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Flowcharts, swimlanes, and timelines –
Alternatives to prose in communicating legal-bureaucratic
instructions to civil servants

Journal:	*Journal of Business and Technical Communication*
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Abstract:	Government-published documents often fail to communicate clearly – with citizens, but also with "professional readers" like civil servants. Highly visual or multimodal approaches remain rare. In particular, this is an unhelpful practice in regards to legal-bureaucratic instructions (e.g. contracts, rules, policies), which exist to guide compliant behavior. The study explores the development and the experimental evaluation of a highly diagrammatic guide for public procurement Terms & Conditions, addressed to civil servants. Results show that the diagrammatic format, in comparison to prose, significantly enhances comprehension accuracy and answering speed, and is perceived as more appealing and functional by the users.

Flowcharts, Swimlanes, and Timelines –

Alternatives to Prose in Communicating Legal-bureaucratic Instructions to

Civil Servants

Introduction

Even though the plain language movement greatly influenced several governments towards

creating more accessible and usable information (cf. Piehl & Sommardahl, 2016), and has stressed

the importance of visual design in clear communication (cf. Mazur, 2000), the great majority of

government-published documents remains purely textual. It is indicative that even government-

issued guides or directives on how to create clear public documents are set in long, unappealing,

mostly textual formats – although those same guides recommend using graphics to further clarity

and capture the readers' attention (e.g. Australian Government Office of Parliamentary Counsel,

2013).

Unfortunately, these dense textual documents often do not meet their goal to inform and direct the

behavior of either general public or "professional readers" – those who need these documents in

order to carry out their jobs. For instance, research conducted in the UK on how to best present

legislation to its users (Bertlin, 2014) reveals that even experienced lawyers can struggle in

understanding it (p.47). Scholars have identified some recurrent problems in government-

published documents: e.g. excessive document length due to years of amendments and additions

(Waller, 2011, p.2); indifferentiated layouts and structures (Waller, 2011, p.2), often reminiscent

of texts created with a typewriter (Schriver, 2015, p.177); and the use of bureaucratic language,

which is distant and unfriendly (Schriver, 2015, p.177), highly technical (Waller, 2015, p.1),

impersonal and complex (Jansen, 2001). Arguably, a lack of explanatory visuals elements and

well-designed document layouts make legalese and bureaucratese even harder to process. Plain

language is necessary, but not sufficient, in engaging wary potential readers: visually disorganized

documents and walls-of-text just *look and feel* difficult (Waller & Waller, 2015). When people do

not easily perceive enough relevant information at a first glance, and thus anticipate high mental

effort, they will simply not read (Fennema & Kleinmutz, 1995). Worryingly, and somehow

counter-intuitively, this may be especially true for civil servants. Workplace readers are in fact

extremely selective as what and whether to read, as reading is a goal subordinated to some other

pressing work-related task (Wright, 2015). They can easily misunderstand or misapply

information because of time-pressure, stress, fatigue, or a distracting reading environment (Jarrett

et al, 2010). Overload is also an issue: Neutelings (2001) has estimated that Dutch parlamentarians

are expected to read 250 000 pages a year. While public organizations may be more willing to

invest in good design when addressing citizens (e.g. Waller & Waller, 2015; Waller, 2015;

Schriver, 2015), they may be blind to the need for it in internal communication, and prefer to do

things "the usual way" (Wright, 2015). Misunderstandings and poor decisions can arguably have

negative consequences on the effectiveness, efficiency and credibility of public organizations, and

affect the good functioning of civil society at large.

A purely textual format, presented or not in an effective layout, remains problematic when the

goal of a document is to regulate behavior – as is the case with contracts, policies, regulations,

bylaws, and guidelines. Although the very goal of these documents is to tell people what their

responsibilities and duties are, they are presented as statements rather than as instructions: this

easily leads to misunderstandings, as it requires readers to make their own inferences as to what is

appropriate (Redish, 1989; Wright, 2015). According to Sless (2015) a legalistic mindset is to

blame: a widespread assumption in government and regulatory bodies is that controlling words

and neatly specifying content is sufficient to control behavior – while supporting actual user tasks

through design is ignored.

Studies show that is best practice to integrate textual and visual elements in instructions (e.g.

Jansen & Steehouder, 1984; Mayer & Gallini, 1990), rather than using words or pictures alone. In

particular, diagrams are typical in effective instructions. Diagrams foster understanding by helping

users identify the steps required to complete a procedure (Roy & Grice, 2004), the correct

sequence of required actions (Jansen & Steehouder, 1996), and the functional components of a

system (Roy & Grice, 2004). They are indispensable because they communicate more effectively

than text relationships between elements (Ware, 2013, p. 304) – such as sequences, transitions,

interactions.

However, diagrams are the great absentee in legal-bureaucratic instructional documents. Even

research on government-published documents has ignored, with few exceptions (e.g. Jansen &

Steehouder, 1984; Berman, 2000), the possibilities of diagrammatic representation and

explanation, focusing instead on layouts and formats for highly textual genres (legislation: Waller,

2015; Rogers, 2015. Government letters: Renkema, 2001; Waller & Waller, 2015) or forms (e.g.

Schriver, 2015; Jansen & Steehouder, 2001). A novel body of research on "contract visualization"

– that is, the use in contract documents of diagrams, systems of icons, visually-structured layouts,

comics and vignettes (e.g. Kay & Terry, 2010; Mamula & Hagel 2015; Waller et al, forthcoming;

Haapio et al, 2016; AUTHOR) – reported initial results on the possibilities of visual explanations

in a legal-bureaucratic document genre. However, the field would benefit from more empirical

evidence, more rigorously collected and analyzed.

Despite the potential benefits of diagrams in making legal-bureaucratic instructions clearer,

governments may be reluctant to change their practices, given the lack sufficient field-specific,

document-specific and audience-specific inspiring examples and research evidence. Knowledge

from technical communication research (e.g. how to clearly visualize objects, users' body parts,

and physical actions) may look irrelevant in making contracts, policies and legislation any clearer.

However, some of the key instructional principles from that domain can still be applied. For

example, procedures can be presented from the perspective of the users, as simple, non-redundant

steps (Boekelder & Steehouder, 1998; Michael & Hartley, 1991), mirroring their likely course of

action (Schriver, 2015; Jansen & Steehouder, 1984).

Rigorous evaluation studies of highly diagrammatic legal-bureaucratic instructions in a real

governmental setting may persuade public writers that the approach is possible and desirable.

From a research perspective, the focus on diagrams complements previous research on

government documents, which focused mostly on overall document design issues (e.g. layout;

visual navigation and hierarchy; forms design). This article seeks to generate knowledge on such

issues, guided by three research questions:

1. To what extent can diagrams help understanding legal-bureaucratic instructions, which are
   originally in written format?

2. What types of diagrams can be used for this purpose?

3. Is a highly diagrammatic approach effective with the intended primary audience(s) of
   legal-bureaucratic instructions?

In this study, I present the development and the experimental evaluation of an explanatory visual guide for the JYSE 2009 SERVICES – the standard Terms and Conditions[1] (T&C's) used in Finnish public procurement contracts for service purchase. The JYSE Visual Guide[2] consisted of a collection of 23 diagrams (swimlane tables, flowcharts, and timelines), one per page, each addressing a specific contractual topic. All texts, apart from an introductory section, a table of content, and the headings on each page, were incorporated within the diagrams. The Visual Guide and the original version of the T&C's included both the same information, but presented in different format: the former as diagrams, the latter in prose. The effectiveness of the Visual Guide was assessed through an experiment based on comprehension questions, carried out with procurement personnel from several public organizations.

The results of the study show that the diagrammatic format, in comparison to prose, significantly enhances comprehension accuracy and answering speed, and is perceived as more appealing and functional by the users. The experimental data is complemented with qualitative data from focus groups. The findings provide evidence that diagrams are more effective than prose in communicating a specific type of legal-bureaucratic instructions – contracts – and that the format is suitable to support the work and information needs of civil servants.

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[1] Terms and conditions (T&C's) are a specific type of contractual document. Their role is to set out service specifications, as well as general and specific responsibilities, rights and duties of the parties. T&C's usually are a non-negotiable document, which can constitute the entirety of an agreement (e.g. in business-to-consumer settings, also called terms of service), or just a section of the whole agreement (e.g. in public procurement or business-to-business commercial contracts).

[2] The JYSE Visual Guide (*JYSEn Käyttämisopas – JYSE 2009 PALVELUT*) is available online at: http://goo.gl/yGgmAf

The remainder of the article is structured as follows. Firstly, I provide a theoretical background, which contextualizes the study and its results in relation to research on contracts, government documents, and diagrams in instructions. Secondly, I describe the empirical context of the study, and the problems that were addressed. Then, in light of theory and context, I formulate three hypotheses, describe the methodology chosen to test them. Lastly, the results and their limitations are discussed. Reflecting on the case described in this study, I also offer suggestions on how to integrate visual design in the production process of public documents.

Theoretical background

Given the multidisciplinary nature of the study, I chose a convenience review of past literature around the following themes: 1) the use of visual language in legal documents, in particular under a proactive law lens; 2) the role of diagrams in instructions, and which diagrams may be suitable for legal-bureaucratic content; 3) the barriers in adopting more visual formats in governmental documents.

