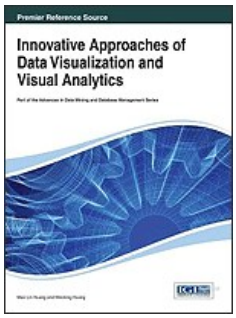

Innovative Approaches of Data Visualization and Visual Analytics

Chapter 10: The Quest for Clarity—How Visualization Improves the Usability and User Experience of Contracts

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ABSTRACT

In today's networked economy, contracts are everywhere. Many of them are watertight and legally perfect documents attempting to refer to every conceivable contingency. For people expected to use or comply with them, such contracts are often difficult to read, comprehend, and/or implement. As an alternative to the current predominantly legal and textual approach, the authors propose a user-centered, visualized approach aimed at better usability and easier implementation. Both consumer and commercial contracts should be communicated in simpler and more user-friendly ways, and we believe that visualization can play a fundamental role in achieving this. This chapter introduces the concept of contract visualization and some early examples produced in this novel field. Results obtained in the first year of a five-year research project, carried out in collaboration with a partner company, indicate preliminary confirmation of positive effects in improving contract usability and related user experience through visualization.

INTRODUCTION

When we hear the words *visual analytics*, what immediately comes to mind is sophisticated computational tools, large datasets, algorithms and digital visual interfaces, all of them playing their part in generating images to represent complex data structures that humans will otherwise have difficulty interpreting. This paper directs attention to the utilization of visualizations in analyzing and communicating complex information using a more 'handcrafted' approach.

Depending on whether you ask a computer scientist or a graphic designer, information design means a quite different set of practices and outcomes. One of the Authors of this chapter is a trained graphic designer who is fascinated by the idea of graphic design as a service, a way of displaying information and knowledge in a human-centered, simple and engaging manner.

Many areas of human social life are regrettably suffused with complexity, bureaucracy, dogmatic traditions and a lack of clear communication. One of these areas is contracts and contracting. The other Author of this chapter, a legal practitioner and long-time pioneer in crossing the boundaries of traditional law, has many years of experience in this field, and has always advocated the use of contracts to achieve business success and prevent problems, aims which require simplification and clarity.

The topic of this chapter comes from a genuine desire to conduct research in a multidisciplinary way in order to tackle a specific problem–contract complexity–that has negative effects on both consumers and private and public organizations. In addition to the traditional *reactive* legal perspective on contracts being minimized, other values from a range of disciplines enter the picture: efficiency, effectiveness and value (from business research), promoting successful outcomes, preventing problems, and balancing risk with reward (from *proactive* law and proactive contracting) (Siedel & Haapio, 2011), and user-centeredness and communicativeness (from design research). The novelty in our research is the focus on simplifying knowledge transfer and enhancing shared understanding in contracting by introducing visualizations and elements of information design into the contracting process and documents. We define this research area as *contract visualization.* In terms of sorting information in the belief that complexity can be made understandable and clarity can be reached through essential, rigorous abstraction (Irwin, 2002), it shares the goals of information design. Contract visualization can also be seen as a subset of the wider research area of knowledge visualization, which can be defined as the creation and transfer of knowledge by visualizations with or without the help of a computer (Burkhard, 2005a), with the aim of supporting cognitive processes in generating, representing, structuring, retrieving, sharing and using knowledge (Tergan, Keller, & Burkhard, 2006).

The benefits of visualization in supporting evidence analysis, explanation, and reasoning have been extensively described in the literature, especially by Tufte (1983, 1990, 1997, 2006), while other authors have begun investigating the possibilities of applying visualization and collaborative, co-located visualizing activities to managerial and organizational practices (e.g. Bresciani, Eppler & Tan, 2011; Roos, Bart & Statler, 2004; Eppler & Platts, 2009; Platts & Tan, 2004). These previous theoretical contributions, together with abundant evidential knowledge from the field of graphic design, constitute the basis for our hypothesis that beneficial results can be expected to flow from the application of visualization in contracts.

Even though visualizations started appearing in legal and contractual documents in recent years, very little research has been conducted so far and the work that has been done has not been systematic. This book chapter has three goals: to define the theoretical motivations behind contract visualization and the practical problems it seeks to tackle, to introduce an overview of the examples of early legal and contract visualizations that inspired our research, and to present the results of an experimental evaluation that appears to confirm the positive effects of visualization on the usability and user experience of contracts.

BACKGROUND

The ability to understand and use contracts in collaborative relationships is increasingly important. Most companies nowadays work in

collaboration with other companies, and the added value delivered to end customers depends on a complex network of actors. As the purpose of contracts is to describe and guide the roles, responsibilities and performance of such actors, they are complex in nature even when they try to be as clear as possible (Passera & Haapio, 2011a). This complexity often overloads the cognitive abilities of readers (Hagedorn & Hesen, 2009; Posner, 2010) and reveals that most contracts do not match their users' needs and show bad cognitive ergonomics. (Passera & Haapio, 2011b) For the people involved, this can lead to job dissatisfaction. For the companies they work for, it can lead to missed opportunities, sour and uncooperative business relationships, and even to long-drawn out disputes and litigation.

But who are these users? They can be divided into two major groups: the legal community and the business community. To date, the focus of contract drafters and scholars has been predominantly on the needs of the former: legal practitioners and researchers, judges, arbitrators and teachers of law. Most of the discussion about using contracts has been about applying them in court, after a dispute has arisen.

For a young lawyer just out of law school, the goal of contract design is almost certainly a contract that is as close to perfect as possible: legally-binding, enforceable, unambiguous, and providing solutions for all imaginable contingencies (Pohjonen & Visuri, 2008). The goal for them is the contract itself. In contrast, the business community requires a different approach because the goal is successful implementation. Signing a contract is just the beginning of the process of creating value together with suppliers, partners and customers (Ertel, 2004). Contracts do not make things happen–people do. In both commercial contracts and public procurement, to agree on desired outcomes and the activities needed to achieve them, key people on both sides have to be able to capture, elaborate, structure, communicate, access and use information and knowledge. Then 'reality' arrives and contracts have to be implemented through concrete actions: people in project delivery teams need to know how work should be carried out and people with financial responsibility need to know how much is due to whom and when. In the field, contracts are seldom easy for users to understand and implement, and contract interpretation remains the largest single source of contract litigation between business firms (Schwartz & Scott, 2010). If the parties involved do not truly understand their roles and the implications of the actions they take, the contract–a piece of paper with a signature–cannot achieve miracles and make the transaction and relationships it defines successful.

In organizational settings, contracts pose at least two challenges, one at the level of individuals and the other at social level. The first challenge follows from the fact that contracts are seldom easy for their users in the field, most of whom have no legal training, to access, understand and to implement. If contract complexity overloads their readers' cognitive abilities and contract implementation consequently fails, it would be wrong to maintain that such contracts are perfect. Quite the opposite, they are not fit for purpose. According to the cognitive load theory (Sweller, van Merrienboer, & Paas, 1998), three types of cognitive load exist (intrinsic, extraneous, germane). Dense, text-only contracts do not help in reducing this load: the task of reading long, difficult documents is time-taking and requires concentration (intrinsic load), the language and terminology used to represent the information may not be self-evident to the reader (extraneous load), and efforts to understand and learn the information provided are often far from being intuitive and unconscious (germane load).

