of interviewees

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Age</th>
<th>Education</th>
<th>Job title</th>
<th>Work experience within web design</th>
<th>Length of interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>26</td>
<td>BA in Information Architecture, MA in UX Design</td>
<td>UX designer</td>
<td>3 years</td>
<td>41,24 min</td>
</tr>
<tr>
<td>2</td>
<td>31</td>
<td>BA in Design and Visual Communications</td>
<td>Creative consultant</td>
<td>5 years</td>
<td>27,57 min</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>BA in Graphic Design and Web Development</td>
<td>Graphic Designer</td>
<td>6 months</td>
<td>44,44 min</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>BA in Graphic Design and Web Development</td>
<td>Web designer/Web developer</td>
<td>2,5 years</td>
<td>42,13 min</td>
</tr>
<tr>
<td>5</td>
<td>43</td>
<td>BA in Behavioural Science, MA in Interaction Design</td>
<td>UX designer/Consultant Manager</td>
<td>13 years</td>
<td>41,51 min</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>BA in Informatics, MA in UX Design</td>
<td>UX design consultant</td>
<td>1,5 years</td>
<td>25,25 min</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>BA in Arts and Science</td>
<td>UX designer/Project manager</td>
<td>11 years</td>
<td>30,29 min</td>
</tr>
<tr>
<td>8</td>
<td>25</td>
<td>BA in Software Development and Mobile Platforms</td>
<td>Freelance Web designer</td>
<td>1 year</td>
<td>30,01 min</td>
</tr>
</tbody>
</table>

4.1 Theme 1: Origin of design constraints

The results from the interviews showed that all participants acknowledged constraints in their work. The respondents were explained the definition of constraints and the different types of constraints according to this study. They were then asked to elaborate which constraints were more prominent in their experience. All participants mentioned external constraints as being present in all their design projects. The external elements that were mentioned the most were time and budget, as well as clients. Respondent 7 explained it as “Every time you start a new project you have external constraints from the client. You need to get to know them and get them comfortable with what you know and then work together towards some kind of goal.”
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This participant also mentioned that budget and time are obvious external constraints as well. Respondent 5 answered similarly, saying that external constraints are definitely the most eminent ones. They explained time to be important in order to achieve something great, while also mentioning time and budget as being the factors that are mostly lacking.

Besides external constraints, most participants also acknowledged having internal constraints. Five respondents recognised having too much previous experiences that could sometimes limit them. An example of this was how respondent 4 explained having internal constraints: “I always do it the same way since I know how to make it work. I don’t create new stuff. It’s something I hope to improve in the future.” Another similar response, “You have your favorite methods, for instance when you do research. Then you want to use them more often and for more things than what would be best method. Also, about digital tools, often I just use the tools that I already know how to use” was said by respondent 5.

Task inherent constraints were harder for the participants to understand. Most of the participants did not name any task inherent constraints before being asked specifically about them. Respondent 6 however, mentioned task inherent constraints as being dependent on different projects having different stakeholder requirements. Another participant, respondent 7, stated that in some projects the task inherent constraints could be the need of doing research before the project starts. After being asked specifically about task inherent constraints respondent 3 said that they have experienced the lack of developers for a certain project, which resulted in design limitations.

4.2 Theme 2: Importance of creativity

One of the questions from the interviews asked participants to explain whether they thought creativity is important in web design. Seven out of eight respondents believed that creativity is an important aspect of a website. One participant who did not agree with this, respondent 6, explained that creativity is not important for the website, however, it is important for the designer. What they meant was that it is important for the designer to feel creative in order to be satisfied with their result.

From the responses of the participants who thought that creativity is important in web design, four respondents noted that it is important to make the website stand out. As respondent 5 expressed it: “If you want to stand out, you can’t just copy your neighbours. You need to be innovative and come up with new things that are better.” A similar response was illustrated by respondent 3 who said that creativity in a website is important for making people remember the website. Additionally, respondent 8 commented that “Without creativity websites would be boring.”

