Proceedings of the European Academic Colloquium on Technical Communication 2016
Proceedings of the European Academic Colloquium on Technical Communication | Vol. 4

edited by
European Association for Technical Communication – tekom Europe e.V.

Review Board members:
Prof. Sissi Closs
Prof. Dr. Birgitta Meex
Prof. Dr. Michael Meng
Prof. Dr. Klaus-Dirk Schmitz
Prof. Dr. Klaus Schubert

The General Licensing Terms of tcworld GmbH for Electronic Publications are to be applied:
Proceedings of the European Academic Colloquium on Technical Communication 2016
Bibliographic Information of the Deutsche Nationalbibliothek
(The German Library)

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available online at http://dnb.d-nb.de.

Co-funded by the Erasmus+ Programme of the European Union

The European Commission support for the production of this publication does not constitute endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

© tcworld 2016
tcworld GmbH
Rotebühlstraße 64
70178 Stuttgart
Phone: +49 711 65704-0
Fax: +49 711 65704-99
Email: info@tekom.de
www.tekom.de
ISBN 978-3-944449-46-3
ISSN 2196-6206

Editors: Elisabeth Gräfe, Natalia Lincoln, Jörg Michael

All rights reserved. This work and all parts thereof are protected by copyright. Any use outside the limits of copyright law is not permitted without the publisher’s consent. All reproduction, translation, microfilming, and storage and processing in electronic media, is prohibited.
<table>
<thead>
<tr>
<th>Contents</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>7</td>
</tr>
<tr>
<td><strong>Ralph Krüger</strong></td>
<td></td>
</tr>
<tr>
<td>A Situated Cognition Perspective on LSP Translation and Technical Writing</td>
<td>11</td>
</tr>
<tr>
<td><strong>Maurizio Viezzi</strong></td>
<td></td>
</tr>
<tr>
<td>From Interpreting Studies to Translation Studies: a Model for</td>
<td>43</td>
</tr>
<tr>
<td>Quality Assessment</td>
<td></td>
</tr>
<tr>
<td><strong>Dacia Dressen-Hammouda</strong></td>
<td></td>
</tr>
<tr>
<td>An Indexical Analysis of Multilingual Communication: Identifying Issues for French Writers in English</td>
<td>55</td>
</tr>
<tr>
<td><strong>Marion Wittkowsky</strong></td>
<td></td>
</tr>
<tr>
<td>Rule-based Machine Translation in a Student Project</td>
<td>71</td>
</tr>
<tr>
<td><strong>Anne Ketola</strong></td>
<td></td>
</tr>
<tr>
<td>An Illustrated Technical Text in Translation: Choice Network Analysis as a Tool for Depicting Word-image Interaction</td>
<td>85</td>
</tr>
<tr>
<td><strong>Birgitta Meex, Geert Brône</strong></td>
<td></td>
</tr>
<tr>
<td>A Tracking Study on Technical Content Navigation Behavior</td>
<td>89</td>
</tr>
<tr>
<td><strong>Tytty Suojanen, Jenni Virtaluoto</strong></td>
<td></td>
</tr>
<tr>
<td>Technical Communication Programs: Building Competencies Needed in the Workplace</td>
<td>97</td>
</tr>
<tr>
<td><strong>Joyce Karreman, Yvonne Cleary, Sissi Closs, Zygmunt Drazek, Jan Engberg, Voichita Ghenghea, Birgitta Meex, Patricia Minacori, Anke Neytchev, Daniela Straub</strong></td>
<td></td>
</tr>
<tr>
<td>TecCOMFrame: Developing a Common Academic Qualification and Competence Framework</td>
<td>111</td>
</tr>
<tr>
<td><strong>About the Authors</strong></td>
<td>125</td>
</tr>
<tr>
<td><strong>Review Board Members</strong></td>
<td>127</td>
</tr>
<tr>
<td>tekom Publication Program</td>
<td>129</td>
</tr>
</tbody>
</table>
Preface

The fourth European Academic Colloquium on Technical Communication (EAC) was held in the Estrel Congress & Messe Center in Berlin, Germany on April 13, 2016. This annual conference organized by tekom Europe is targeted at members of the European academic community who teach and carry out research in the area of technical communication or related fields, such as translation, multilingual communication, localization, terminology, and information management. Since 2011, the EAC has served as a significant venue for the dissemination and sharing of technical communication research and practices in a European context.