One solution would be to move from legalese to plain language. A number of studies confirm the benefits of this approach and its preferred status among many groups of readers – clients (Adler, 1991), judges (Kimble, 2006), and the public (Plain Language Institute of British Columbia, 1993). On the other hand, conventional (especially Anglo-American) drafters of contracts still consider legalese superior. They talk about the benefits of using language that has been tested. For them, legalese has a clearly established and settled meaning. The reference here is to language that has been the subject of litigation. But why rely on language that resulted in litigation? While such language may help to win a battle in court, it does not help those who want to avoid such conflict to reach successful business outcomes. There is also little scientific evidence to support the use of legalese. Common arguments employed focus on the difficulties of adopting plain language (Tiersma, 2006), rather than explaining why legalese is superior from a cognitive, communicational or even practical (i.e. efficiency/effectiveness) perspective. In this light, rather than a substantiated choice, legalese appears to be more a professional convention grounded in tradition and sustained by the difficulty of achieving change. While we welcome and support the use of plain language, we do not believe that plain language alone would suffice to make contracts unambiguous and simple to use in everyday practice.

Contracts often attempt to communicate intangible and complex information. To add an extra layer of difficulty, the fact that clauses refer regularly to other clauses means they resemble hypertext, making it impossible to retrieve all the relevant knowledge from a single location. Text, even in its plainer forms, is not a good tool for communicating the abstract relationships hidden in a document such as the structure of the document itself or the implementation processes it seeks to describe. Also, it does not provide or illustrate a logical structure for making sense of correlated, but scattered, information. According to Keller and Grimm (2005), visualizing such sense-making structures can help reduce external cognitive load because users do not then have to autonomously develop mental structures for managing this information. Visualizations can serve as a basis for externalized cognition (Scaife & Rogers, 1996) and enhance readers' processing ability.

The second challenge is that even though the individuals whose actions are defined in a contract must understand what is required of them, this is not enough when the context of use is a heterogeneous group of people. Different individuals have to communicate, collaborate and synchronize their activities in order to produce and deliver what has been agreed. All these interactions are carried out in a social context. In which different actors collect, negotiate and share meanings. Such processes can be viewed through the lens of knowledge management, an approach that stresses the importance of knowledge creation, capture and transfer in keeping an organization effective, innovative and competitive (Burkhard, 2005b). Knowledge is embedded in culture, systems, artefacts, and individuals and can be managed through four processes (Alavi & Leidner, 2001), its creation, its storage and retrieval, its transfer, and its application. These stages can also be used to describe the contracting process. In which knowledge concerning the goals, scope and terms of a specific form of collaboration is first collected and created through negotiations, then recorded or stored in a contract. Contract implementation, the most important phase of all, is about retrieving and applying such knowledge. As all members of the teams involved must become aware of what is required of them, the process used to transfer this knowledge must be an effective one.

According to Burkhard (2005b), for knowledge to be transferred and then applied, it must be conveyed to individuals in the correct context. Such contexts are extremely heterogeneous. In different organizations, and even in different departments within the same organization, there is a clear risk that the parties involved in a discussion are not actually talking about the same issue, even though all of them believe they are: different practices, cultures and business needs influence the ways that people think. Maintaining an awareness of this invisible, tacit and complex factor at all times is very hard. Also, this is clearly not the type of information best expressed using text or clauses in a contract. Inter-company understanding appears to be a typical case in which the knowledge transfer process is difficult and sticky (Von Hippel, 1994),

because the knowledge being exchanged is complex and causally ambiguous (Szulanski, 2000). Eppler (2004) identified chasms of knowledge between experts and managers that can be bridged with the help of *knowledge communication* the deliberate activity of interactively conveying and co-constructing insights, assessments, experiences or skills through verbal or non-verbal means.

This is where visualization enters the picture: even though most of the contracts written today are text-only, they could benefit from the years of research and practice in the field of information design and knowledge visualization which demonstrate convincingly how visual elements can work in parallel with text to enrich and clarify its meaning. Burkhard (2005b) also suggested that knowledge transfer can rely on the powerful and innate human ability to effectively process visual representations. Visualizations can make the invisible visible, help to illustrate relationships and patterns, focus the attention of readers and support recall, coordinate individual thoughts and activities, and illustrate different courses of action. These benefits mean that visualization can be part of a practical solution for tackling issues connected with both cognitive overload and knowledge transfer.

To summarize, even though communication between the parties involved is a vital aspect of successful business relationships, the focus of today's contract designers and drafters continues to be on legal risk allocation, rather than on how best to communicate the deal that has been made and the resulting relationship, together with its terms, to those who need to understand and implement it. A mental exercise for reconsidering this attitude would be to view contracts and contract visualizations as boundary objects, artefacts–not necessarily physical ones–serving as negotiating interfaces between communities, practices and people communicating and working together through them (Star & Griesemer, 1989). If the focus is shifted towards collaboration and successful working practices, a comprehensive rethink of the types of instruments and tools being used and consideration of whether they have been consciously designed to be fit for purpose is imperative. The requirement for contracts to express essential information in a user-centered and user-friendly way becomes even clearer, because if there is any misunderstanding, the parties involved cannot simply do their best and attempt to keep their promises.

The remainder of this book chapter develops two main topics. Firstly, we provide an overview of early examples of contract-related visualizations which. In addition to having inspired our research, show how such techniques can be successfully applied, as well as having a user-friendly 'look and feel'. Secondly, we introduce our case study. In which a prototype visualized contract was developed and tested with users. Our experimental evaluation focused on assessing whether visualized contracts provide improved usability and a better user experience than contracts in the traditional, text-only form.

THE QUEST FOR CLARITY AND USER-FRIENDLINESS IN CONTRACTS

Beyond Text in Legal Design: Early Examples

Some pioneers have already gone beyond text in the design of legal documents. In Central Europe, the visualization of legal information has developed into a research field in its own right. In German-speaking countries, the terms legal visualization (Rechtsvisualisierung), visual legal communication, visual law and multisensory law have all been used to describe this growing field of research and practice. (Brunschwig, 2011, 2001)

In the United States, the use of visualizations has been studied, for example. In the context of improving comprehension of jury instructions (Semmler & Brewer, 2002; Dattu 1998) and in facilitating the making of complex decisions connected with dispute resolution (Siedel, 1992). Visualization has also been observed in the role of a persuasion tool in a variety of settings from the courtroom (Feigenson & Spiesel, 2009; Solomon, 2006) to the boardroom.