Contracts-as-instructions: the proactive law lens

Changing attitudes towards visual communication in law. The legal field is traditionally a textual and verbal domain, and famously resistant to innovate on its conventions. Visual communication is a rather novel proposition, and its possibilities have not yet been sufficiently explored empirically and theoretically. However, legal scholars predict a greater use of visual elements in the future since lawyers and judges increasingly peruse legal documents on screen rather than on paper, and can more easily create and include multimedia elements in documents without significant costs (Porter, 2014; Johansen & Robbins, 2015). Apart from technology, the plain language movement is the other factor challenging the monopoly of text, as the goal is not

writing per se, but communicating clearly. Plain language advocate and law professor Joseph

Kimble lists "design" as one of the 5 key elements of plain language, and encourages to "use

diagrams, tables, and charts as needed to help explain the text" (2002, p.44). The Federal Plain

Language Guidelines in the US (Plain Language Action and Information Network, 2011) and the

Plain English Manual of the Australian Office of Parliamentary Counsel (2013) share these

recommendations; the latter manual, in particular, suggests the use of diagrams to plan, clarify and

test the logical correctness of rules, and encourages writers to consider including such diagrams in

the final bill (p.11). A report on new formats for Canadian legislation states that "using diagrams

to help describe laws is revolutionary" and "likely the most innovative design feature" in the new,

suggested format (Berman, 2000, p.23).

Legal scholars such as Murray (2015) welcome a greater use of visual communication in law as a

way to help bridging cultural, language and literacy gaps between legal experts and clients, jurors,

and decision-makers. Judge Posner (2013) and Chief Judge McKee (Johansen & Robbins, 2015)

call for more lawyers to use visuals in legal briefs, and Rosman (2013) suggests at least 7 ways in

which visual elements can improve their clarity and factuality (e.g. explaining a rule, showing a

case procedural history, illustrating the relationships among the parties, etc). Of course, the issue

of the legal interpretation and enforceability of visual language is an open one, but solutions have

been proposed: for instance, recognizing that visuals (just like text) are rhetorical devices, courts

could adopt rules for use and interpretation inspired by the ethical codes of photojournalists

(Porter, 2014). Alternatively, one may clearly state on legal documents that, in case of

inconsistencies between text and visual, the textual version prevails – a solution already

commonly used in bilingual contracts (AUTHOR).

Persuasion vs. functionality. While legal research has mostly concentrated on visual legal

rhetoric and the *persuasion* of materials used in court, such as briefs, judicial opinions, pieces of

evidence, and jury instructions (Sherwin, 2011; Porter, 2014; Rosman, 2013; Miles & Cottle,

2000), a second stream instead addresses the *functionality* of legal documents in everyday use,

outside of adversarial settings. The so-called *proactive law and contracting* scholars focus

especially on improving business-to-business or business-to-government contractual documents

and practices, so as to preventing disputes and securing business success for both parties (Haapio

& Siedel, 2013, p.6). Proactive law opposes the narrow view that contracts matter only to lawyers,

and – in case of disputes – to judges (Pohjonen & Koskelainen, 2012; Barton et al., 2013; Barton

et al. 2015; Kim, 2013; Haapio, 2013b). Conversely, it calls for simpler, clearer, human-centered

contracts, which should be understandable also by business managers and consumers. In this

research stream, contracts (and other 'governance' documents, such as bylaws, policies, etc) are

seen as instructions: *visible scripts for the parties to follow* (Berger-Walliser et al, 2011, p.57),

blueprints for [business] *performance* (e.g., DiMatteo et al., 2012, p.92), *user's guides* and

instruction manuals (Mitchell, 2013, p.21), *information products* and *useful devices* that must

meet the needs and expectations of all readers' groups (Haapio, 2014, pp.453). Contracts are not

only legally enforceable *rules*, archived until disagreements arise, but a managerial tool *to be used*

to monitor the correct implementation of transactions and projects. The user- and goal-dependent

focus in this stream resonates with the priorities of plain language, technical writing, and

information design – supporting document users to understand and achieve their goals quickly,

with no mistakes.

A methodological research gap. Proactive law research addressed layout, diagrams, and

other instances of visual language in contractual documents from two perspectives. The majority

of these studies argues for visuals in contracts from a theoretical perspective (e.g. Barton et al,

2013; Berger-Walliser et al, 2011; Haapio, 2013a). While it often shows examples and redesigns, it does not offer an empirical quantification of the benefits of visual alternatives to prose. Few studies sought to evaluate experimentally readers' comprehension and while their results seem encouraging, their validity is affected by methodological limitations: in one study, only a small part of the contract included diagrams and was tested (Mamula & Hagel, 2015); in another, the participants were university students, and the visual version of the contract used in the experiment was a mock-up created just for the study (AUTHOR); in another study, explanatory diagrams were used, but the sample of participants was very small, and the statistical analysis is not thorough (AUTHOR); in yet another, the main finding is that visual elements increase the time spent reading software license agreements – but increased comprehension of the agreement seems to be just a direct function of increased reading time (Kay & Terry, 2010). An additional issue is that the terms 'visualization' and 'design' are used to refer to quite different expressions of visual language: layout and overall document design (Waller et al, forthcoming), layout and icons (AUTHOR), explanatory diagrams (AUTHOR), illustrations and vignettes (Kay & Terry, 2010), and multimodal genres such as comics (Haapio et al, 2016).

Acknowledging these issues, the current study seeks to confirm these initial explorations through a more rigorous and convincing methodology. Moreover, building on the conceptualization of *contracts as instructions*, I decided to focus specifically on the explanatory possibilities of diagrams.

Diagrams as comprehension aids in instructions

The effectiveness of visual means in conveying complex information have been reported in many research areas, i.e. information visualization (e.g. Ware, 2013), human-computer interaction (e.g. Blackwell, 2001), educational psychology (e.g. Chandler & Sweller, 1991), technical

communication (e.g. Fukuoka et al, 1999), and, more recently, managerial studies (e.g. Platts & Tan, 2004; Kernbach et al, 2015). Consistently with the focus of this article, I will concentrate on literature about diagrams and their role in comprehending instructions.

Instructional diagrams. In regards to instructions – intended as documents seeking to give directions on how to accomplish a procedure, solve a problem, or behave – literature on the role of visual language can be roughly categorized as follows: a first stream considers the overall document design level, examining how visual elements in layouts are used to rhetorically and perceptually affect text reading and understanding (e.g. Tenbrink and Maas, 2015; Ganier, 2004; but also, more in general, Waller, 1980; Kostelnick, 1990, 1996). The second stream focuses on the role of diagrams, illustrations, photos, screenshots and symbols in supporting learning, inference and understanding – mostly in domains such as procedural, operational and assembly instructions (e.g. Fukuoka et al, 1999; Krull et al, 2004; Maes & Lenting, 1999; Roy & Grice, 2004; Rude, 1988), or mathematical and scientific problem-solving (e.g. Lambiotte & Dansereau, 1992; Larkin & Simon, 1987; Mayer & Gallini, 1990).

The latter stream shows that diagrams often outperform linear text in supporting attention and information search (Larkin & Simon 1987; Wright & Reid 1973); deductive reasoning (Bauer & Johnson-Laird 1993); comprehension and problem solving (Glenberg & Langston, 1992; Masri et al, 2008; Mayer & Gallini, 1990; Mayer et al, 1996; Wright & Reid 1973); and recall (Glenberg & Langston, 1992; Mayer & Gallini, 1990; Mayer et al, 1996). These effects occur because diagrams decrease cognitive demands by working as external memories (Bauer & Johnson-Laird 1993). By mapping logical relationships into visible spatial relationships, the cost of interpretation is offloaded to the external representation – which can simply be "read-off" (Scaife & Rogers, 1996). Making relationships visible constrain possible interpretations and guide correct inferences

(Stenning & Oberlander 1995). Cognitive load theory (Chandler & Sweller, 1991; Sweller, 1994) posits that different ways to present information impose different loads on human working memory. Since humans possess different processing systems for visual and verbal information (e.g. Baddeley, 2003; Paivio, 1979), and each working memory sub-system has a limited capacity (e.g. Sweller, 1994; Baddeley, 2003), solutions that integrate verbal and visual elements are easier to process. Diagrams, merging visual and textual elements in a holistic display, rely on the relative strengths of different modalities: visual elements are usually better at representing relationships, mechanisms, parts' functions, trends, and patterns (Albers 2012, p., 269; Mayer & Gallini, 1990), but text is usually better at conveying abstract concepts, and denoting terms, details and meanings precisely (Doumont, 2002; Albers, 2012, p.269).

These findings should be considered in the presentation of complex instructions, where information overload and mistakes prevent readers are required to act upon information in the correct way.

Flowcharts, tables, timelines. Providing information from the perspective of the users results in instructional effectiveness (Schriver 2015). Applying this principle means, for instance, to present instructions in a step-by-step fashion that facilitates the process of "mental animation" of the procedure (Roy & Grice, 2004); to accommodate for the use of instructions in the situation and moment in which they are needed (Boekelder & Steehouder, 1998); and to arrange the content in both chronological and modular order, so as to support different reading and searching styles arising from users'goals (Ganier, 2004).

Readers tasked with implementing *contracts as instructions* would benefit from a specific

perspective[3]. For example, they need to understand if a certain rule applies to them; who is

responsible to do what; what actions are required; deadlines; and how to remedy to problems.

With this in mind, some types of diagrams seem particularly fit for the purpose.

Flowcharts offer a suitable alternative to prose when users need to consider complex combinations

of contingencies to solve a problem (Wright & Reid, 1973); distinguish between relevant and

irrelevant information for their situation (Michael & Hartley, 1991); reduce complex problems or

procedures in a sequence of simpler steps (Holland & Rose, 1981); and switch between reading

and taking action at the right moment (Boekelder & Steehouder, 1983). Some authors (e.g. Wright

& Reid, 1973; Holland & Rose, 1981; Jansen & Steehouder, 1984) have indicated legalistic,

bureaucratic texts as the typical example of information better expressed through flowcharts, as

they are characterized by complex conditional structures (signaled by terms such as *if / then,*

unless, notwithstanding, etc). Business law scholars have proposed flowcharts as effective

methods to map and communicate clearly business transactions and procedures (Jones & Oswald,

2001; Conboy, 2014), albeit no empirical evaluation was conducted.