Follow up questions to the participants were asked whether they feel pressured to be creative as designers. Out of the eight interviewees six said that they felt the pressure. The reason for this according to respondent 3, was because of the expectations that people have regarding designers and how creative they supposedly should be. Respondent 2 complimented to this by saying that people already have an image of how creative designers should be. Correspondingly, respondent 6 expressed the feeling of pressure because of their job title and how people perceive and think of it. The participant illustrated this by explaining that people seem to think that “UX is going to change the world.”
4.3 Theme 3: Constraints in creativity

The findings from the method show that constraints affect creativity in various ways throughout the web design process. The results reveal that the effects are both positive and negative, and definitely existing since all the eight interviewees expressed it. However, the majority of the effects mentioned were negative. Respondent 1 said that time is the most crucial element to be creative and that without it, creativity would be decreased. The same respondent also mentioned an experience where the lack of time caused stress which lead to a less creative result. Moreover, respondent 6 also had a negative experience with time affecting creativity. The participant said that time-pressure for a certain project lead to choosing a safer and less innovative option. Time was mentioned also by respondent 4, who said “Often when we talk about design projects, there is always time limit. Depending on the project, sometimes you are given more time and other times the project needs to be done as fast as possible. The less time I have, the less creativity there is in the design.” Time was mentioned again by respondent 5 who besides this also explained the importance of having knowledge to be able to achieve a creative and innovative outcome.

An additional negative aspect to how constraints affect creativity was stated by respondent 7, 8 and 2 who highlighted communication process difficulties. Respondent 7 illustrated this by saying that the creative process is affected by having to deal with clients and co-workers. The participant further explained that by having to take others’ opinions into consideration, the creative process becomes less natural and a bit disrupted. People’s opinions were mentioned to be a negative factor in creativity by respondent 8 as well. This participant said that in the case where the client feedback does not correspond to what they believe to be true themselves, the motivation to be creative diminishes. This would cause frustration and discouragement. Another participant, respondent 2, mentioned that frustration and irritation can come from communication issues with clients. The participant explained that “Frustration leads to no enthusiasm. Creativity goes down with it.”

When it comes to having constraints in the design process in general, the participants expressed similar opinions. Four out of eight participants articulated the feeling of stress and pressure, and the lack of inspiration was brought up by three participants. When being asked a question specifically about time in the design process, six out of eight respondents stated that it is affected by constraints. Five out of these six respondents see constraints as making the design process longer, therefore it is viewed as something negative. Respondent 1 said that they have internal constraints in the form of lacking knowledge which would lead to a need of doing more research. This results in a longer design process.

While the negative aspects of constraints in creativity are more prominent in the results, the positive aspects were also highlighted by the respondents. One of the positive aspects mentioned by Respondent 3, was that constraints can help creativity in the beginning of the design process by giving context to the problem. The same participant also mentioned that restrictions can be seen as challenges. Additionally, respondent 7 said that while constraints can be negative, they can also contribute to problem solving which is a part of being creative. Respondent 7 also mentioned that they previously felt stressed because of constraints but has now learned how to deal with it. This is due to more experience in the field, they said. Moreover, respondent 5 expressed that the feeling of pressure that constraints can create, can help the creative process. As the participant stated “I work a bit sharper when I have pressure. I work best when I have pressure from the outside.” An example of a participant who
expressed a positive experience with internal constraints was respondent 8. The participant said that not having enough knowledge can be fun since you get to learn something new.

4.4 Theme 4: Web design guidelines

When asking participants if they knew about web design guidelines, all respondents articulated that they did. The most mentioned ones were WCAG accessibility guidelines and Nielsen’s usability guidelines. Respondent 6 expressed Nielsen’s guidelines to be “the holy grail”. Two participants did not name any specific set of guidelines, however, they still expressed knowing common practice guidelines. One of these participants, respondent 8, said that they instead think “design for stupid” during the design process. The reason for this, explained by the participant, is that users generally are not as experienced with computers as web designers are. Other mentioned guidelines were about information architecture, web development standards, responsiveness and colour knowledge.

Although the knowledge about guidelines varied among the interviewees, the opinion that they could be helpful was clearly expressed by everyone. For instance, respondent 6 said “Guidelines are good to know about and it’s a good base for starting the design process.” Similarly, respondent 5 mentioned that web design guidelines are helpful for not missing important aspects. Respondent 7 said that while others can see guidelines as limiting, it was not the case for the participant as they see it as a part of the creative process. Another opinion was expressed by respondent 5 who stated that guidelines can sometimes be too ambitious, meaning that they are too specific. This participant thought that guidelines should be broad and well-thought in order to be easier implemented. Respondent 1 believed that guidelines are only helpful when the designer has the ability to think “outside the box”.