Recently, visual elements such as timelines and photos have even made their way into court decisions in both Europe and the United States. In Sweden, a judgment of the Court of Appeal for Western Sweden (2009) includes two timeline images showing the chain of events which is crucial to understanding the facts of the case. This particular judgment won the Plain Swedish Crystal 2010, a plain language award, not only for being written in a pedagogical and innovative manner, having a clear structure, good paragraphing, clarifying summaries and subheadings, but also for the fact that reading it was facilitated by bullet points and images (Språkrådet, 2010). In the United States, an Opinion by Judge Richard Posner of the Chicago-based 7th U.S. Circuit Court of Appeals uses the ostrich metaphor to criticize lawyers who ignore court precedent. Two photos are included in this opinion: one of an ostrich with its head buried in the sand, another of a man in a suit with his head buried in the sand. (Posner, 2011)

In Canada in 2000, recognizing the need for new ways to generate public interest in the law, the Government commissioned a White Paper proposing a new format for legislation. This document by David Berman (2000), a visual communication designer, also introduced the concept of using diagrams to help describe laws. While creating a flowchart diagram, Berman's team also revealed inconsistencies not accounted for in the legislation, suggesting that if rendering laws in diagrammatic form was part of the drafting process, the resulting legislation could in some instances be substantively improved. (Berman, 2000)

Another convincing example of visualizing legal rules is the Street Vendor Project, work carried out by designer Candy Chang in collaboration with the Center for Urban Pedagogy in New York. After noting that the rulebook [of legal code] is intimidating and hard to understand by anyone, let alone someone whose first language is not English, the project prepared *Vendor Power!*, a visual Street Vendor Guide that makes city regulations accessible and understandable (Figure 1). Together with a modest amount of text, the guide features diagrams illustrating vendors' rights and the rules which are most commonly violated. (Chang, n.d.)

Figure 1: Excerpt from Vendor Power!–A visual guide to the rights and duties for street vendors in New York City Project description available at http://welcometocup.org/Projects/MakingPolicyPublic/ VendorPower

Visualization is also applied with educational intent in the Wolfram Demonstrations Project, an open-code resource that uses dynamic computation to illuminate concepts in science, technology, mathematics, art, finance, and a remarkable range of other fields (Wolfram Demonstrations Project, n.d.). The project includes a rich library of visual and interactive demonstrations taken from the field of law, including a clarification of the so-called 'Battle of Forms'. Such a battle arises in the not uncommon situation where one company makes an offer using a pre-printed form containing its standard terms, and the other party responds with its own form and set of standard terms. The Wolfram Demonstrations platform allows users to choose various details of the case, with the output showing the most likely judicial finding as to whether a contract exists and the terms of that contract, together with a graph explaining the argument that will be advanced in support of that judicial finding. (The Wolfram platform can be tested at: http://demonstrations.wolfram.com/VisualizingLegalRulesBattleOfTheForms/).

With such obvious benefits, why is more visual material not seen used in contracts, contract negotiations, and in communications about contracts? One of the reasons for the dominance of text could well be the fact that with few exceptions, lawyers are accustomed to conveying their thoughts and ideas using nothing but words (Siedel & Haapio, 2011).

Research related to legal risks in the context of contracts conducted at the Faculty of Law in the University of Oslo provides an exception: using icons and diagrams illustrating legal risk, both a graphical modeling language and a method for proactive legal analysis were developed. (Mahler, 2010) In a case study, a group of lawyers, managers, and engineers were asked to use the method to analyze the risks connected with a contract proposal. The results of the case study showed that the diagrams were perceived as being very helpful in communicating risk-related aspects amongst the study participants. On the other hand, the need for simplicity and usability also resulted in some limitations and the need for a system in which graphical and natural-language elements are combined to allow improved decision-making (Mahler, 2010).

Flowcharts appear to be a useful tool for clarifying information which is complex and possibly ambiguous, not only because they offer a simple and easily recognizable method for displaying questions and answers, but also because the method is familiar to business audiences. Jones and Oswald (2001; Jones 2009) provide examples of how flowcharts can be successfully used to clarify contractual information, showing concrete examples of how elements such as the logic of contract structure, the actors involved, and clauses such as contract duration and indemnification can be visualized, as well as explaining why this should be done. Another example, from the UK, is the NEC family of contracts for procuring works, services and supply, together with associated guidance notes and flowcharts which make understanding them easier. Originally known as the *New Engineering Contract*, NEC has been widely praised for its collaborative, integrated and practical approach to procurement (NEC, n.d.).

That the flowchart approach is both flexible and replicable in other sets of terms and conditions is shown by an ongoing experiment developed by one of the Authors in collaboration with Kuntaliitto, the Association of Finnish Local and Regional Authorities (Pohjonen & Koskelainen, 2012). With the help of icons and flowcharts, this project is creating a freely available visual guide to the General Terms of Public Procurement in Service Contracts (Ministry of Finance, 2009). Figure 2 is one example–a flowchart that describes in visual form the situation in which a defective service has been supplied. In the flowchart, the implications of different actions are explored and the logic adopted in the contract for resolving the problem is shown. Readers can easily identify the situation at hand, and then use the flowchart to quickly check the preferred course of action and possible risks. Each block displayed in the chart is marked with the number of the clause in which the original information (in text form) can be found. After obtaining an overview and an initial orientation regarding the subject using the flowchart, users can proceed to reading the text for necessary details. In addition, as no contract is perfect, the flowchart also illustrates some limitations by pointing out cases in which the text of the JYSE 2009 Services General Terms do not provide a solution. Highlighting limitations of this type helps the parties

involved to make informed decisions and agree separately on such points if they consider this to be important.

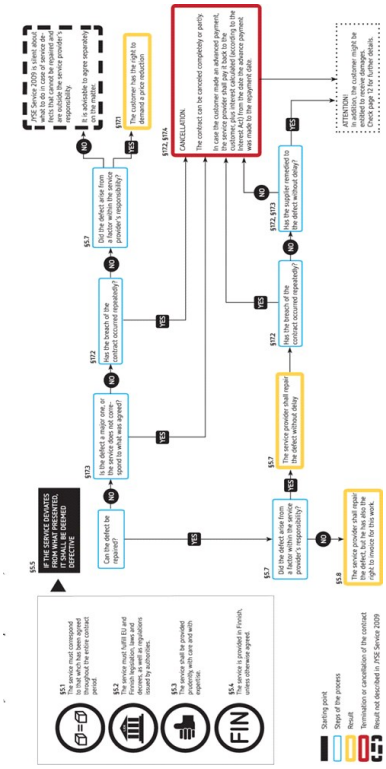

Figure 2: Flowchart visualizing contract clauses dealing with defects in service provision: extract from a visual guide (draft version) to the General Terms of Public Procurement in Service Contracts (Ministry of Finance, 2009) Work in progress

A different context in which examples of legal visualization can be found is the digital world: usage licenses, copyright and data privacy are now everyday issues which have an impact on everyone connected to the web. For example, Creative Commons licenses use simple, recognizable icons which can be clicked on to reveal a plain-language version of the relevant legal code (Creative Commons, n.d.). Users are informed about the possibilities and limitations of sharing, remixing and including the licensed content in free or commercial work (Figure 3). If additional information is required, the full text in legalese is also available and just one click away. This 'layered' approach is user-centric because it envisions use by different readers with different skills and knowledge needs.