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[3] The distinction among different contract readers is crucial. Lawyers and judges

usually do not need to implement contracts. Their goal is to assess them and,

eventually, find what is wrong with them. Thus, they read *everything* in a contract,

multiple times, and with intent (Burnham, 2003). The current problem is that *other*

audiences are not taken into account when contracts are drafted, resulting in formats

that are dysfunctional and unfit for business and administrative readers (Haapio,

2013a).

Tables are also a valid alternative to prose, although often yield more comprehension mistakes

than flowcharts (Wright & Reid, 1983; Boekelder & Steehouder, 1998). Thus, they are

recommendable for comparatively simpler problems, and when speed matters more than decision

accuracy (Wright & Reid, 1983). Tables create a visible structure helpful to select and sort

information (Rude, 1988). Strylowski (2013) invited legal writers to use tables to clarify their

thoughts, and express them concisely.

Given the importance of presenting instructions in chronological order (Jansen & Steehouder,

1996), there is surprisingly little research on timelines, "*graphical representations of a set of*

temporal units punctuated by 'tasks', 'events' or 'milestones'" (Yakura, 2002, p.956). One may

distinguish between time charts – which focus on the duration of events – and process diagrams –

which stress instead the order and temporal relationships between events (Lohse et al, 1994).

Gantt charts, timelines and other representations of time are ubiquitous in organizations, as they

support coordinated action (Yakura, 2002). Timelines have also been suggested as a solution to

disambiguate contractual issues related to contract duration and termination (AUTHOR; Mamula

& Hagel, 2015).

Diagrams and explanatory visualizations in government documents: barriers to adoption

The previous sub-section provided a short review on diagrams as an effective instructional

method, and also identified some techniques that may be effective in contracts and other legal-

bureaucratic instructional documents. Why then governmental organizations are still not taking

advantage of diagrams in instruction-like documents? Why the few inspiring examples can mostly

be found in pilots and research studies, but have not been taken into use?

The reasons are complex, spanning from the existing mindset to document production processes in

public organizations. Jansen (2001) suggests that '*public writers do not consider themselves to be*

writers, but rather policy designers or legislators…And a "good policy" is not synonymous to an

excellent written policy paper' (p.120)*.* Public writers judge document quality by their own

criteria: official texts must seem to '*follow naturally from objective circumstances*' (Jansen, 2001,

p.127)*,* and *vagueness* is a strategy to preserve the imperative tone of the documents when

unpleasant details need to be presented to the audience (p. 128). Waller (2012, min. 10:04) talks

instead about '*design illiteracy on the part of the writer*', defining it as *a lack of models and*

grammar to obey when composing documents, a lack of understanding of affordance and gestalt,

and a lack of empathy with the user. He also doubts that the average public servant has access to

suitable design tools, or sufficient skills to use them effectively (Waller, personal communication,

11 December 2015). Experimentation with visual formats may be further hindered when

authoritative supporters of simplification and plain language in the legal field do not recognize the

functional role of visual language, dismissing it as embellishing 'bling' (Adams, 2011). Lastly,

doubts on how to manage the time and costs of design may further reinforce the status of visual

communication as an optional, rather than a necessity.

These attitudes and practices lead to well-documented shortcomings in government-to-citizen

communication (see e.g. Janssen & Neutelings, 2010; Waller & Waller, 2015; Schriver, 2015;

Holland & Rose, 1981; Jansen & Steehouder, 1984). However, impersonal and dense documents

create confusion and inefficiency also *within* public organizations, especially when they should

constitute actionable instructions to guide the work of civil servants and decision-makers.

While a single study can in no way represent best practice, the case presented below illustrates that

a different approach to effective legal-bureaucratic instructions in a governmental setting is indeed

possible. Diagrams can accommodate both the need for the precise language of legal experts and

the comprehension needs of readers. Also, their production is not necessarily too resource-

intensive if government writers flexibly collaborate with designers.

Empirical background:

a Visual Guide for the Finnish terms of public procurement

The problem

In 2007, the Finnish Ministry of Finance established a working group to produce standard Terms

and Conditions (T&C's), designed to apply as broadly as possible to different types of public

procurement. One such document, the JYSE 2009 SERVICES, was designed for the procurement

of services (Ministry of Finance, Finland, 2009). The standard recommendation of the Ministry

was to entirely incorporate the JYSE T&C's into public procurement contracts – which are

formed, all in all, by four parts: the standard JYSE T&C's, case-specific contractual terms, the

buyer's procurement announcement, and the seller's proposal. However, the Ministry also allowed

the parties to agree separately on specific terms to better fit the procurement situation at hand. In

order to make an informed choice whether to fully incorporate JYSE in public procurement

contracts, civil servants must understand well these T&C's.

Between 2011–2013, researchers from a Finnish university collaborated with the Association of

Finnish Local and Regional Authorities (*Kuntaliitto*) in a project aimed at studying and improving

public procurement practices in Finland. During this project it transpired that often the meaning

and influence of the JYSE terms was not fully understood. These issues incidentally emerged[4]

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[4] The primary goal of the studies was to investigate organizational learning and co-

creation in procurement networks (Klemelä et al, 2011).

from the interviews and observations of 22 experts and civil servants, working at a medium-sized

Finnish municipality. Discussions and meetings with experts from *Kuntaliitto* helped confirm the

problem. Misinterpretation of JYSE terms had been a cause of ineffective procurement:

mismatched expectations between suppliers and public procurers had resulted in defective service

provision, claims, monetary loss, and, above all, citizens unhappy with public services.

The issues were summarized as follows. Firstly, civil servants often worked based on their

memories and common sense, as they felt already overloaded with paperwork. According to the

Kuntaliitto experts, even when the JYSE terms were actually read, many misunderstandings

occurred. JYSE is not a particularly complex document, albeit its tone is neutral and official. The

situation mirrored the findings of Jansen and Steehouder (2001): often it is a lack of understanding

of the logic and goals of regulations – rather than terminology – that prevents understanding. In

fact, sometimes civil servants mistakenly believed that JYSE was a complete, ready-to-use

contract, instead of just a part of the contract. Another common misconception was that JYSE

must be always fully incorporated in the public procurement contract. Consequently, the

procurement units often missed the possibility to better customize their contracts and build better

relationships with suppliers.

In many cases, misunderstandings could have been avoided with the help of a lawyer. However,

most Finnish municipalities are small and do not employ a lawyer. They can only rely on the legal

experts of regional procurement centres. In this situation, lawyers get involved too late, or are not

consulted at all.

Towards a solution

In order to tackle these problems, in 2012 *Kuntaliitto* asked the researchers to propose solutions

outside the box of a legalistic mindset. When the idea to develop an explanatory, user-friendly

guide to the JYSE terms emerged, I was asked to join the case as a researcher and designer.

Kuntaliitto wanted a guide for the JYSE 2009 SERVICES terms in particular, as

misunderstandings and contentious situations were more frequent when procuring services, rather

than goods. The explicit aims of the project were to present the JYSE 2009 SERVICES terms in a

way that (L. Hoppu-Maenpää, personal communication, 20 October, 2011):

1) The document would feel appealing, simple, useful; it would also encourage reading by looking

as little legalistic as possible;

2) Information would be more logically presented, and conceptual links between provisions more

easily findable and understandable;

3) The most common sources of misunderstanding would be disambiguated, and the topics made

more explicit through diagrams, in order to facilitate rapid and accurate comprehension.

Kuntaliitto had the power to publish an explanatory guide, while they did not have the power to

modify the official JYSE 2009 SERVICES terms, as their publication was under the responsibility

of the Ministry of Finance. Involving the Ministry and persuade them to initiate a redesign and

redrafting project would have taken considerable time and effort, so *Kuntaliitto* opted for a

solution – the Visual Guide – that could be developed and distributed to civil servants and vendors

in a more reasonable timescale.

Although the Visual Guide could provide correct and thorough information (targeting, for instance, those who would *never* read the official JYSE), it had to be presented as a comprehension complement, rather than as a substitute of the original T&C's. To avoid any doubt in case of a dispute, the original JYSE 2009 SERVICES published by the Ministry of Finance had to remain the only official and legally valid version. The Visual Guide carried a clear disclaimer notifying readers of its non-binding legal status.

Design features of the Visual Guide

The original JYSE 2009 SERVICES consisted of a traditional, 20-page, textual document (Figure 1). The JYSE Visual Guide instead featured one diagram per page (swimlane table, flowchart, or timeline), each explaining a specific contractual topic at a time (Figure 2) – for a total of 28 pages. All texts (apart from the table of content and a short, one-page introduction explaining the approach of the Visual Guide) were integrated within diagrams, or were headings. The diagrams provided visual structures to collect and present together, on the same page, all thematically related clauses. Often, in the original JYSE document, such clauses were found in different sections, on different pages. Icons were also used next to the text chunks, to further cue their theme. The new approach aimed at helping readers in finding and integrating all the relevant information more easily – without the need to skim and browse through the whole document.

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Three types of diagram were used, each for a specific type of information:

1) swimlane tables were used to list vis-a-vis the roles, rights and responsibilities of buyer and

   supplier (Figure 3);

2) flowcharts were employed to illustrate possible courses of action and their consequences, such

   as price changes, or explaining what happens in case of delays and defects (Figure 4);

3) timelines illustrated different possible scenarios leading to the end of the contract, either as

   agreed or due to termination or cancellation (Figure 5).

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INSERT FIGURES 3-5 ABOUT HERE

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While *Kuntaliitto* approved this heavily visual approach, they set limitations on the language to be

used in the Visual Guide. They insisted to use sentences and terminology from the original JYSE

document. However they agreed to chunk down the original texts, adding more full stops and

bullet points, so that the chunks could fit in the boxes and columns of the various diagrams. Every

portion of text in the diagrams had to be identified with a clause number referencing to official

JYSE (Figures 3–5).