Even though all participants found guidelines helpful, half of them recognised that they can be limiting as well. Not all respondents gave a specific explanation to why guidelines are limiting. However, respondent 4 gave an example of this by saying that they always place the logo in the top left corner since this is how they think it should be done. The same respondent expressed that they wish to break this habit. Moreover, respondent 5 stated that guidelines limit you if there are too many of them. From another perspective, guidelines were sometimes seen as outdated and could be dangerous to use according to respondent 1. A specific example that the participant brought out regarding this was one WCAG guideline that advised against using flashy animations in the website. Since flashy elements are no longer something often seen in modern websites, the guideline felt irrelevant to the participant.

Three participants believed that guidelines are simply opinions, therefore, it is up to the designer to decide whether to follow them or not. Respondent 3 said “Guidelines are guidelines. You decide if you follow them or not.” Respondent 2 mentioned that general guidelines should be seen as opinions, however, accessibility guidelines are more important to follow: “They are the law.” Furthermore, respondent 8 claimed that designers should not feel the need to follow web design guidelines fully. The participant added “Otherwise all websites would look the same.”
4.4.1 The effect of guidelines on creativity

When being asked whether guidelines affect creativity or not, seven out of eight participants believed that it does. The reasoning behind the effect varied quite a lot. Out of these seven people, five thought that the effect was of a more negative nature as it limits creativity. Respondent 6 believed that the longer you are in the field, the more likely you are to follow standards that you already know of, and therefore you become less creative. Another explanation of the limiting aspects of guidelines was said by respondent 5 who expressed that “If I did not follow guidelines, I could be more crazy and do more wild things.” Additionally, respondent 2 articulated that facts are not good designing with since it could lead to a dull result. Similarly, respondent 8 explained that guidelines could be constraining and boring to follow. Often it is not up to the designers to decide how many and which guidelines to use in the design process, which was mentioned by respondent 4. When the project and client demand a highly accessible and standardised website, respondent 4 believed that the creativity could be negatively affected.

Two participants expressed the positive effect on creativity by using guidelines. One of them was respondent 7, who stated that it helps designers to place the focus in the right area. The participant added that by not wasting time to try and invent new rules, the creativity can be instead used for other areas where it is more needed. Respondent 8 mentioned another positive aspect regarding the beginning of the design process: “If you have no clue what to do, it is helpful to follow guidelines.”

Furthermore, even though guidelines could affect creativity in a negative way, most participants believed that it is still possible to achieve a creative result. Respondent 8 illustrated this by saying that the designer needs to be extra creative when following guidelines to achieve a creative outcome. Similarly, respondent 3 noted that being creative is about finding solutions, which implies that guidelines are seen as problems to be solved. Respondent 4 said that even when following guidelines, it is still possible to get a creative and charismatic result since it is ultimately up to the designer to make the design decisions.

4.4.2 Breaking guidelines

As mentioned above, some participants thought of guidelines more as opinions that sometimes are unnecessary to follow. When the participants were asked whether they sometimes break web design guidelines, everyone responded positively. The reasoning behind why this happens varied amongst the interviewees. The overarching opinions regarding this were the following: to get a more creative result, the unnecessity to always follow guidelines, and unintentionally breaking them. The most repetitive answer from these was the opinion that guidelines can be unnecessary. Respondent 1 expressed this by saying that if the guidelines do not fit the project, they are unnecessary to follow. However, the participant did want to use the word “break”, but rather the word “ignore” or “exclude”. Moreover, respondent 5 said that they sometimes break specific guidelines because they are considered boring to follow and not needed. Similarly, respondent 8 noted that they break guidelines because of irrelevancy for certain design projects.

Another mentioned reason for breaking guidelines, to unintentionally break them, was voiced by respondent 7. The participant said “Since I am more used to Apple guidelines, I sometimes break Android guidelines without knowing it.” The same
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respondent made it clear that they try to always follow guidelines and think that they should not be broken without a reason. In addition, respondent 5 expressed that when in a hurry, guidelines can unintentionally be broken due to time pressure. The respondent added that it is more about stress and not about forgetting them.

Other participants explained that they break guidelines to get a more creative result. Respondent 6 stated that in order to be creative, they have sometimes ignored web design guidelines. However, the participant added that they used to do it more in the past and now have realised that users do not like when certain guidelines are broken. Respondent 4 mentioned that the reason for breaking guidelines is to make people think, i.e. to do something different. The same participant continued by saying that guidelines should be broken even more.