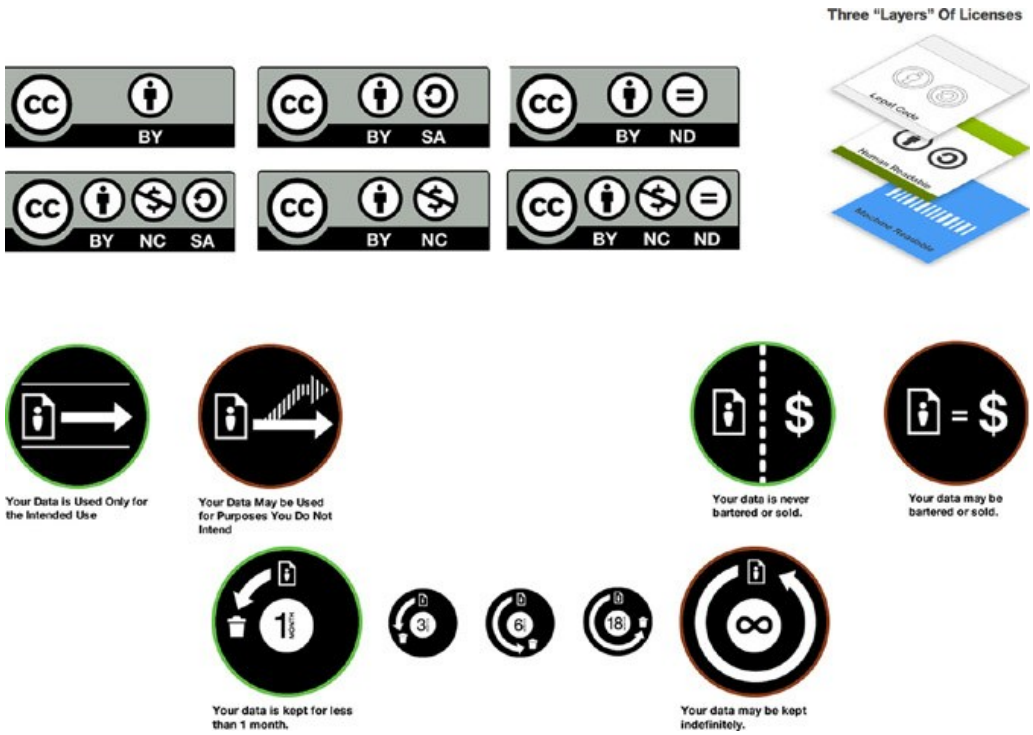

Figure 3: Examples of icons used for the rapid communication of complex content on the Web. Top: The Creative Commons Licence

icons and the Creative Commons licence rationale. Bottom: Mozilla Privacy Icons by Aza Raskin

Another experiment involving icons was carried out by Aza Raskin, a guru in interface design, for Mozilla. The set of Privacy Icons developed by Raskin can be used by websites to clarify the ways in which users of the website are agreeing to allow their personal data to be used (Figure 3). The inspiration for this work was twofold: the desire for simplicity in the Creative Commons approach to icons, and attempts to raise awareness about the attributes in privacy policy and terms of service that people should care about (Raskin, n.d.). As well as providing users with a more transparent service, utilization of the Privacy Icons can also enhance the brand image of websites that wish to differentiate themselves in terms of their privacy-related good practice.

In the light of a growing number of examples, visualizations appear to be finding their way into the communication of law-related messages and documents – a development which has been promoted by Colette R. Brunschwig (2001, 2011) and other pioneers for quite some time. On the other hand, contract visualization research and practice are still in a seminal phase, with most authors concentrating on theoretical suggestions or the presentation of examples.

To date, the number of tests conducted on contract visualization techniques to clearly assess their benefits in terms of cognition and attention levels, and memory retention, is small. Kay and Terry (2010) have experimented with textured agreements, which they describe as visually redesigned agreements that employ factoids, vignettes, and iconic symbols, with the aim of increasing the time that users spend reading the End-User License Agreements (EULAs) shown during software installation. The measures they are proposing indicate that visualization techniques increase the levels of interest displayed by readers and related attention spans.

An experiment was conducted to assess the usability of the Canadian Employment Insurance Act (GLPi & Schmolka, 2000), after it had been redesigned following the plain language and plain information design principles proposed in the already-mentioned White Paper by Berman (2000). In this case, which is not about a contract but a piece of legislation, the visualized version of the document also performed better than the traditional text-based one. Unfortunately, because the variables involved were not measured separately, this experiment failed to clearly distinguish between the benefits resulting from the use of plain language and those associated with visualization.

The field of contract visualization still lacks adequate empirical data on the methods, tools and best practices to be employed in implementing visualization techniques when drafting contracts, as well as data that supports the efficiency and effectiveness of this type of approach. Our goal is to move forward from what might be called the preliminary examples stage and extend the discourse by prototyping visual contracts in suitable contexts, collecting feedback from users, and analyzing the impact of contract visualization.

The aim of the case study and experimental evaluation presented in the next section of this chapter is to provide initial empirical data on the benefits of contract visualization. The experiment was the first in a series which, by using the same methodology but different contracts relevant to different groups of users, is seeking to assess whether contracts which employ visualization techniques really do make use by their target groups easier. The generic concept of easiness has been translated into two main testable measures drawn from the design tradition and commonly used to evaluate whether a specific artefact matches the needs of its user group. The first measure, usability, is used to assess the functionality and fitness for purpose of the contract document. The second measure, User experience (UX), is used in assessing the overall quality of interaction between user and artefact, and can therefore be used to investigate more widely the expectations of contract users, their perceptions and their subsequent experiential evaluations. It is our belief that by optimizing usability and the user experience, user-friendly contracts can be created which both support understanding and promote engagement with the content.

Case Study: Designing and Testing a Visual Contract Prototype with Users

The focus of this case is the experimental evaluation of a prototype B2B contract that contains visualizations. To minimize any threat to the general validity of the results, it was important to work with actual users in a real setting, testing documents as similar as possible to those already in use. The case study was carried out in cooperation with a Finnish company operating in the metals and engineering sector. On the company side, the case owners came from the sourcing department. Both the company and its case owners were conscious of the need to identify and employ novel methods of involving suppliers in delivering better levels of quality to end customers.

Preliminary interviews and workshops provided a rich qualitative background and a better understanding of the contract-related problems being experienced. For example, suppliers perceived the company's current terms and contract templates to be complicated and inflexible, which translated into sourcing personnel experiencing difficulty in negotiating forms of collaboration that were truly based on mutual trust and engagement. Other problems identified included common bottlenecks in the delivery process and specific contract clauses that were often subject to misinterpretation.

A second element in the preliminary analysis was a survey of the contract templates used in such negotiations. All the examples assessed typically consisted of text with almost no formatting apart from a simple table of contents and capitalized headings. As in many other contract templates, no attention had been given to typographical elements such as font size, font type and margins, all of which are factors known by graphic designers to have a significant effect on both legibility (the degree of recognizability of individual letters, a function of typeface design) and readability (the ease with which text can be read and understood, which depends on factors such as line length, kerning, indentations, point size, justification and so on).