The document design process

The JYSE Visual Guide was developed in collaboration with *Kuntaliitto*'s legal experts, who had

a privileged perspective on the most common problems of JYSE. They could easily empathize

with the target group, since part of their job was to train, support and advise local civil servants.

This collaborative approach ensured that all design and language choices were approved step-by-

step by those responsible for releasing the Visual Guide. The experts were asked to comment and

suggest improvements as soon as a sketch was ready, since they had to ensure that the Guide

included exactly the same content of the official JYSE. They also participated to several full-day

workshops with the researchers, collaboratively sketching alternative versions of diagrams and

icons icons, and experimenting with different wordings and document structures.

Kuntaliitto initially gave permission to get feedback only from a selected group of 5 civil servants,

as they feared that without enough control an unfinished mock-up could mistakenly circulate and

be used in the field before an official approval. For the same reason, the developing team could

not involve representatives of vendors. Approved "proxies" of vendors were however allowed to

participate in later feedback sessions: 2 public procurement experts at a private law firm, and 2

representatives of an association defending the interests of small-medium enterprises. The

developing team alternated user and expert feedback in order to cycle through as many design

iterations as possible.

When a complete mock-up document was approved, 24 civil servants from 9 public organizations

were invited to test its effectiveness through an experimental evaluation, questionnaires, and by

participating to a focus group (AUTHOR). In light of the findings, ambiguity in wording,

diagrams, representation and layout were further reduced, and user preferences on colors and icons

were taken into consideration.

The final design of the JYSE Visual Guide was published in the summer of 2013 on the website of

Kuntaliitto, and its experimental evaluation is presented in the remainder of the article[5].

[5] Compared to the pilot study – the goal of which was to quickly inform decision-

makers – the study presented in this article is more carefully designed: it employs a

different, wider and more varied participant sample; it includes control variables in the

statistical analysis; and it contextualizes the results in relation to previous research.

Methodology

Hypotheses

In order to answer my research questions – and to evaluate the JYSE Visual Guide according to criteria agreed with *Kuntaliitto* (compared to the original JYSE, the Visual Guide should increase comprehension accuracy and speed, and feel more appealing to use) – three hypotheses were formulated:

H1: A highly diagrammatic format of legal-bureaucratic instructions (in this case, JYSE Visual Guide) allows for faster comprehension of their content, in comparison to the text-only version of the same document (in this case, JYSE 2009 SERVICES).

H2: A highly diagrammatic format of legal-bureaucratic instructions (in this case, JYSE Visual Guide) allows for more accurate comprehension of their content, in comparison to the text-only version of the same document (in this case, JYSE 2009 SERVICES).

H3: A highly diagrammatic format of legal-bureaucratic instructions (in this case, JYSE Visual Guide) elicits a more positive overall user experience, in comparison to the text-only version of the same document (in this case, JYSE 2009 SERVICES).

Experiment Design

The study took place between August 2013 and April 2014, and was carried out in 16 sessions because of the difficulty to recruit participants from several public organizations, in different cities, and adjust to their work schedules. Each session lasted between 90 and 120 minutes, and

included an experiment based on comprehension tasks, self-administered questionnaires, and a

focus group.

The experiment consisted of ten comprehension tasks, five to be answered using the JYSE Visual

Guide (*Visual Condition*) and five using the original JYSE 2009 SERVICES (*Textual Condition*).

The order of the comprehension tasks, as well as the experimental condition associated with the

tasks, was randomized to avoid the so-called order effect (Cozby, 2009) – systematic bias in the

score of later tasks, because repetitions of similar tasks caused learning or fatigue. Consequently,

there were four different experimental possibilities (Table 1). Tasks 1-5 and Tasks 6-10 included

questions of similar difficulty and format, and were piloted in advance with 3 research assistants

to check that all questions were comparably challenging and clearly phrased.

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INSERT TABLE 1 ABOUT HERE

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The experiment was complemented with self-administered questionnaires before and after the

tasks, as well as a focus group discussion at the end of the session, in order to gain further

qualitative insight into the participants' impressions.

Documents used in the two experimental conditions

The experiment employed the original JYSE 2009 SERVICES documents in the control condition,

and the JYSE Visual Guide in the experimental condition (see document descriptions in sub-

section "Design features of the Visual Guide" above).

It is worth stressing that language, phrases and terminology in both documents were the same. This provided good experimental control and avoided introducing confounding variables related to language. As verified by *Kuntaliitto*'s legal experts, the Visual Guide is informationally equivalent to the official JYSE terms.

Research Participants

The participants were recruited from public organizations. The participants had to be actively involved in procurement in their organization. After sending invitations to over 80 public organizations, 76 volunteers agreed to participate in the study. 72 responses were valid and were included in the analysis.

The recruited research participants represented 12 Finnish municipalities, 9 universities and research institutes, 4 hospital districts and 6 other public organizations. The average age of the sample was 40.8 (SD = 10.74), and 68 % was female. In average, the participants had 6.9 years of experience in public procurement, and their self-reported level of knowledge of the JYSE terms was, in average, 5.3 on a 9-point scale where 1 means "very poor knowledge" and 9 means "excellent knowledge"). Most of them were well-educated, as they had obtained at least a bachelor (34,7%) or master degree (47,2%).

Unfortunately, vendor representatives could not be included in the study. Most public organizations with were unable to share contact information of their suppliers, because of privacy policies. A second attempt to recruit vendors consisted in asking professional associations and forums related to procurements to distribute an invitation through their online channels. However, not enough replies were received, and they came too late to be included in the study.

The research participants of this study are thus a convenience sample, and represent only the buy-side of the JYSE user base.

Measures

Comprehension Accuracy. Since each condition comprised 5 tasks, each subject obtained two accuracy scores – one for the visual condition and one for the textual condition – each ranging between 0 and 5 and representing the sum of correct answers. Correct answers were assigned one point each, and partially correct answers obtained 0.25, 0.5 or 0.75 points (Table 2). All answers were graded, separately, by two researchers, who ended up agreeing on 99% of the grades. Discrepancies were discussed, and a final grade would be agreed upon together.

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INSERT TABLE 2 ABOUT HERE

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Answering Speed. Similarly, each subject's answering speed was measured on comprehension tasks in each experimental condition. Answering speed represents the sum of the time taken to complete all tasks in one condition.

User experience. Two instruments were chosen to assess user experience (UX), the subjective feeling perceived by a user when using a given system (Preece et al.,2002). Both questionnaires were administered after the completion of each experimental condition. The first instrument, the HED/UT scale (Spangenberg et al, 1997; Voss et al, 2003), captures user perceptions of utilitarian and hedonic value in interacting with a design. The hedonic dimension

(HED) represents the degree of gratification experienced by the users interacting with each

document; the utilitarian dimension (UT) represents the perceived degree of functionality and

usefulness of the documents. This instrument was chosen because perceptions of functionality and

pleasantness seemed well-suited to evaluate contracts: while pleasantness is important to engage

potential contract readers, it is also crucial that the document is functional and useful. Each

component of the HED/UT is measured on a scale ranging between 1 and 7 points, with 4 being

the sufficiency threshold.

The second instrument, the I-PANAS-SF scale (Thompson, 2007), instead provides a measure of

affective response. I-PANAS-SF is a shortened and validated version of the widely used Positive

and Negative Affect Schedule (PANAS) (Watson & Clark, 1994), and it is suitable for use with

non-native English speakers (Thompson, 2007). The questionnaire comprises 10 items in the

format of a 5-point Likert scale. 5 items measure positive affect (PA: alert, inspired, determined,

attentive, active), and 5 negative affect (NA: upset, hostile, ashamed, nervous, afraid). Positive

and negative emotions are considered separately, as different emotions, in different degrees, may

coexist in human experiences. Each component of the I-PANAS-SF is measured on a scale

ranging between 5 and 25 points.

Control variables. Control variables were employed to assess whether there were

alternative explanations for score variations. They were also used to check for possible

interactions between individual characteristics and experimental conditions. Before the

comprehension tasks, each participant filled in a questionnaire providing details about 1) age, 2)

gender, 3) years of experience in procurement, 4) self-assessed level of knowledge of the JYSE

2009 SERVICE document (on a Likert-type scale where 1 meant "very poorly" and 9 meant

"extremely well"), 5a) object-imagery skill, 5b) spatial-imagery skill, 5c) verbal skill. The three

last items address cognitive style, representing the preference of each individual for visual or

verbal strategies of information processing. I used the Object-Spatial Imagery and Verbal

Questionnaire (OSIVQ) developed by Kozhenikov and Blazhenkova (2009), a well validated self-

report instrument composed of 45 items in the format of a 5-point Likert scale, which provides a

measure of verbal skills, object-imagery skills (ability in building and processing vivid, colorful,

detailed images of individual objects) and spatial-imagery skills (ability in representing and

processing schematic images, and spatial relationships, movements and transformations).

Results

The first step of the analysis was to check the effectiveness of the randomization in limiting any

systematic order effect. Comprehension accuracy and answering speed scores were analyzed

through a mixed ANOVA with pairwise comparisons, which showed that the two sets of questions

used in the study had a reasonably comparable level of difficulty: the speed and accuracy scores of

groups 1 and 2 (first group of tasks in visual condition, second series of tasks in textual condition)

showed no statistically significant difference despite the groups had sets of questions. The same

was true for group 3 and 4 (first group of tasks in textual condition, second series of tasks in visual

condition). The analysis confirmed the existence of a learning effect, as there is a comparative

improvement in solving the second series of tasks, albeit this effect was not strong enough to

override the main experimental effect. Overall, the randomization procedure was effective and

since no systematic bias affected the results.