Throughout the interviews, participants mentioned that usability is crucial in web design, which is part of following usability guidelines. When being asked about accessibility guidelines, all participants said that they consider them, however, they only mentioned it when being asked specifically about them. To further investigate if the participants actually implement accessibility guidelines, follow-up questions were asked. The results from this showed that some of the participants use accessibility guidelines only when the client or company demand it. Respondent 8 answered correspondingly to this by saying “I used the accessibility guidelines in a project because the client told me to.” Similarly, respondent 2 said that they use accessibility guidelines mostly for projects in the public sector since they expect it. Another reason for leaving out the accessibility guidelines was illustrated by respondent 7 who said that for fast projects there is not enough time to consider using them. Moreover, respondent 3 said that accessibility guidelines could easily be forgotten or ignored by people since it might result in an ugly outcome.
5 Discussion and conclusions

This chapter is divided into three main parts: discussion of the method, discussion of findings and conclusions. Under conclusions the main points of the research are presented as well as limitations of the study and recommendations for future work.

5.1 Discussion of method

The chosen method for this research was semi-structured interviews. The benefits of conducting semi-structured interviews was the possibility to ask follow-up questions when needed. In this research, this was helpful when the interviewees were a bit vague in the answers or when it felt like they had more to provide to the questions. Furthermore, by conducting individual interviews the participants were not influenced by any other participants’ answers. Another benefit of individual interviews is the participant’s opportunity to express their opinions in a safer and more private environment.

The weakness of this method is that it is very difficult to be unbiased during the interview process. Sometimes follow-up questions could make interviewees think in a certain way. Additionally, when the interviewees were unable to fully understand the interview questions, they were given more specific examples which might have led to biased answers. However, to avoid this from happening, the interviewers still tried to be as unbiased as possible in the formulation of the questioning and examples. Moreover, since interviews are planned and different from a natural conversation, the participants might have felt pressured to express themselves in a specific way. To overcome this, the participants were told that there were no right or wrong answers and that the answers did not need to be a certain length. The environment of the interviews aimed to make the participants feel safe and calm. Another aspect that could have affected the results is the fact that the interviews were conducted in English language, which was not the participants’ native language. This might have resulted in a narrower use of language. Therefore, important information might have been lost or misunderstood. To prevent this from happening, the participants were told in advance that they could express themselves in their native language if needed.

Furthermore, methods used in previous related studies including experimental study (Chevalier & Ivory, 2003; Chevalier & Bonnardel, 2007; Chevalier, 2007) and survey study (Caniëls & Rietzschel, 2015) could have been considered for this study as well. In an experimental study, participants would have been given a certain design task. By doing so, the effect of web designers’ creativity under constraints could be studied further. However, since creativity is a very subjective and complex phenomenon to measure, an experimental study would have been very hard to analyse. By using surveys as the method, a greater sample size could have been reached. Nonetheless the disadvantage would be to lose the possibility to dig deeper into the subject and ask follow-up questions. Therefore, interviews were more suitable as the participants got the chance to shape the structure of the interviews and express themselves more thoroughly.

Overall, the method used was successful and served the purpose of the study well. Through interviews, relevant data was collected and later further analysed. The findings were enough to answer the research questions.
5.1.1 Validity and reliability

To assure quality of this research, validity and reliability was considered. In order to reach high validity, the theoretical background in this study presents relevant and important information which gives a base to the research questions. Additionally, the method correlates to the aim of the study. Moreover, the interview questions used were created with the purpose of finding out answers to the research questions.

To obtain high reliability, it was assured that the presenting and analysing of the results did not include any personal opinions of the authors. Another aspect that was considered in order not to lose any valuable data from the interviews, was audio recording. All interviews were recorded on two different devices to make sure of having a backup in case of quality issues or loss of one of the recordings.

5.2 Discussion of findings

The purpose of the study was to investigate how the creative process of web designers is affected by design constraints. In order to find out the answer to this, one research question along with a sub-question was constructed to address the purpose of this study. Below, the research questions are being answered in relation to the empirical findings.

5.2.1 Research question 1: How is the web designers’ creativity affected by design constraints?

When looking at the findings of the study, an evident result is that creativity is a crucial element in web design. This result agrees with previous studies conducted in related fields (O’Neill & Warr, 2005; Loho-Noya & Wei, 2009). Moreover, it is clear that various design constraints are apparent in web designers’ work process. Hence, to find out how creativity relates to design constraints for the web designer, this research question was proposed and studied. Here is presented the answer to the research question.