About 30 participants from 12 countries had many fruitful discussions and exchanges that contributed to the success of the conference and made it truly international in its scope. The growing number of participants demonstrates the popularity of the EAC among scholars working in the broad field of technical communication for sharing ideas and findings with colleagues from across Europe. The goal of this year's edition was to establish a strong research network that blends expertise from technical communication with adjacent domains such as writing, terminology, and translation, in order to address research topics that tap into the shared features of the disciplines. The disciplines are viewed as a continuum, which opens up the opportunity to integrate research on e.g. scientific writing and technical translation with research on technical communication.

For the first time, the conference was co-funded by the Erasmus+ program of the European Union. Therefore the afternoon session was devoted to the TecCOMFrame project, which is aimed at the development of an academic qualification and competence framework for academic technical communication studies. The framework should enable and support transparency, recognition, and transferability of the qualification and competences of technical communicators throughout Europe. In order to achieve this, after the presentation of the first draft of the framework, feedback was collected from the audience during an interactive session.

Altogether, eight talks were accepted and selected for publication. Covering a wide variety of different aspects within several disciplines, the contributions range from examining writing rules, searching for domain-specific information, and improving technical communication through corpus-based terminology to technical communication education including qualifying competencies, job profiles, and curriculum development.
Ralph Krüger, the inspiring keynote speaker, takes a cognitive scientific perspective on the two fields of specialized or LSP (Language for Special Purposes) translation and technical writing, which, even though they are distinct fields, are often claimed to exhibit more commonalities than differences. He attempts to build a bridge between the fields of LSP translation and technical writing as these two fields are increasingly converging. He drafts a model of the situated technical writer, which is derived from the Cologne Model of the Situated LSP Translator.

Maurizio Viezzi presents a translation quality model based on four parameters. The model was developed for the field of Interpreting Studies, but it fits equally for translation because translation and interpreting share the same nature and functions. The model can be used as a potential tool to improve the quality of translations.

Dacia Dressen-Hammouda reports on results from an indexical study of the features of a learner corpus of French L1 scientific writing. She first describes indexicality as a research tool, and goes on to compare the features of English argumentation and French argumentation, based on published literature. These features are then compared to those of the learner corpus. The results of this study serve as a basis for enhanced assistance to French L1 writers in their efforts to master the complexities of constructing appropriate texts in English.

Marion Wittkowsky describes how machine translation is integrated into a course project in the Master’s program of the International Technical Communication study course at Flensburg University of Applied Sciences. She demonstrates that Master students who are educated to become technical translators or technical writers learn to reflect on the advantages and disadvantages of accepting lower quality target texts, provided that the texts are understandable for a specific target audience. In addition, students obtain first-hand experience in improving source texts through appropriate editing. Should a post-editing step be required, translators who are involved in the whole process can easily execute this step. For post-editing, well-educated translators are needed as being a native speaker is not sufficient. The future research in this area could probably bring up an approach to define different quality levels and to find better ways to generate multilingual text units from existing documentation on demand.

Anne Ketola presents her studies in word-image interaction in the translation process of illustrated technical texts. The data of the study consist of eight translations of an illustrated technical text that deals with presenting the operating principles of two types of separation devices used in the mining industry for ore beneficiation. The
data were produced by a group of Master’s level translation students during a course of technical translation from English to Finnish.