Then speed and accuracy scores obtained in both experimental conditions were analyzed through a

paired-samples t-test. Table 3 reports the mean of answering speed and comprehension accuracy

scores in textual and visual condition, as well as their differences. The result of the analysis shows

that there are very statistically significant differences in speed ($t = -6.206$, $p < .001$) and accuracy

($t = 4.238$, $p < .001$), thus confirming hypotheses 1 and 2: the visualized version of the JYSE

terms, compared to the traditional, text-only JYSE terms, allows for faster and more accurate

comprehension of the content.

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The effect of diagrams on answering speed and comprehension accuracy was further investigated

through regression analyses, including control variables and relevant interaction terms in the

model (Table 4–6). All variables involved in the interaction terms were centered to avoid

multicollinearity between these terms and their individual components, as recommended by Aiken

and West (1991, pp. 37-38). Since each participant obtained a score on the dependent variables in

both textual and visual condition, both scores were included in the analyses (thus, $N = 144$).

Arguably, scores in a given condition may have been influenced by individual characteristic of the

research participant: for instance, a highly visual participant could perform particularly well in the

visual condition; or a "verbalizer" could excel in textual condition. Similarly, subjects with many

years of experience in procurement or with a deep knowledge of the JYSE terms may have

performed particularly well in textual condition, as the document used was the original JYSE 2009

SERVICES that they customarily used in their work. However, the results of the regressions show

that the only statistically significant coefficient positively correlated with both answering speed

and comprehension accuracy is the experimental condition: that is, any difference in scores is

uniquely caused by the document format, and not by individual characteristics of the research

participants. Hypotheses 1 and 2 are thus fully supported.

Interestingly, high object-imagery skill is significantly inversely correlated with answering

accuracy. A possible explanation is that object-imagers tend to process information holistically

(Kozhenikov et al.2005), while understanding a contract requires a sequential analytic processing

style – which is characteristic of verbalizers and spatial-imagers.

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INSERT TABLES 4-6 ABOUT HERE

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Next, I analyzed the user experience measures. The HED/UT scale revealed users' perceptions

towards the two versions of the JYSE document, in terms of utility and pleasantness. The results

are summarized in Figure 6. The JYSE Visual Guide scored better in both dimensions: it was

perceived not only as more functional (UT-visual = 3.8; UT-textual = 3.6), but also more pleasant

to use (HED-visual = 4.9; HED-textual = 2.6) than the original. These differences, assessed

through a Wilcoxon non-parametric t-test, were very statistically significant for the hedonic

quality dimension (t = 6.391, p < .001), while trending towards significance for the utilitarian

quality dimension (t = 1.685, p = .092).

It is worth noting that the UT-scores for both versions remained below the sufficient score of 4.

During the focus group, many participants revealed their misgivings about the general usefulness

of the JYSE terms, because of a lack of clear guidelines on when to incorporate them fully or

partially in contracts. Others pointed out that they would have preferred the diagrams and icons to

be incorporated in the official document, rather than collected in a separate guide, to avoid

switching between two documents. The general perceived low-functionality of JYSE can be

explained by these shortcomings. The vast majority of the research participants expressed their

enthusiasm for the JYSE Visual Guide during the focus group, finding it clear, useful and easy to use. Several participants wished that also other general procurement T&C's currently used in Finland (e.g. for the purchase of goods, construction projects, and IT projects) would be complemented with a visual guide, and asked the researchers to relay their request to *Kuntaliitto*.

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These qualitative insights are mirrored by the results from the I-PANAS-SF questionnaire, which measured positive and negative affective responses. The results (Figure 7) show that median positive affect (PA) increases, and median negative affect (NA) decreases when using the JYSE Visual Guide (PA = 17.986 ; NA = 7.069) instead of the official JYSE (PA = 15.583 ; NA = 9.305). The differences in both PA and NA (Table 7), are very statistically significant ($p < .001$).

Concluding, Hypothesis 3 is also confirmed, as the user experience of the JYSE Visual Guide, compared to the original JYSE, is more positive, both in terms of perceptions and affective response.

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INSERT FIGURE 7 ABOUT HERE

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Discussion

Using diagrams (flowcharts, swimlanes, timelines) and icons significantly improved

comprehension accuracy and answering speed among civil servants. These results converge with

those of previous studies on visual alternatives to prose in instructions (for a review, see e.g.

Michael & Hartley, 1991), especially in regards to contract documents (e.g. Kay & Terry, 2010;

Mamula & Hagel, 2015). The effectiveness of the diagrams employed in the JYSE Visual Guide is

consistent, theoretically, with the predictions of cognitive load theory. By presenting information

in ways that support reading, inference-making and interpretation (Sweller, 1994), 'extrinsic'

cognitive load –a cause of comprehension errors and slow reading (Jarrett et al, 2010) – can be

reduced.

Diagrams were a more effective format, also because they presented information in a way that best

answered users'questions (Ganier, 2004). We knew that civil servants were likely to consult

contractual documents in case of problems with the supplier, and we designed diagrams that

would simplify finding answers to questions such as: "Is it our responsibility, or theirs?", "What

rules apply to this case?", "What are we allowed to do?", "What is the best course of action to

solve or minimize this problem? What should we do?". In the original document, readers found

answers by searching and integrating information scattered in different clauses, on different pages

– a cognitively taxing task that was minimized in the Visual Guide. As suggested by the higher

error rate, prose was less effective than diagrams in eliciting correct problem representations and

offer problem-solving strategies (Schnotz & Banner, 2003).

A particularly positive result was the absence of the so-called *expertise-reversal effect* – i.e.

instructional methods highly suitable for novices may be detrimental for experts, and viceversa

(Kalyuga, 2007; Lambiotte & Dansereau, 1992). The Visual Guide was a useful comprehension

tool for novice and veteran civil servants alike.

Interestingly, as emerged in focus group discussions, participants were aware of how design

conventions and familiarity facilitate comprehension (Kostelnick, 1990). Many felt that the Visual

Guide was easily learnable to use, but that they had been relatively "slow" using it, because it was

something new and they "*knew the old document almost by heart, so it's almost like cheating*".

They believed they would have performed better if they had been more familiar with the Visual

Guide. Despite these perceptions, the participants had been, in fact, significantly faster with the

Guide. This suggests that answering accuracy and speed may still improve after adopting the new

document.

The results also illustrate how diagrams can positively affect user experience. The JYSE Visual

Guide was perceived as more pleasant, functional, and less stressful to use. Experiential quality

was sought as an indicator of future acceptance of the Visual Guide. More positive first

impressions may motivate disengaged users to try using the new document; and effortless

interactions may ensure repeated use. Moreover, Wright (2015) posits that workplace readers

disregard information that they believe is not addressed to them. Ensuring that the JYSE Visual

Guide is not perceived as 'something for lawyers' may have contributed to the overall satisfaction

with its design.

Generalizability of the results

The external validity of the results is ensured by the experimental setup of the study, which

allowed controlling for potentially confounding variables. Randomization and post-hoc tests also

helped avoid biasing order effects. Further precautions were taken to increase as much as possible

ecological validity, which may be low in lab experiments: 1) the documents used in the

experiment were real ones; 2) the comprehension tasks were modelled after plausible tasks that

civil servants may have to accomplish; 3) the tests were carried out with a relevant subset of its

intended users (procurement professionals working in public organizations).

On these grounds, the positive effects of diagrams on the comprehension of JYSE can be

generalized, in a narrow sense, to other public procurement T&C's and contractual documents –

for an audience comprising civil servants. However, since JYSE is also a representative example

of legal-bureaucratic instructions, the results may generalize more broadly to other similar

documents, which seek to prescribe the actions, rights, duties, prohibitions and obligations of

actors within a governmental setting.

One of the design targets of the JYSE Visual Guide was to motivate people in public procurement

and potential suppliers to read and engage with the document. However, this goal can only be

evaluated in the long term, outside of an experimental setting. The current study resorted on proxy

indicators of self-efficacy – the belief in one's ability to successfully perform a task with a certain

system – which affects whether users will ultimately adopt new solutions (Ellen et al., 1991). The

JYSE Visual Guide in fact elicited feelings of satisfaction and competence (as assessed through

UT scores and focus groups discussions). This finding may be cautiously extrapolated to indicate

good chances of successful future adoption.

Limitations

Despite its merits and strengths, the experimental methodology has also some weaknesses: the

process of completing comprehension tasks cannot fully reflect the naturalistic patterns of

document use likely to be found in the workplace (Renkema, 2001). People do not only obtain

knowledge from documents, but also from colleagues and other sources. Moreover, readers may

be unable to assess whether they do have a problem, and where to search for an answer. The

current results are thus limited to certain patterns of interaction with the document: when an

employee is able to assess the situation at hand, can formulate the need for information, knows

where to search for an answer, and finally decides to look at the terms.

Secondly, some comprehension mistakes happen because employees *think* they know the correct

information, and thus do not feel the need to look at the original source material. This type of

mistake cannot be solved through more effective instructional approaches alone. Training is

crucial. As the research participants suggested during the focus group, the JYSE Visual Guide

could work very well as a training aid, and as the first-stop-for-information for new, less

experienced employees.

Lastly, the study failed to involve representatives from potential suppliers both in developing and

testing the Visual Guide, limiting the generalizability of the findings. Although *Kuntaliitto* was

primarily interested in helping its own stakeholders (civil servants), contracts can only succeed if

both parties are compliant, and thus the perspective of vendors is crucial to ensure clarity and

collaboration between public and private organizations.

The current shortcomings may be ameliorated through a mixed methods approach within the

frame of a single or comparative case study. Rigorous experimental evaluation could be

complemented with insightful, reliable qualitative data.