The results show, based on the findings and analysis of the interviews, that some patterns are clearly visible. It seems that web designers acknowledge that their creativity is being affected by various design constraints, however the aim of this study was to find out how. The voiced opinions regarding the subject were mostly negative, while some positive effects were also noted. When looking at the negative effects, some were more prominent than others. One of the more prominent patterns was the mentioning of an external constraint, time. The overarching opinion was that the lack of time affects creativity in a negative way. The result of not having enough time, seemed to lead to decreased creativity. This correlates to the study by Caniëls and Rietzschel (2015) who believed that not having enough resources as a form of constraint, decreases one’s creative abilities. The opinion that time is needed to be innovative was evident in the findings of this study. The lack of time could cause stress and pressure for the designer which could ultimately lead to the choosing of a safer design method and/or result in a less creative outcome.

Another evident finding was that communication issues with clients, another external constraint, affect the designers’ creativity in a negative way. It seems that negative interactions with clients can lead to disruptions in the creative process for the designer, which makes the process less natural. This could also cause frustration and irritation.
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for the designer which reduces the motivation to be creative. Lack of motivation to be creative could also be caused by negative feedback from the client, which also can result in discouragement for the designer.

While the effect of constraints on creativity can also be positive, the study did not discover any specific patterns regarding this. However, when looking specifically at how guidelines as constraints affect web designers’ creativity, more prominent patterns were seen. An interesting finding is that the general opinion regarding guidelines amongst designers seemed to be that they are helpful. However, when in relation to creativity less than half of the participants of the study acknowledged the positive effects. This could be interpreted in a way that designers find guidelines helpful in the design process as it encourages them to place the focus on the right things. This corresponds to what Onarheim & Biskjaer (2013) stated in their study as they found that constraints could be helpful for shifting focus in order to come up with new creative ideas. Nonetheless, designers seem to have a more negative view to how guidelines affect the possibility to be creative.

Another negative effect when it comes to guidelines as constraints was the limiting aspect. The results show that web designers feel that they are limited in the design choices by following guidelines. It seems that designers think they would achieve a more creative result when not having guidelines to follow. Similarly, Krug (2014) mentioned that designers can feel reluctant to follow guidelines as it could affect their creativity negatively. Furthermore, the design process could result in becoming longer, especially when using accessibility guidelines. Another negative aspect of guidelines is the limitation that knowledge, as an internal constraint, could cause. By being used to always following the same guidelines, one is more likely to repeatedly do so, instead of finding new creative solutions. This correlates to what Brodin et al. (2014) stated, that by having knowledge one is more likely to reuse old models that have proven to work previously.

5.2.1 Research question 1.1: What could cause web designers to break web design guidelines?

The results of the research show that even though designers find web design guidelines helpful, they tend to break them. There are several reasons to why this happens. It seems that the most prominent argument is that designers find guidelines unnecessary to follow. This comes from the fact that guidelines do not always fit certain design projects and can be seen as irrelevant. Additionally, it is expressed by web designers that guidelines are simply opinions. This means that each designer can decide for themselves whether to follow them or not, and is therefore not seen as a fundamental requirement to follow.

Another pattern that is visible in the findings is that guidelines are broken unintentionally. By following a specific set of guidelines, other contradicting guidelines can be accidentally ignored. This could also happen due to shortage of time, when following guidelines are not of highest priority. Unintentionally breaking guidelines could also be caused by the fact that the designer might lack knowledge in the field. In other words, they break certain guidelines because of simply not being aware of them.

The study also reveals that by breaking guidelines, designers feel that they could achieve a more creative result. This corresponds to a study by Loho-Noya & Wei (2009) which claims that breaking design guidelines, while being creative, results in a more expressive website. Furthermore, it is believed by designers that by following
guidelines, specifically accessibility guidelines, the outcome of the website aesthetics could be negatively affected. In other words, the website design could be seen as unattractive and less visually pleasing. Similarly, a study by Saito et al. (2014) highlighted that web designers often associate accessible web design with unattractive aesthetics.

5.3 Conclusions

The aim of this bachelor thesis was to explore two related matters. Firstly, how web designers’ creativity is affected by constraints. Secondly, what the cause for breaking web design guidelines is. Therefore, one research question along with a sub-question was constructed. To gather knowledge and gain an understanding about already existing works in this area, literature review was carried out.

In order to answer the research questions, semi-structured interviews with web designers were conducted. Through the interviews, information was gathered which later on was analysed and interpreted through thematic analysis. To answer the main research question, findings showed that the effect that constraints have on creativity from a web designer's perspective is mostly negative. The most evident result was that external constraints, especially time and communication issues, can hamper creativity. This is due to stress and frustration. Furthermore, another finding is that web designers perceive guidelines in combination with creativity as limiting. Regarding the sub-question, three patterns were found. These patterns showed that web designers break guidelines unintentionally, due to irrelevancy or to reach a more creative outcome.