**Birgitta Meex and Geert Brône** present the results of their pilot study on technical content navigation behaviour. They want to gain insights into how users navigate through technical web-based content space in order to search for and process information in a typical exploration task. They address the following questions: Which particular contents do participants look at in which order and how much time do they spend lingering on those contents? Do they prefer PDFs or videos to gather (new) technical information? Can the preliminary findings of this small-scale study confirm the latest industry trends? What can content designers learn from users’ navigation behaviour to create user-friendly technical content and guide the development of future formats? In general, participants were shown to adopt a linear reading mode, not to interact much with the contents, and to linger only marginally longer on pages that contained special points of interest. Also, it was apparent that participants’ motivation decreased substantially as time passed by.

**Tytti Suojanen and Jenni Virtaluoto** consider the general dimensions of working life relevance in academic studies. These include, for example, the transfer of knowledge to professional problem-solving and the innovation and reflective abilities of graduates (Teichler, 2015; Tynjälä et al., 2004). In a next step, the authors focus on how these dimensions relate to technical communication studies and the building of professional competencies in the field. Third, they provide selected practical examples of academia-industry cooperation (e.g. the use of industry instructors, internships) and teaching methods that support the development of professional skills and competencies (e.g. portfolios) from the universities of Oulu and Tampere in Finland. They discuss the benefits of these practices, as well as challenges related to them.

**Joyce Karreman and Yvonne Cleary** as well as the other members of the consortium report on the current status of the TeCOM-Frame (Technical Communication Competence Framework) project. The project was launched in the autumn of 2015 to develop a joint European academic qualification and competence framework for the training of technical communicators. Partners from eight higher education institutes from across Europe are working together on this project, which is coordinated by tekom Europe. The authors outline how the framework will help to build a solid academic and curricular basis for the growing field of technical communication. It is based on the existing Cross-industry Competence Framework but has a different focus and scope. Given that only few Higher Education
Institutions across Europe offer study programs in technical communication and since there is a shortage of graduates in the field, this new framework focuses on the competencies to be taught in higher education programs in technical communication and on the establishment of appropriate curricula for training in technical communication. After elaborating on the six requirements of the framework, the authors list the relevant subjects and sub-subjects along with their respective related competencies. They conclude by reflecting on the challenges, strategies and next steps to be taken.

Thank you to all those who have contributed to producing this successful EAC and the comprehensive proceedings and thus contributed to the improvement of the teaching and learning of technical communication across Europe. We are grateful to the speakers and authors for their insightful contributions, the participants in the colloquium for their collaborative efforts and valuable feedback, the editors for their meticulous work, and tekom Europe for its logistic and financial support. Finally, we are also indebted to the European Union for its financial support under Grant No. 2015-1-DE02-KA202-002278.

Karlsruhe/Antwerpen, September 2016
Sissi Closs & Birgitta Meex, on behalf of the Review Board
A Situated Cognition Perspective on LSP Translation and Technical Writing

1 Introduction

This article takes a cognitive scientific perspective on the two fields of specialized or LSP (Language for Special Purposes) translation and technical writing, which, even though they are distinct fields, are often claimed to exhibit more commonalities than differences (see, for example, Schubert 2007:103). In a first step, I survey the major paradigms in cognitive science and cognitive translation studies and present the Cologne Model of the Situated LSP Translator, which aims to capture the complex reality of the professional translator from a cognitively plausible perspective. After discussing the various components of this model, I elaborate on the increasing convergence of LSP translation and technical writing, before surveying Zehrer’s (2014) model of the technical writing process. This model shows various parallels to the Cologne model and is also based on the findings of modern cognitive science. I conclude the article with the discussion of a draft model of the situated technical writer, which is derived from the Cologne Model of the Situated LSP Translator. I hereby once again intend to illustrate the close interrelation between the fields of LSP translation and technical writing.