Producing highly visual documents in public organizations: further reflections[6]

The theoretical section of this article pointed at the barriers to adopt highly visual formats in government settings, especially when the audience is not the general public. The key findings of this study do not provide solutions on how to overcome these barriers, although they may persuade institutions of the importance of change. Further insights can be offered by reflecting on the design process of the JYSE Visual Guide.

Let's start from the extent of the benefits. Diagrams in public documents are not only a boon for potential readers: diagrams can help government writers, lawyers and decision-makers to review and improve the quality of the clauses more easily, spotting at a glance missing provisions and illogical rules (Australian Government Office of Parliamentary Counsel, 2013, p.11; Berman, 2000, p.24). In this case, for instance, the lawyers from *Kuntaliitto* were able to notice several shortcomings in the current procurement terms. These mistakes became apparent during the workshops, when lawyers were engaged to collaboratively sketch the flowcharts with designers. These experts had never noticed before such inconsistencies, since it was very difficult to spot them by reading the clauses in the 'serial' way afforded by prose (Doumont & Vandenbroeck, 2002). Diagrams offered a whole new perspective on the content. As a result, *Kuntaliitto* lawyers were able to create a list of suggestions for improvement, which was submitted to the Ministry of Finance, and ultimately led to the drafting and publication of new JYSE terms in 2014 (which,

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[6] Although any generalization is elusive, I decided to include these reflections, since they may be of great value to researchers and practitioners facing the same problems in similar contexts. In fact, according to Flyvberg (2006), the *force of example* of concrete, context-dependent cases plays a crucial part in the "cumulative development of knowledge"– offering depth of understanding rather than breadth.

however, did not include diagrams or other visuals). Sketching diagrams are not only necessary to

better communicate regulations, but to draft better ones.

The JYSE case also hints at some options on how to realistically implement multimodal

documents in a governmental setting. Firstly, government officials need research results and

examples as bases to propose changing the status quo. In this case, I was involved in the project

because the *Kuntaliitto* lawyers in charge had read my research papers (AUTHOR) and were

aware of the positive results from a Canadian pilot on redesigning legislation according to plain

language and plain design principles (Berman, 2000; GLPi & Schmolka, 2000). Arguably, the

interest to improve the functionality of public documents by means of design would grow as more

models, ready-made modifiable visual templates, examples, and sources of inspiration – as well as

research evidence – become available, and inspire other institutions to redesign their own

documents. The change may be slow at the beginning, but could grow exponentially as latecomers

start adopting and appropriating the approaches and examples developed by pioneering early-

adopters. As the *functional* role of visual language would start to be understood and demonstrated,

it may become more obvious and well-justified for government decision-makers to invest in

design expertise, training, and software. Without the correct mindset, understanding, and the

willingness to adopt new practices at individual, team and organizational levels, no amount of

training is successful in creating change (Janssen, 2001).

Secondly, multidisciplinary collaboration and first-hand experience is crucial. In order to foster

change through successful (re)design projects, legal experts and decision-makers need to be

involved from the very beginning (Schriver, 2015), and optimally as co-creators (Waller &

Waller, 2015). In this case, lawyers had a first-hand experience of the design process, and focused,

together with the whole team, on finding viable solutions and compromises, rather than hindering

or boycotting the project. They were asked to create and modify sketches, bringing their expertise

and perspective into the designs. Perhaps lawyers and public writers will never transition to full-

fledged multimodal document designers. However, they could produce 'legally-validated' rough

sketches and mock-ups, which could be easily finalized by a designer, and deployed more quickly

(and cheaply).

This approach offers a solution to the third issue – whether collaborating with external designers

(or hiring them in public organizations) prohibitively affects production time and costs. As this

study shows, lawyers creating rough sketches as raw materials for designers considerably speed up

the process. Another way to make sensible investments in good design is to prioritize working on

documents which will be used, unchanged, for a long period of time (Janssen, 2001, p. 106).

Focusing on creating or redesigning "stable" documents, which are not created and modified on a

day-to-day basis, would also avoid the issue of how to provide civil servants with the necessary

design tools and skills. Lastly, public organizations could resort to collaborations with students

specializing in graphic and information design[7]. Inexpensive experimental pilots can get buy-in

more easily, and especially if successful could pave the way for more ambitious projects with

experienced professionals. At the same time, students would benefit from real-life chances to test

their skills, develop civic engagement, and find meaningful graduation projects.

Conclusions and suggestions for future research

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[7] At least in Finland, there is a strong tradition of collaboration with universities, and

it is common for public and private organizations to sponsor student projects and

theses. *Kuntaliitto* took this approach into consideration.

This article identified three types of diagrams (flowcharts, swimlane tables, and timelines) suitable

to represent legal-bureaucratic instructions, and found that they led civil servants to understand

public procurement T&C's faster and more accurately. The findings contribute to the growing

literature on 'contract visualization' in two ways: it offers empirical evidence to support the

proposition of using visual representations to make contracts more understandable; and it confirms

the results of early studies, which were not sufficiently rigorous in methodology. The proposed

conceptualization of "contracts as instructions" suggests the opportunity for technical

communicators and information designers to lend their skills to the field of law, and explore

solutions beyond layout and plain language.

The study also contributes to the field of document design in government settings. Firstly,

previous research has focused mostly on overall document and layout issues in primarily textual

documents or forms, while this study explores more thoroughly the potentiality of highly visual

formats. Secondly, previous research has focused mostly on public or government-to-citizen

communication. I argue for the need to also address the information needs of 'insider' audiences,

which display the characteristics of workplace readers (Wright, 2015) and are faced with the

"impracticable task" of reading thousands of pages every month (Neutelings, 2001). Attention

should be paid to the problems arising when these readers from badly designed documents: poor

communication leads to mistakes, inefficiencies and information avoidance, resulting into

ineffective organizational action – with negative socio-economic repercussions that impact the

whole community.

In order to create best practices and motivate public organizations to adopt more visual

approaches, there is a need for models on how to effectively design/redesign public documents,

paired with trustworthy data from user evaluations. Future research could expand the venues of

investigations suggested in the current study. For instance, other types of explanatory

visualizations suitable for legal-bureaucratic documents (different types of diagrams, and other

types of visual solutions, such as color coding systems; icon systems; visual metaphors; comics…)

could be identified and compared in different scenarios of use. Alternatively, future studies could

focus on the possibilities of co-designing explanatory visualizations with experts and end users, or

follow the process of adoption and use of radically visual documents. Moreover, this study's

concern with the information problems and needs of audiences *within* public organizations could

be further investigated, focusing on different document types, contexts of use, and goals.

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12

personnel used in providing the service. The service provider shall retain work management and supervision responsibility for its own personnel, if no personnel hire or transfer of work management and supervision responsibility has been separately agreed.

8.5   If between the contracting parties there takes place a transfer of business in which personnel in the customer's employment transfer to the service provider's employment or the invitation to tender requires that personnel transfer to the service provider's employment on their former terms of employment, statutory provisions on the transfer of business shall be applied to the transferring personnel.

9   Customer's obligation to cooperate

9.1   The customer shall be responsible for ensuring that the tasks within the customer's responsibility are performed in accordance with the contract.

9.2   The customer must give the service provider sufficient and correct information for the provision of the service.

9.3   The customer must ensure that the service provider's personnel can access when necessary the customer's premises or equipment as agreed.

10   Price

10.1   The price shall be fixed, if not otherwise agreed. The price shall not include value-added tax.

10.2   The service provider shall invoice in accordance with the prevailing Value-Added Tax Act.

10.3   If not otherwise agreed, the price shall include the service in accordance with the contract, any indirect taxes and fees, excluding value-added tax, payable by the service provider and applicable at the deadline for tenders, travel and accommodation costs, daily allowances, overtime compensation and documentation relating to the service.

10.4   If not otherwise agreed, the service provider shall not be entitled to levy invoicing charges.

10.5   Any advance payment shall be considered a fixed part of the contract price.

10.6   The service provider shall have the right to take into consideration in the price reasonable direct costs arising from new public fees decreed by the authorities or increases of existing fees that take place after the submission of the tender, provided that they

JYSE 2009 SERVICES

13

were not known about when making the tender and that the service provider can demonstrate grounds for the price change. Accordingly the price of the service shall change from the date when the above-mentioned changes come into force. The service provider shall also have the above-mentioned right when the price is fixed.

10.7   If the price is not fixed, the service provider shall have the right during the contract period to adjust the price corresponding to the general cost trend of the service. The service provider must deliver a price adjustment notification in writing at least two (2) months before the price adjustment comes into force. The service provider must present to the customer an appropriate explanation of the cost trend and the reasons for the price adjustment. If no unanimity is reached on the price adjustment, the customer shall have the right to give notice of terminating the contract from the time that the price adjustment comes into force. The giving of notice must be made in writing before the new prices come into force. If the customer does not give notice of terminating the contract, the contract shall continue using the new prices notified by the service provider or other prices agreed together by the contracting partners in price adjustment negotiations.

10.8   If the price is not fixed, the customer shall have the right during the contract period to propose a price adjustment corresponding to the general cost trend of the supplies. If no unanimity is reached on the price adjustment and the customer considers that it cannot continue the contract under the prevailing prices, the customer shall have the right to terminate the contract with a notice period of two (2) months. Notice of termination must be made in writing. If the customer does not give notice of terminating the contract, the contract shall continue using the prices prevailing before the price adjustment proposal or using other prices agreed together by the contracting partners in price adjustment negotiations after the price adjustment proposal.

10.9   If not otherwise agreed, the contracting parties may propose price adjustments in the ways described in Paragraphs 10.7 and 10.8 at the earliest twelve (12) months after the contract came into force and at intervals of not less than twelve (12) months.