Listening to contract users and their stories about real-life contracting events was an important step in deciding on the direction for the design intervention. Aims included improving the typography and document layout, highlighting key sections of the document by using visual techniques such as colors and bold text, and introducing charts and diagrams to explain the text in a way that was more user-friendly. The text of the contract was redrafted by the case company's in-house legal counsel in order to make it shorter and simpler. As each round of visual and textual suggestions went through iterative cycles involving feedback from users, they were able to both comment on the direction of the intervention and steer it according to their real-life needs. The result of this process was a credible prototype of a visual contract template. While text in the document was based on the original contract template, it did not reflect any particular business case. This was important at a later stage in the test procedure, as rather than relying on their familiarity with previous cases, participants were able to provide responses that were more genuine and immediate.

The main visual features of the contract prototype (Figures 4 and 5) can be summarized as follows:

- Better readability through the use of shorter text lines and wider margins
- Better legibility through use of the Utopia typeface rather than Arial. Utopia is both more legible and more condensed, which means that more text can be placed on a page even when shorter lines are used to improve readability
- Color and positioning used to highlight the headings in each clause
- Key terms and concepts in the text highlighted by using bold type
- Bulleted lists used to state the long lists of elements previously contained in text paragraphs
- The use of color coding in the table of contents to highlight recurring topics and the overall document structure
- The inclusion of charts, diagrams, timelines and flowcharts to clarify selected sections of the contract text (including a timeline to clarify the validity and termination clause, a flowchart providing an overview of the process, and photographs to indicate how the purchased materials should be packaged)

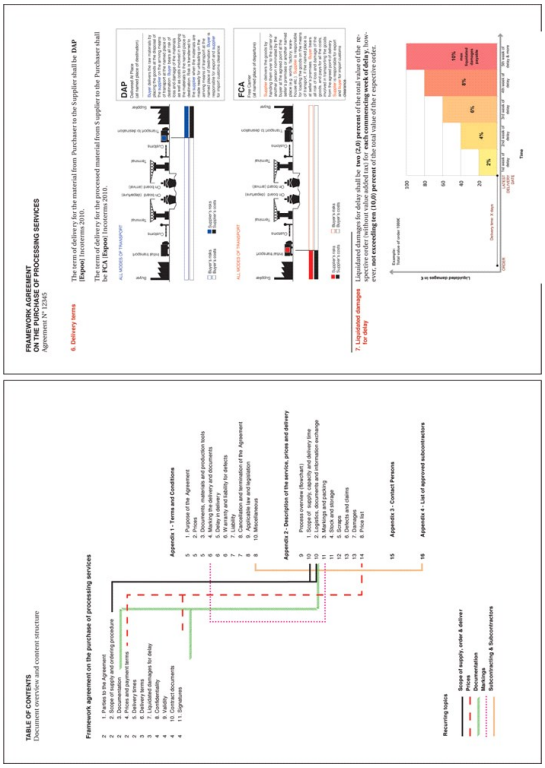

Figure 4: Example pages from a Framework Agreement: color-coded table of contents (bottom) and document layout including a delivery terms diagram and a liquidated damages bar chart (top)

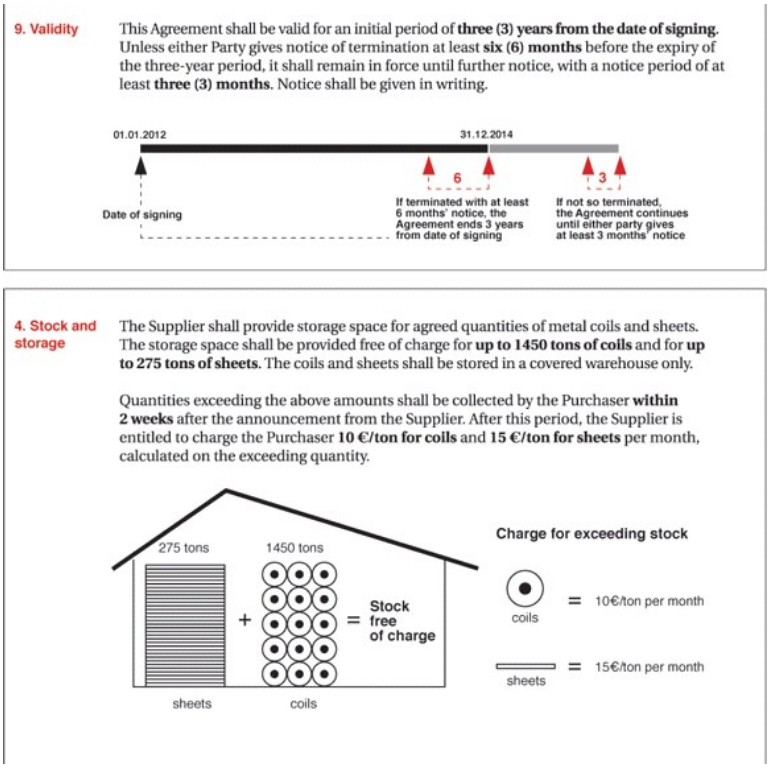

Figure 5: Examples of visualized clauses in a Framework Agreement: validity (top) and storage conditions (bottom)

Hypotheses

When the prototype contract with visualized elements was ready, it was tested. The goal was to assess whether the new visual version was easier to use and more user-friendly than the previous text-only version. Values associated with the terms easier and more user-friendly emerged from the preliminary interviews with contract users and can be categorised as follows:

1. Faster to read
2. Easier to understand
3. Less complicated to skim through
4. Information less complicated to identify
5. Helping to avoid misunderstandings and mistakes
6. Reduced levels of frustration

These values are easy to associate with two important measures used in assessing successful designs: usability and User experience (UX). Usability has been defined as the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use (ISO 9241-11, 1998). Often associated with functionality, the domain of usability focuses on the degree to which a task is performed effectively and efficiently. Preliminary interviews with the case study participants revealed that the existing text-only contracts they used were long and difficult to read, and that due to their complexity, misunderstandings among different contract readers were a frequent occurrence. For contract users to efficiently and effectively perform their work, quicker reading, easier understanding and making fewer mistakes are all important elements. Both reading speed and correct understanding are metrics that can reveal how usable a contract is, and also allow for quantitative comparisons between different contract versions. The goal of improved contract usability through the inclusion of visual elements–contract visualization–was therefore conceptualized into the following experimental hypotheses:

- **H1:** Visualized contracts support faster reading and information finding
- **H2:** Visualized contracts support more accurate understanding of the information provided

The second concept, User experience (UX), has its origins in research into user-centered design (Usability Professionals' Association [UPA], n.d.). In general terms, UX can be defined as [e]very aspect of the user's interaction with a product, service or company that make up the user's perceptions of the whole (Nuutinen, Seppänen, Mäkinen & Keinonen, 2011). In addition to the pragmatic needs that are mostly addressed by usability, UX attempts to satisfy users' emotional, hedonic and contextual needs. Even though an experience as such cannot be designed, it is possible to design for an improved user experience by providing suitable tools, evidences (Shostack, 1977) or scaffolds that users can employ when building their own experience (Sanders, 2002). In our case, the experience of working with contracts was often described by participants as complicated and frustrating. Their enthusiasm for contracts was limited and they were not willing to spend a lot of time on them, and negative past experiences affected their future expectations. Contracts were viewed as a necessary evil, and most of the participants

indicated that they would avoid having to handle them if this were possible.