It must be pointed out that the discussion of cognitive translation studies and the Cologne model will be quite exhaustive since a lot of research has been dedicated to the interface between cognitive science and translation studies (see, for example, Risku 2004, 2005, 2010; Krüger 2015b). On the other hand, technical writing research – at least to my knowledge – has only started quite recently to incorporate cognitive scientific models and concepts into theory construction (most notably Zehrer’s 2014 work mentioned above). Therefore, there will be an imbalance between the discussion of LSP translation and technical writing from a cognitive scientific perspective, the more so as my professional and academic background is in translation and not in technical writing.
2 Major paradigms in cognitive science and cognitive translation studies

Cognitive translation studies is the subfield of overall translation studies which is specifically concerned with the translator’s cognition and which attempts to answer the question of “what happens in the minds of translators” (cf. Krings 1986). It emerged in the wake of a series of paradigm shifts in translation studies, which led from a perspective on linguistic systems via a perspective on texts to a perspective on translational action and the person of the translator (Stolze 1994/2011). Cognitive translation studies itself also passed through various development phases, which followed the main paradigms in cognitive science. Here, I will only give a brief overview of these phases which, together with the corresponding cognitive scientific paradigms, will be discussed in detail below. In the first phase, the epistemic interest in the translator’s cognition was rather microscopic. Early cognitive translation studies postulated an “ideal translator” (cf. Kade 1968:62) reminiscent of the Chomskyan “ideal speaker-listener”, whose mind was conceptualized as a storage box for different “translation algorithms”. Over time, the epistemic interest in the translator’s cognition widened to include the individual knowledge requirements of the translator and hence the translator as a real person. Initially, this real translator was investigated in relative isolation from the various influences in the professional working environment, but gradually these factors became more important in constructing cognitive theories of translation. Within cognitive translation studies, this development has culminated in the theory of situated translation (Risku 2004), which assigns central importance to the individual situational factors of the translator and his/her working environment.

I would now like to sketch the overall developments in cognitive science and cognitive translation studies in some more detail. This overview is intended to provide the context for the Cologne Model of the Situated LSP Translator presented in section 3 below, and it will be structured along the three main paradigms in cognitive science (Rickheit/Strohner 1993; Strohner 1995) and the corresponding development phases in cognitive translation studies, as identified by Risku (2004).

2.1 Symbol manipulation

The earliest paradigm in cognitive science emerged in the 1950s/1960s and is usually called the symbol processing (Strohner 1995:43) or symbol manipulation (Risku 2004:68) paradigm. Prior to the emergence of this paradigm, research into human cognition was dominated by the so-
A Situated Cognition Perspective on LSP Translation and Technical Writing

called *behaviorist* approach, which conceptualized the human mind as a black box and regarded hypotheses about the processes in this black box as speculative and hence as unscientific (see Risku 2004:67). The development of the computer provided an important impulse for overcoming the dominance of behaviorism and for the emergence of the symbol manipulation paradigm (see Rickheit/Strohner 1993:16). In this paradigm, human cognition is equated with the information processing of a computer. Hence, human thinking is seen as a logical, symbol-based process, human memory serves to store objective data and rules and problem solving is conceptualized as an explicit, linguistically and symbolically transparent process based on algorithms (Risku 2004:68). From this perspective, human communication is understood as a linear and rule-based process which can be explained, for example, using the mathematical theory of communication by Shannon (1948) in its linguistic reinterpretation by Weaver (1949). According to this view of communication, translators are “code switches” who replace the elements and rules of one linguistic system with those of another one (Risku 2005:62).¹ This rather mechanistic view of translation is depicted in figure 1 below:

![Figure 1: Translation as symbol manipulation](image)

In line with the discussion above, translation is conceptualized here as a process of code change which involves decoding a source text and re-encoding it in the form of a target text. The translator’s cognition is reduced to a set of linguistically-oriented translation algorithms, for example, the source and target language grammar, Vinay/Darbelnet’s *stilistigue comparée* (1958/1977), Catford’s translation

---

¹ The idea of translation as a form of code change emerged in the works of the German scholar Otto Kade (1968:14, 33, 55), one of the major proponents of the Leipzig school of translation.
rules (1965), or Jäger’s translation grammar (1975). These translation algorithms determine the linguistic processes by which the translator transforms a given input (a source text) into a given output (a target text).