10.10   In the event of the customer giving notice of terminating the contract on the grounds presented in this section, the service provider shall be obliged if the customer so wishes to deliver the supplies at the prevailing prices, if the notice of termination has been made on the basis of Paragraph 10.8, or according to the prices notified by the service provider in the price adjustment notification, if the notice of termination has been made on the basis of Paragraph 10.7, until the time notified by the customer, however at most six (6) months from the ending of the contract.

11   Terms of payment

11.1   Payments shall be paid against an invoice. If not otherwise agreed, the invoice shall be due for payment twenty-one (21) days from the arrival of an acceptable invoice.

JYSE 2009 SERVICES

Example spread of the JYSE 2009 SERVICES terms (English version of the document)
Figure 1
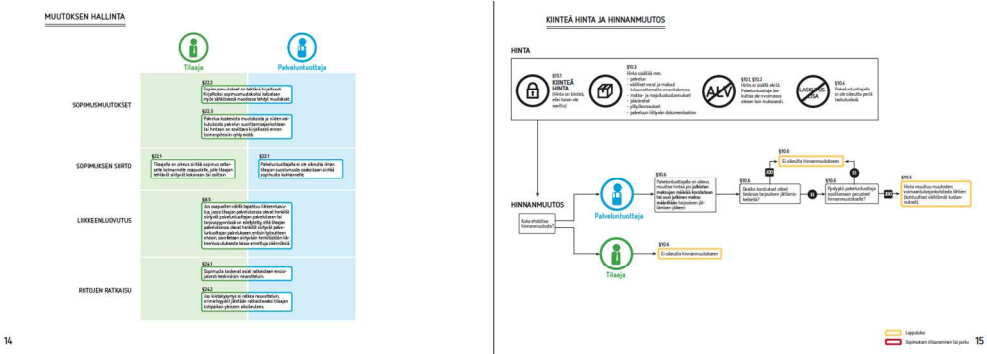
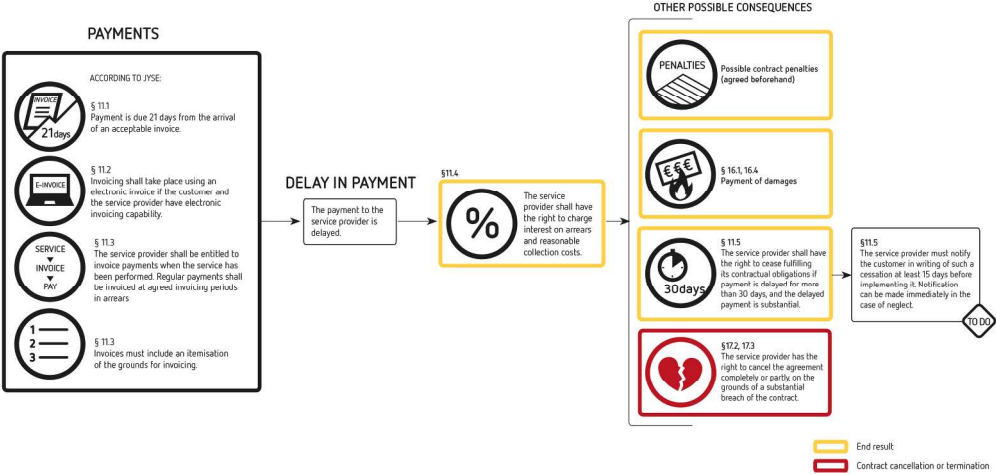Example spread of the JYSE Visual Guide (Finnish version of the document)
Figure 2
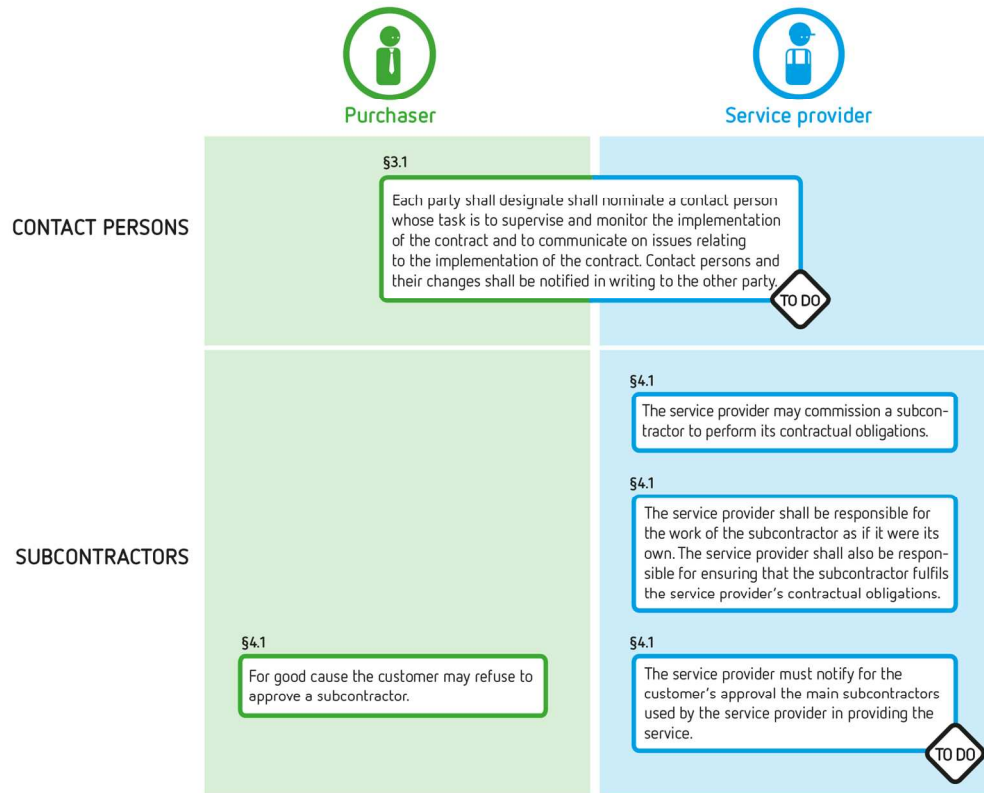
Example of Supplier/Purchaser swim-lane table, indicating the parties' responsibilities vis-à-vis (translation from Finnish)
Figure 3
140x111mm (300 x 300 DPI)

Example of flowchart, illustrating payment procedures and consequences arising from delayed payments
(translation from Finnish)
Figure 4
209x99mm (300 x 300 DPI)
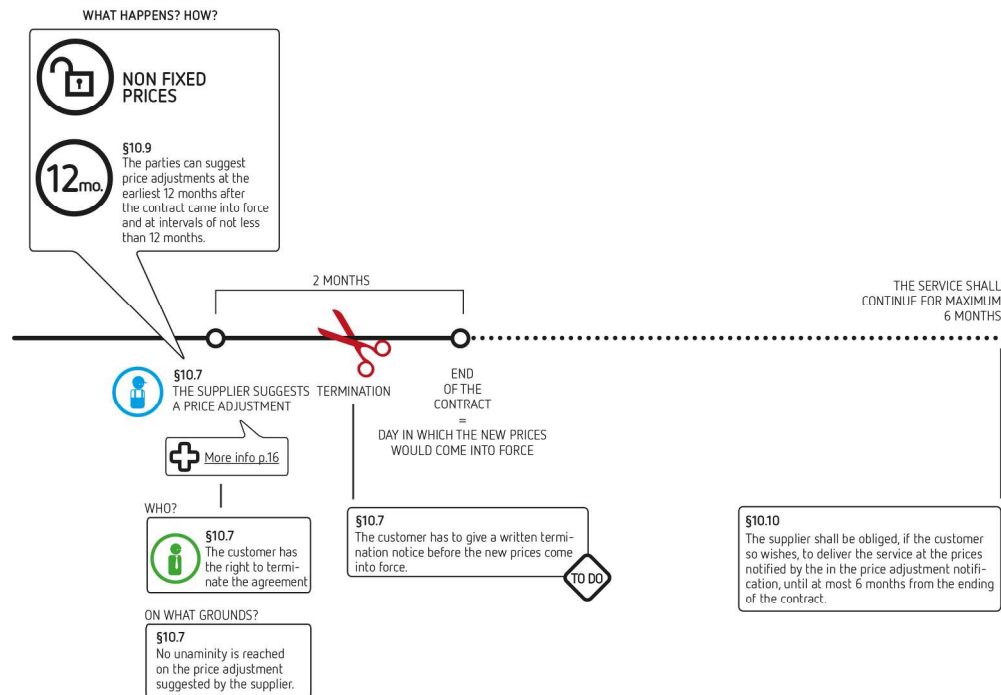
Example of timeline, illustrating contract termination if the Parties cannot agree on price adjustments, as suggested by the supplier (translation from Finnish)
Figure 5
208x144mm (300 x 300 DPI)