UX is a dynamic concept, and it can be expressed as experience before usage (anticipated UX), experience during usage (momentary UX), experience after usage (episodic UX) and experience over time (cumulative UX) (Roto, Law, Vermeeren, & Hoonhout, 2011). In our experiment, a single contract usage event was adopted as the unit of analysis, and participants were not asked to verbalize their experience while reading the contract document because this would have affected their concentration and disrupted the verisimilitude of the task. It was therefore only possible to measure and compare the anticipated UX and the episodic UX. Hypotheses on the impact of visualization on these two dimensions were expressed as:

- **H3:** Visualized contracts provide a more positive user experience than text-only contracts
- **H4:** Visualized contracts affect users' expectations in a positive manner

Test Procedure

The test procedure was a partial repetition in structure and approach, of the test used to assess the usability of the redesigned Canadian Employment Insurance Act (GLPi & Schmolka, 2000). This piece of legislation was redrafted in plain language, with flowcharts, enhanced typography and layout all helping to enhance the clarity and readability of the information it contained. We considered this approach to be a suitable precedent for our case study. With a few modifications and additions, the testing procedure used for assessing the usability of the redesigned Canadian Employment Insurance Act proved suitable for testing our four hypotheses.

The test utilizes two methods of data collection: a self-administered questionnaire in three parts (before, during, and after using a contract), and a follow-up focus group discussion. Our study took place in December 2011 and January 2012 with three different sessions being organized. As in the original study, different user groups were involved to allow data to be gathered from all relevant stakeholders. Study respondents were drawn in roughly equal numbers from four company departments: five from legal, six from sourcing, six from sales, and five from supply chain management, and these 22 respondents were then divided into an experimental group and a control group, the first using a visualized contract and the second using a text-only contract. None were involved in giving feedback during the contract redesign phase, and respondents were only able to view the contract for the first time during the test to ensure that the feedback they gave was uncompromised. On the other hand, the respondents can still be considered to be informed users, because of their familiarity with the original contract templates and the types of agreement used in their company, all of which made up the raw material for our redesign. Working with informed users was a necessary condition for maintaining a reasonable degree of realism in the experimental setting and being able to trust the resulting data. The goal of assessing usability and UX was to optimize the contract design for real-world users. The respondents were small in number, yet selecting large statistical samples would not have been meaningful in this context. In our case study, the characteristics and skills of the people who were the respondents was more important than their number.

The structure of the test reflects the different aspects dealt with in our four hypotheses. In the first part. In addition to general questions such as age, gender and field of expertise, we asked the respondents to indicate on a 7-point scale how difficult they expected it to be (1 = not difficult at all, 7 = extremely difficult) to answer comprehension questions about what is agreed in a contract. This figure was taken as an indication of their general expectations. Respondents were then handed one of the two contract versions and asked to skim through it quickly. After this, they were asked to indicate how difficult they expected it to be to answer comprehension questions about what was agreed in that contract: this figure was taken as indicating the anticipated UX.

During the second part of the test, members of the experimental group were asked to answer eight comprehension questions with the help of the visualized contract, while members of the control group were asked to answer the same questions using a text-only version of the same contract. Even though the two contract versions were different in appearance, their text content was identical to avoid interference by other variables, and to more surely allow any difference in the results to be attributed to the presence or absence of visual treatment. During this part of the test, both respondents' speed in providing each answer and the number of correct answers they gave were recorded.

In the third part of the test, respondents were asked to indicate how difficult it was to actually answer the comprehension questions about what was agreed in the contract they had been given. This figure was taken as indicating the episodic UX. They were then given the other version of the contract and allowed to look at both versions at the same time. Finally, they were asked to express a preference regarding how different aspects of the contract were handled in the two versions.

Respondents then participated in focus group sessions. One of the Authors facilitated these discussions, following a semi-structured interview format and prompting participants to feel free about expressing their impressions, their thoughts and their feedback. As qualitative data was required in order to understand the motivations behind contract users' preferences, and to discover what experiences and thoughts the visualized contract provoked, the focus group sessions were recorded and transcribed. Even though the participants were not native English speakers and their comments included linguistic errors, we decided to report them in their original form without making corrections.

Results of the Experimental Evaluation

In terms of both speed and accuracy, members of the experimental group using the visualized contract performed, on average, better than members of the control group using the text-only contract. The percentage of correct answers given in the experimental group was 71.9% compared to 60% in the control group (Figure 6). The average time per answer given was lower (i.e. they answered more quickly) for users of the visualized contract (mean = 164.26 seconds, SD = 105.8) than for the text-only contract users (mean = 224.15, SD = 172.95). During the test, if they felt that they really could not find the required information, respondents had the possibility of pressing an 'emergency' button and abandoning an attempt to answer a question: this situation occurred four times in the control group (5.7% of the total number of answers given in the group), but only once in the experimental group (1.2% of the total number of answers given in the group).

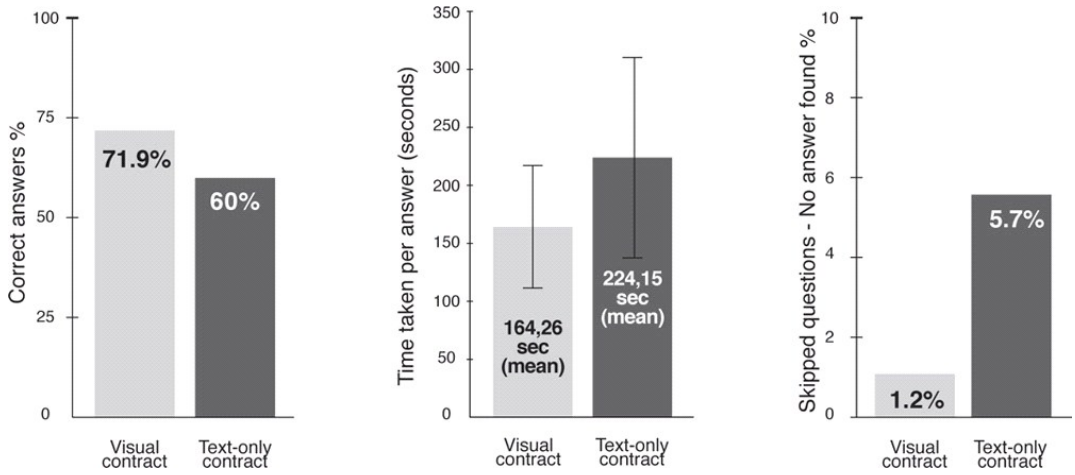

Figure 6: From left to right: 1) Correct answers (% of the total number of answers given per group), 2) Average time taken in answering a question (seconds with standard deviation), 3) Questions skipped because the respondent could not locate the necessary information (% of the total number of answers given per group)

During the focus group discussions, participants identified which visual elements helped improve the usability of the contracts they had been working with. Some of the related observations were made many times: for instance, the red lateral headings were considered clearer, the key terms highlighted in bold helped in finding relevant information, a less-dense layout made the contract more readable, topic-sensitive color-coding in the table of contents helped in identifying recurrent topics and where they could be found, and the visualizations employed gave hints about the content of the surrounding text, which made locating needed information faster as its location was easier to recall, "From the first glance I already remembered … so when the question came I remembered straightaway where I saw it." A visual approach was also seen as a useful way of supporting understanding: some respondents said, "It's understandable from text also, but [visualization] helps you to understand it faster or even clearer," or, "If it's only text, I think I need to read it a couple more times before I really understand what is says."