When comparing these findings to previous related work, the contribution of this study is the new perspective taken, by focusing on web designers’ creativity. The results of previous work regarding constraints in the perspective of web designers (Chevalier & Ivory, 2003; Chevalier & Bonnardel, 2007; Chevalier, 2007) could be seen as similar to this study. However, the difference is evident when looking at the purposes of the studies. Moreover, while this study found out how web designers’ creativity is affected by constraints, the results of the mentioned related studies present how the final outcome was affected by constraints without focusing on creativity. Furthermore, when looking at the contribution of this work in regards to previous studies in the field of constraints and creativity (Caniëls & Rietzschel, 2015; Onarheim & Biskjær, 2013), this study introduces the new perspective of specifically targeting web designers. This is something that the other studies do not take into consideration.

5.3.1 Limitations of the study

The limitation that affected the study the most was during the contact period with interviewees. 16 web designers were contacted through email and out of these only half reached back. It would have been helpful to get more responses and be able to conduct a few more interviews. Furthermore, by having more participants the distribution of the samples could have been greater. While there was a variety of age and job titles amongst the participants, the majority were 20-30 years old and/or working within user experience design. Besides, all participants were based in Jönköping, Sweden, which limited the geographical range. However, due to time-pressure it was not possible to wait longer or reach out to new possible participants.
5.3.2 Future research

Recommendations for future research include using a secondary research method. By for example doing an experimental study next to interviews, larger data could be gathered. Therefore, the reliability of the findings could reach a higher level. Moreover, considering a bigger and more diverse sampling could be beneficial since it could result in obtaining more perspectives and opinions. This could be done by reaching out to people from different locations, ages and experience levels.

Since this study did not cover the perspective of web developers, it could be further studied. From our findings, it seemed that web designers and web developers have very different experiences and opinions. It would be interesting to see if the results would be similar.

Another area that was not touched, was regarding application design. Guidelines differ from regular website design to mobile application design. Therefore, it would be interesting to explore how application designers perceive these specific guidelines in regards to creativity.
References


Appendices

Appendix 1

Thesis Interview Questions

Introductory questions

First we introduce our thesis topic and purpose to the participant. Then we explain how the interview is structured and let them know that they are free to answer as much or as little as they want. We also let them know that no personal information will be used.

How old are you?
What is your job title?
What education do you have?
How many years of work experience do you have in the field of web design?

Questions regarding the web design process

What do you think are the most important qualities to a website?
What do you think makes a website aesthetically appealing?
What makes a website unattractive?
Do you consider functionality or aesthetics being more important on website?
What tools and programmes do you use when creating a website?
  • Do you start the process by hand or in computer?
Do you feel like you have access to the right tools at work in order to be creative?
What do you think is the hardest part in the design process (when it comes to creating websites)?
What is your focus in the beginning of the design?

Constraints

The next set of questions are about constraints which we explain to the participants as being limitations and restrictions. Then we explain three types of constraints: external, internal, task inherent. We give some examples of what each constraint could contain in order to make the participants understand the following questions.

In the process of designing a website, do you feel like you have any design constraints in general?
How do constraints affect you in the process of designing?
Do constraints affect the time that you put into the design process?
Do you think your creativity could be affected by constraints?
Do you feel like you get the support you need for your ideas from the company you work for?
How free are you to make your own decisions in design projects?

**Web Design guidelines**

Next set of questions is about web design guidelines. By guidelines we mean design rules that web designers should follow in order to increase the usability or accessibility which we explain to the participants and give examples.

Do you have any web design guidelines that you follow when designing a website?

What is your opinion about guidelines?

Do you think your creativity could be affected by guidelines?

How do you know about them? (Where did you learn about them? Online? In school?)

How important it is to follow design guidelines?

Is it possible to get a creative result when following guidelines?

Do you sometimes break guidelines?

- If yes: What causes you to break them?

Do you know how to make a website accessible for everyone? (People with disabilities)?

- If yes, what kind of accessibility guidelines do know?

Are accessible web guidelines something you consider when designing a web?

**Questions regarding creativity & website design**

What do you think makes a person creative?

What do you think makes a website creative?

Do you think creativity is important in web design?

Do you feel like you have the opportunity to be creative when designing websites?

Where do you get your ideas and inspiration from?

Do you feel pressured to be creative all the time?

- If yes: Does that inhibit you to become your most creative self?