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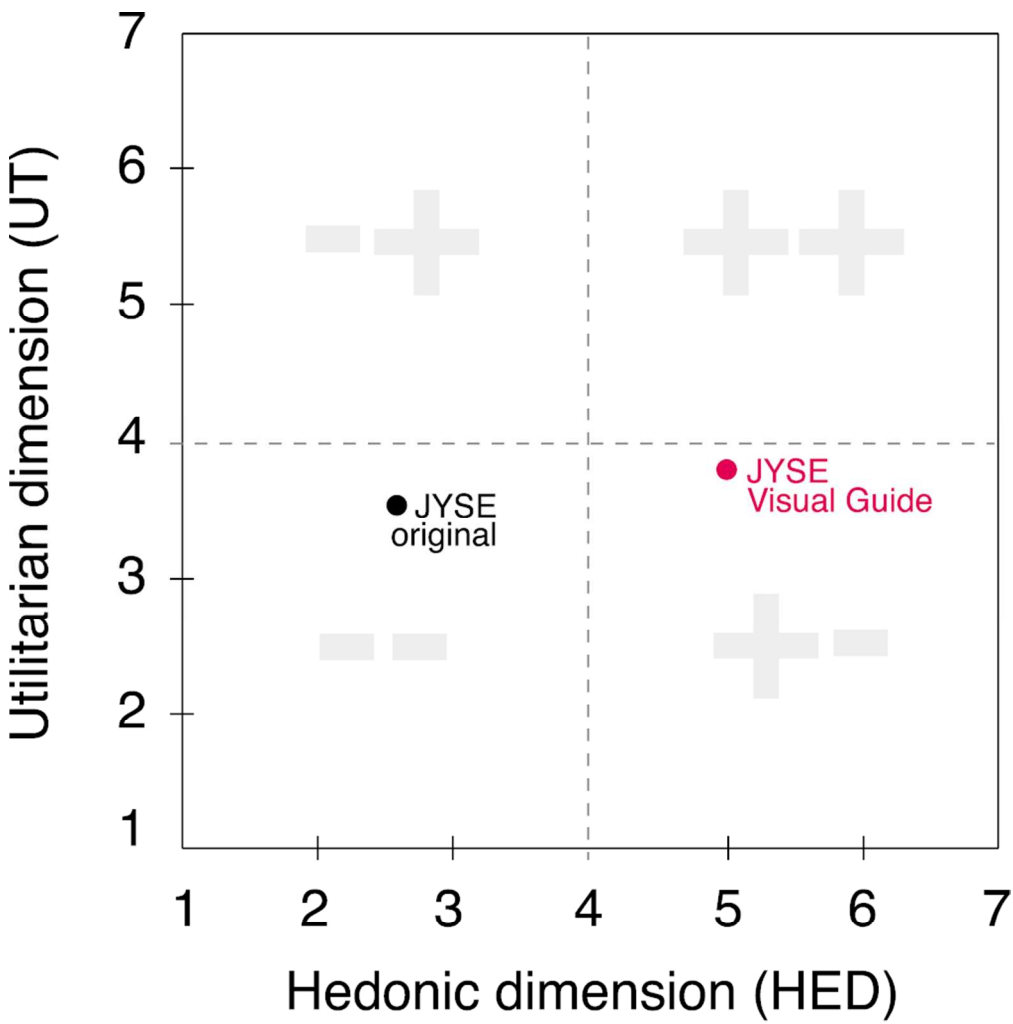
Evaluations of JYSE Visual Guide versus original JYSE terms, reported on the Hedonic/Utilitarian scale matrix.
Figure 5
85x86mm (300 x 300 DPI)
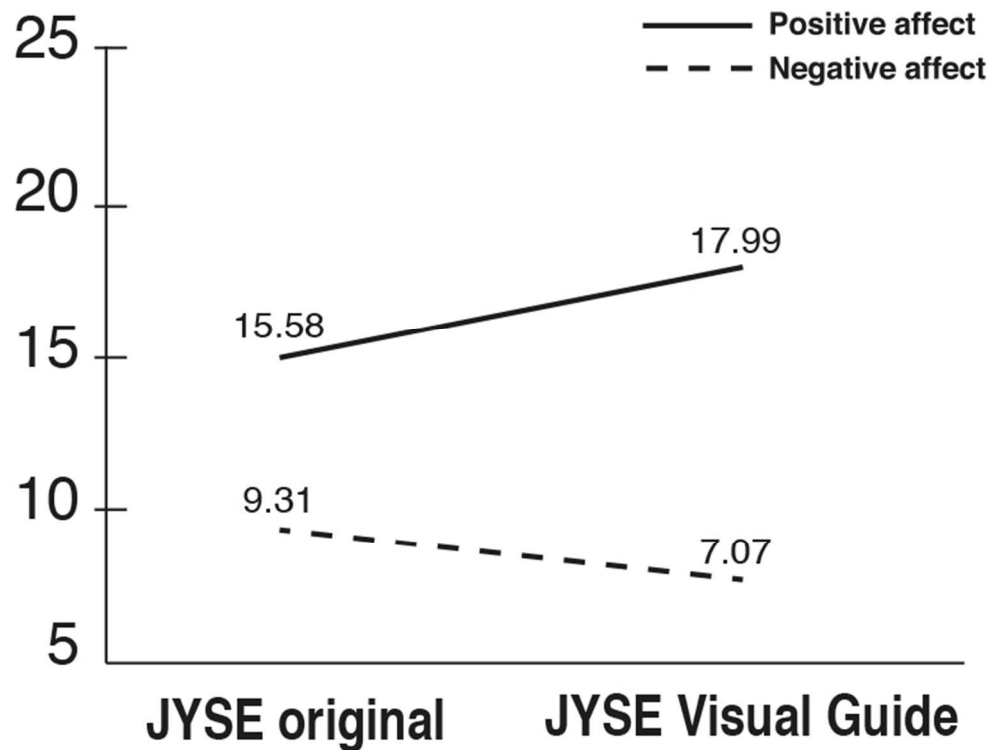
Mean Positive and Negative Affect, assessed through the I-PANAS-SF scale.\r\nVisual comparison of the increase in PA scores and decrease of NA scores while using the JYSE Visual Guide.
Figure 7
66x50mm (300 x 300 DPI)

TABLE 1

Randomization of task completion and condition order across experimental subjects.

Group 1 Completes tasks 1-5 in Visual Condition first. Completes tasks 6-10 in Textual Condition next.		Group 2 Completes tasks 6-10 in Visual Condition first. Completes tasks 1-5 in Textual Condition next.
Group 3 Completes tasks 1-5 in Textual Condition first. Completes tasks 6-10 in Visual Condition next.		Group 4 Completes tasks 6-10 in Textual Condition first. Completes tasks 1-5 in Visual Condition next.

TABLE 2

Protocol for grading the response accuracy.

Points	Rationale
0.25	The participant only mention the clause number where the correct answer can be found, or writes down verbatim the relevant excerpt. However, s/he does not provide a correct, precise and clear response in own words (e.g. if answering correctly would require to provide a precise date, the date is not given)
0.5	The participant wrote down the relevant clause or rule in own words. However, s/he does not provide a correct, precise and clear response (e.g. if answering correctly would require to provide a precise date, the date is not given)
0.75	The participant provided a correct, precise and clear response in own words, eventually referencing the clause or rule s/he applied. However, there are minor imprecisions (e.g. if the correct answer would be a precise date, such as '4th of March 2016', the participant wrote instead '5th of March 2016')
1	The answer is correct in all respects. The participant provided a correct, precise and clear response in own words, eventually referencing the clause or rule s/he applied.

TABLE 3

Mean answering speed and accuracy. Statistical significance of the difference of means assessed

through a paired-samples t-test.

	Visual condition		Textual condition		Difference of means	T-test difference significance (two-tailed, p < .001)
	Mean	SD	Mean	SD		
Answering speed (seconds)	818.979	222.791	990.612	219.216	- 171.633	- 6.206
Answering accuracy (points)	4.170	.734	3.629	.888	.541	4.238

TABLE 4

Descriptive Statistics and Correlations

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Answering speed	904.79	236.47									
2. Answering Accuracy	3.899	.856	-.118								
3. Experimental treatment	.500	.502	-.364**	.358**							
4. Age	40.880	10.7	.033	.020	.000						
5. Gender	.690	.462	-.132	.023	.000	.091					
6. Years of experience in procurement	6.967	6.57	.113	.140	.000	.272**	.019				
7. Knowledge of JYSE	5.260	2.01	-.110	.103	.000	.160*	.042	.303**			
8. Spatial-imagery skill score	2.832	.506	-.074	.026	.000	.011	-.194*	.020	-.005		
9. Object-imagery skill score	3.252	.652	-.067	-.149	.000	.221**	.487**	-.011	.008	-.046	
10. Verbal skill score	3.14	.448	.030	.079	.000	-.137	.038	.080	.108	-.195**	-.257**

n = 144   *p < .05   **p < .01

TABLE 5

Results of the regression analysis (answering speed as the dependent variable)

Variables	Coefficients
Experimental treatment (0 = textual; 1 = visual)	-.364**
Age	.034
Gender	-.155
Years of experience in procurement	.155
Knowledge of JYSE	-.160
Spatial-imagery skill score	-.103
Object-imagery skill score	.006
Verbal skill score	.027
Treatment x years of experience	-.022
Treatment x Knowledge of JYSE	.136
Treatment x Object-imagery score	-.021
Treatment x Spatial-imagery score	.026
Treatment x verbal skill score	.019
Adjusted R^2	.138
R^2	.212
F	2.762
Significance of the model, p	.002

n = 144   ** p < .001

TABLE 6

Results of the regression analysis (answering accuracy as the dependent variable)

Variables	Coefficients
Experimental treatment (0 = textual; 1 = visual)	.358**
Age	.016
Gender	.125
Years of experience in procurement	.110
Knowledge of JYSE	.062
Spatial-imagery skill score	.042
Object-imagery skill score	-.206*
Verbal skill score	.016
Treatment x years of experience	-.134
Treatment x Knowledge of JYSE	-.036
Treatment x Object-imagery score	.069
Treatment x Spatial-imagery score	-.129
Treatment x verbal skill score	-.101
Adjusted R^2	.167
R^2	.242
F	3. 211
Significance of the model, p	< .001
n = 144 * p < .05 ** p < .001	

TABLE 7

I-PANAS-SF scores on mean Positive and Negative Affect.

Statistical significance of the difference of means assessed through a Wilcoxon non-parametric t-test.

	Visual condition		Textual condition		Difference of means	T-test difference significance (two-tailed, p < .001)
	Mean	SD	Mean	SD		
Positive Affect (PA)	17.986	3.81	15.583	3.34	2.403	5.283
Negative Affect (NA)	7.069	2.795	9.305	3.231	- 2.236	- 4.759