In terms of individual expectations and perceived difficulty, the visualized version of the contract appeared to be regarded as more user-friendly while also inspiring greater confidence among users. Before seeing the contract to be used, the initial expected difficulty in answering comprehension questions in the experimental group averaged 3.42 (SD = 0.62) on a 7-point scale (1 = not difficult at all, 7 = extremely difficult) and 3.80 (SD = 1.03) in the control group (Figure 7). After skimming through their assigned contract versions, members of the experimental group anticipated an average difficulty of 3.50 (SD = 1.26), while the average for the control group was 4.20 (SD = 1.07). Actual working with the visualized contract suggested an experience comparable to expectations, while working with the text-only version suggested an experience that was somewhat more difficult than expected. A clearer trend emerged after considering the perceived level of difficulty declared after the comprehension questions: the average for the experimental group (visualized contract) was slightly lower at 3.33 (SD = 1.17), while the average for the control group (text-only contract) rose to 4.70 (SD = 1.34). These results are also relevant in experiential terms, since despite the fact that the text in both contract versions was identical, and therefore in theory equally easy (or difficult) to understand, the presence of visualizations appeared to inspire responses that were less negative.

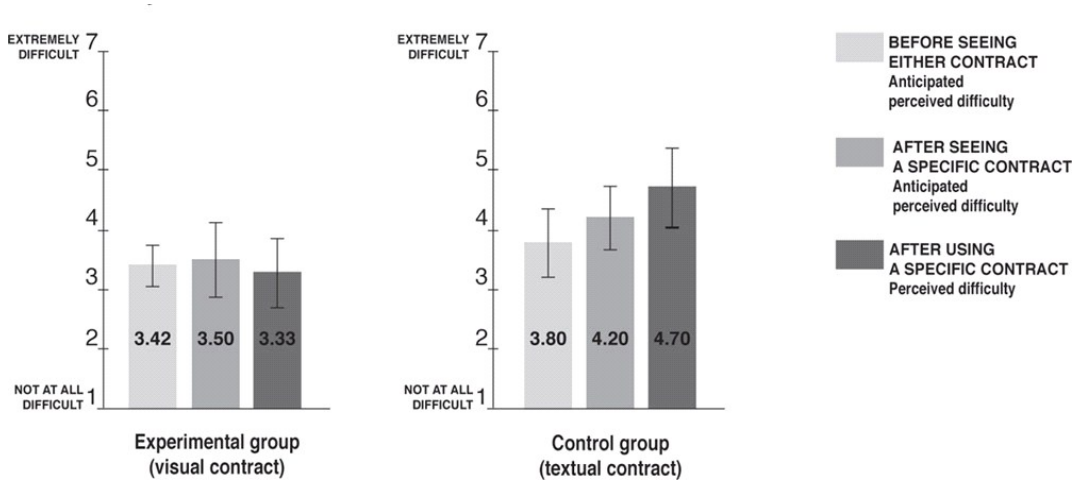

Figure 7: Perceived difficulty in contract utilization (self-assessed). Comparison between the experimental (visualized contract) and control (text-only contract) groups before the contract was viewed, after it was viewed, and after it had been used

Data collected during the focus group sessions revealed some of the participants' reasons for preferring the visual version of the contract, "One picture tells more than thousand words, It is not always clear 'what is what' in the text, so I liked these pictures because they help, [the contract] became more interesting to see, It is more inviting, It is more readable, It is easier to find [answers]," and, "When the text confuses me I always need to read it few times. But if there is also an image that explains it, then reading one time is enough." Several of the factors highlighted were related to improved contract usability, but comments from the focus session participants revealed how this had also a positive effect on the usage experience. Their descriptions of the visualized contract as more interesting and more inviting indicates that

contracts were probably not considered (or expected) to be interesting or inviting in any way. Visualizations seemed to provide a more positive experience, which was able to catch the attention of previously disillusioned users and engage them in new ways.

Another point worth noting is that contract visualizations could help companies in communicating specific values and improving the levels of trust and collaboration with suppliers. Test respondents were asked to compare the two contract versions by imagining that each had been drafted by a different company. They were then asked which values they associated with the hypothetical companies that had drafted the different contracts. Most respondents appeared to associate visualized contracts with more-trustworthy, innovative, and quality-oriented organizations. Other brand values inferred for the companies creating visualized contracts were openness to collaboration, transparency, and honesty (Table 1). In the focus group sessions, additional thoughts relating to company values and image emerged, and the participants tried to imagine what it would feel like to be working with actual visual contracts. One participant said, "It could increase the trust felt by the business people of the other party. They would know that we are trying to make the contract in a way that everybody really understands what is in it." Other participants added, "[visualization offers] some support to ensure that we are being clear about all the important points, or gather all the opinions about certain [matters] and also It's much easier to start a discussion with new persons." Some respondents also saw visualization as a tool for collaboration during the contracting process, since, "Visualizations need to be done together with the other contract party."

Table 1: Perceived brand image. A comparison of the values suggested by a visualized contract and a text-only contract

What Idea do You get About the Company that Drafted this Contract? What Values Do You Think It Holds?	The Company that Drafted the Text-Only Contract	The Company that Drafted the Visual Contract	Both Companies	None of the Companies
It is an innovative, quality-oriented organization	0%	100%	0%	0%
It is a trustworthy, reliable partner	14%	63%	23%	0%
They are truly open to collaboration	0%	77%	23%	0%
They truly make an effort to communicate with the other party	0%	95%	5%	0%
They value clarity in business	5%	68%	17%	0%
They respect their contractors	5%	59%	31%	5%
They aim at efficiency	14%	68%	18%	0%
They aim at effectiveness	9%	72%	19%	0%

Another value considered important was transparency. Respondents viewed visualization as beneficial, because, "Making both sides understand what was agreed is always good." During the focus group sessions, a common opinion expressed by respondents was that visual contracts could act as good marketing tools, especially in a sales setting, because they would allow greater differentiation from competitors and deliver better customer service. Some respondents said they would be proud to adopt visualized contracts in their organization, "It would be quite nice to be the first ones who are using visualizations, and showing that we are a top company also in this." Another comment made was that their company could be seen as, "The only one that has different contracts."

FUTURE RESEARCH DIRECTIONS

From a theory-construction viewpoint, the results of our case study are a preliminary but encouraging addition to the field of knowledge visualization. They support the view that visualization has positive effects in knowledge-intensive organizational tasks (Bresciani, 2011; Platts & Tan, 2004). From a practical perspective, feedback provided by the test respondents will help in further developing prototypes for visualized contracts and promoting visual approaches within our partner company, as well as having provided valuable experience in launching upcoming case studies with other organizations.

Establishing new research cases is a necessary step in increasing the validity and reliability of the results obtained. Firstly, in order to make generalizations, the number of test respondents must be larger. Secondly, any sample drawn from a single organization is only representative of that organization. Employing the same research methods in public and private organizations from different industrial sectors could provide better insight into the general applicability of our results, and also be useful in identifying industry-specific user needs. Thirdly, many different types of contracts exist and can only roughly be categorized as B2B, B2C or public procurement contracts, long-term or short-term contracts, sales of goods or services contracts, and so on. Depending on the nature of each contractual relationship and exactly what has been agreed, many individual typologies exist in each of these contract families. Experimenting with different types of contract in such contexts can be expected to reveal both similarities and specificities, and also help us in determining which consistent findings can be generalized.

One important aspect of our work is cooperation with real users in real-life cases, not only as a way of engaging them in our research activity and providing, in return, interesting results that can improve their working practices, but also as a way of increasing the reliability of our research results. This follows Yin's recommendations for case study research (2009), in which significant analytical sampling is preferred over statistical population sampling. Our fundamental assumption is that if different users who use different contracts to accomplish different tasks all perceive the same benefits from integrating visualization techniques into their contracts, then visualization can be isolated and identified as the reason for improvement. From a design perspective, involving anyone who is not a real user of the contract being tested would not make much sense because good design is contextual to who uses it. Although university students (a wide and easily-accessible population for researchers) would be suitable subjects when working with, for instance, a student housing tenancy agreement or a phone service agreement, they would probably not be the right people to listen to if the subject being investigated is purchase contracts for industrial equipment or industrial services.

Returning to theoretical viewpoints, actively interacting with real users has proved helpful in expanding both the focus of our studies and our research questions. Investigating contract usability and user experience is only a first step. To gauge the proper potential that lies in contract visualization, we should focus on the actual social interactions which constitute the context in which contracts are planned, created and used. One research question that is certainly worth asking concerns collaboration: do visual contracts work as better boundary objects, enabling more effective information and knowledge transfer? The experimental work we have done so far has taken account of individual understanding, but the next step is to check whether such understanding actually has an impact on social interactions. A second interesting question is whether visualized contracts can have a positive influence on organizational performance by providing better tools for collaboration.

Measuring such an effect will be particularly tricky, because organizational performance is affected by a multitude of elements: even if contract visualization brings benefits, these could be hard to identify or negated by other forces at play. A last question, and not a trivial one, is which skills and tools are needed for the concrete adoption of contract visualization as a routine organizational practice. Our goal would not be for companies to have to rely on visual designers every time they strike a deal: we would like managers and lawyers to be able to produce the necessary visualizations autonomously and without being fearful of what they would probably call their inability to draw. The aim is not beautiful images but visuals which are simple and functional. Lawyers and business users should have access to better digital drawing tools than the selection now available to them, and more importantly, should learn to think and communicate in visual terms. Our future research work will involve investigating what is required to provide non-designers with basic visual literacy skills and how their acquisition of visual thinking skills can be promoted.

CONCLUSION

This chapter has provided an overview of some of the common problems that contract users encounter in utilizing complex contracts. We have shown how issues connected with cognitive overload and unclear communication not only make it harder to carry out the tasks which make up one's job, but can even jeopardize organizational performance. Misinterpretations and unintentional errors can easily lead to non-performance, to late or inadequate performance, and in the worse case to claims and litigation. Contracts can in fact be user-*un*centered, not only because of their overly-legalistic logic and language that is a poor match for the abilities of most of their non-legal-background users, but also because of a significant lack of balance which places the emphasis on their drafting rather than on communicating their content and goals. We believe that much can be achieved in terms of clearer communication: both simpler language and clearer logic are necessary steps, but if content communication is taken seriously, why not draw on the advantages offered by different modes of communication? As it can support both interpretation and reasoning, we feel that visualization is an effective way of communicating information which is both abstract and complex.

According to the initial results of the tests we have conducted, our hypotheses on the beneficial role played by visualization in contracts appear to be verified. In terms of usability, test respondents using a visual contract were able to reply to questions faster and provided more correct answers than the control group (H1 and H2). Many respondents expressed the view that visualizations made contract reading more fluent because they supported content visibility, text comprehension and information recall. In addition, as they restated and communicated concepts in alternative ways, visualizations were viewed as a means which clarified and highlighted sections of the text. In terms of user experience, visualized contracts appear to provide a better first impression than traditional text-only ones, and such positive impression was confirmed also after test respondents had used the contract (H3 and H4). Trends in the experimental group indicate that initial expectations and subsequent experience are essentially comparable when using a visualized contract, but in the control group, the initial feeling that a traditional text-only contract will be difficult to use appears to get worse once it actually has been used. Avoiding this type of negative surprise could be a first step towards re-engaging existing users and changing their attitude towards contracts in the long term. Our results, however, suggest that there is more to be gained, as the respondents in our tests appeared to associate positive brand values with a visualized contract. Using visualized contracts in a sales setting could help differentiate a company from its competitors and win over new customers.

Further research and a wider range of examples are required to allow the envisioning of both accurate frameworks for contract visualization and concrete practices and methods. Our ongoing research work aims to provide both, while at the same time raising general awareness about the importance of user-centeredness and effective communication in the field of contracting. Visualization offers ways of empowering users whose job it is to make sense of complex contracts. The visual breakdown of intricate arguments and logical structures, together with visual descriptions of often intricate processes can promote a more analytical approach to the text components in contracts. Rather than struggling with initial sense-making, the clearer understanding supported by visualization enables more sophisticated insights and decision-making. For organizations, this translates into better business opportunities and fewer problems down the road. In the case of individuals, it means that personal choices will be better informed and working with contracts will become less demanding.

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KEY TERMS AND DEFINITIONS

Contract Usability: The extent to which a contract can be utilized by specified users to perform their tasks and to achieve their goals with effectiveness, efficiency and satisfaction, given a specified context of use. The concept focuses on user performance: in this research, the performance by user groups with non-legal backgrounds using contracts as part of their everyday work.

Contract User Experience: The way a user feels about using a contract. The concept focuses on the overall experiences, values, meanings, thoughts and feelings perceived by the user when working with a contract. User experience, when positive, contributes to engaging users in a certain activity: in this case. In reading a contract and acting upon it.

Contract Visualization: A subset of knowledge visualization which utilizes infographics and other information design methods to make contracts clearer and more user-friendly

Knowledge Visualization: A field of study and practice that investigates the power of visual formats to support the cognitive processes of generating, structuring, sharing and retrieving knowledge

Proactive Contracting: A field of research and practice that uses contracting processes and documents to merge Proactive Law with contract, quality and risk management in order to promote successful outcomes, prevent problems and balance risk with reward

Proactive Law: A future-oriented approach that uses the law to promote successful outcomes and prevent problems, unlike traditional law, which is oriented to the past and mainly uses legal rules to react to past failures

User-centered Contract: A contract that is designed and drafted focusing on the knowledge needs of different user groups (with both legal and non-legal backgrounds), their cognitive capabilities and the contexts where the contract will be used