Today, this mechanistic understanding of translation as a form of symbol manipulation is considered inadequate for describing the highly complex and multifaceted phenomenon of translation (Risku 2010:96). For example, Strohner (1995:51) points out that the symbol manipulation paradigm cannot explain how humans successfully deal with deficient information in communication. Take the following example from Krüger (2013:289):

EN: [...] there are three main approaches to capturing the CO₂ generated from a primary fossil fuel [...].
DE: [...] es gibt drei Hauptansätze zur Abtrennung des bei der Verbrennung eines fossilen Primärenergieträgers [...] entstandenen CO₂.

The source text information CO₂ generated from a primary fossil fuel is deficient in this context because it does not encode the information that CO₂ is generated by burning such a fuel (which is made explicit by the German prepositional phrase bei der Verbrennung). And while the explicitation shift we can observe in this example is one of the translation procedures in Vinay/Darbelnet’s stylistique comparée (1958/1977:9) and is therefore covered by the translation algorithms illustrated in figure 1, such an algorithm could only provide the formal instruction to explicitate, not the actual content to be explicitated. Since this content is neither part of the linguistic ST code nor part of the algorithms operating on this code, the explicitation shift observed above cannot be explained properly by the symbol manipulation paradigm. In this context, Risku (2004:69) points out that this approach fails where humans still manage to interpret incomplete or deficient linguistic information with ease. This problem is particularly pressing in the context of specialized translation since the “postulate of economy” (Fijas 1998) entails that LSP translators are often confronted with moderately to highly deficient or underdetermined source texts (see, for example, Krüger 2015a:76ff.). The symbol manipulation paradigm has to remain agnostic as to how translators successfully translate these kinds of text.

2.2 Connectionism

This and other points of criticism eventually led to the decline of the symbol manipulation paradigm. Also, more recent studies in cognitive science had shown that nature had given the human brain a structural design which differed considerably from that of a com-
puter (Strohner 1995:48). In particular, it had become evident that information processing in the brain is not performed serially by means of a central processing unit; rather, it is distributed over a multitude of different components, which means that information is processed in a parallel way (Strohner 1995:48). As a consequence of these findings, the symbol manipulation paradigm eventually was replaced by the paradigm of *connectionism*. As the name implies, connectionism is based on the idea of interconnectedness, which is derived from the structure of the human brain with its billions of connected neurons (Rickheit/Strohner 1993:15). According to connectionism, cognition is not a process of symbol manipulation but rather a form of pattern recognition based on neural networks. Also, human knowledge is no longer codified in fixed symbols but distributed in the activation patterns of such neural networks. As Rumelhart et al. (1986:75) put it quite concisely: “[T]he knowledge is in the connections.” Cognitive science and cognitive linguistics developed various theoretical equivalents to these interconnected neuronal structures, for example the well-known *frame* concept. A frame is a pattern of thought and action which exhibits a rather low degree of granularity (see Risku 2004:70). The concept has become particularly prominent with the linguistic theory of frame semantics developed by Fillmore, who defines frames as “conceptual structures that underlie [the meaning of linguistic units] and that motivate their use” (Fillmore 1994/2006:613). In translation studies, the frame concept was applied, for example, by Vannerem/Snell-Hornby (1986/1994), Kußmaul (2007/2010) and Krüger (2015a). These authors draw on the frame concept primarily as an instrument for modeling the cognitive organization and representation of human knowledge in translation. In figure 2 below, I depicted the translation process from a connectionist perspective:

![Figure 2: Translation as pattern recognition](image-url)
From the point of view of connectionism, the translator is no longer regarded as a mechanistic code switch but rather as an individual person with individual knowledge frames. Connectionist approaches to translation discard the notion of translation being a rule-based and objective process of decoding and re-encoding but instead conceptualize it as a complex and (inter)subjective process of interpretation and construction.\(^2\) While symbol manipulation focused on text-induced bottom-up inputs, connectionism also considers the top-down inputs influencing text production and reception, i.e. the translator’s world knowledge organized in the form of frames. The microscopic translation algorithms of the symbol manipulation paradigm are discarded in favor of more macroscopic factors influencing translational action. In figure 2 above, I illustrated three such exemplary frames, which I would like to discuss briefly with reference to the translation example in section 2.1. The translator, before beginning to translate, will ideally form an idea of the target situation in which the target text will have to function, for example by analyzing the translation brief, which is assigned central importance in functionalist translation theories (e.g. Nord 1997:60). This translation brief may tell the translator that a covert translation (House 1997) or an instrumental translation (Nord 1997) is required, which will enrich his/her target situation frame. If we assume a reasonably competent translator, s/he will also have sufficient knowledge of the required target language register. This register knowledge should tell the translator that the source text fragment \(CO_2\) generated from a primary fossil fuel is too implicit for the German target audience and will have to be explicitated in German. From a connectionist point of view, the information to be explicitated – which could not be captured in the symbol manipulation paradigm – would form part of the \(CO_2\) frame, which could be depicted as follows:\(^3\)

\(^2\) Contrary to the terms encoding and re-encoding, the terms interpretation and construction stress the translator’s active contribution in the processes of text reception and production (see Krüger 2015a:173, 177ff.).

\(^3\) The frame representation in figure 3 is based on Busse (2012:744). It must be pointed out that the frame depicted here only captures a small subset of all knowledge that may be relevant for understanding the concept of \(CO_2\) in a given context. It is one of the central tenets of cognitive semantic theories such as frame semantics that the encyclopedic knowledge associated with a certain concept is potentially unlimited (see Langacker 2008:47; Busse 2012:611).
If the translator is to perform the explicitation shift illustrated in the example in 2.1, the corresponding information must – from the point of view of connectionist approaches to translation – be part of his/her individual cognitive CO₂ frame (as is the case in figure 3 above); otherwise, the translator would have to enrich his/her frame knowledge by means of corresponding subject-matter research.

This discussion should have shown that connectionism allows for a much more differentiated and realistic description of translational action than the symbol manipulation paradigm. However, this paradigm has also been subject to various criticisms, which are concerned mostly with the insufficient recognition of the situatedness of human cognition and of the influence exercised by possible environmental factors (Strohner 1995:53). As Risku (2004:71) points out, connectionism still conceptualized cognition as an isolated process in an individual person’s brain. This perspective was increasingly considered to be too narrow, which eventually led to the emergence of the current cognitive scientific paradigm. Here, human cognition is conceptualized in much broader terms than in the two preceding paradigms.

2.3 Situated Cognition

This current cognitive scientific paradigm goes by the name of situated cognition. Its central tenet is that humans and their environment form a cognitive ecosystem (Strohner 1995:56), which cannot be simply divided into its constituents. As a result, it is assumed that cognition
is not isolated in the human brain but emerges from the dynamic interaction of the brain with its environment (Strohner 1995:54). The idea of a cognitive ecosystem postulated within the situated cognition paradigm allows a description of human cognition which takes into account all the situational factors that were largely ignored in the two preceding paradigms. The consequences of situated cognition for translation studies are summarized quite concisely by Risku (2010:103):

We need to find out not only what happens in a translator’s mind, but also what happens elsewhere, e.g. in their hands, in their computers, on their desks, in their languages or in their dialogues. Translation is not done solely by the mind, but by complex systems. These systems include people, their specific social and physical environments and all their cultural artefacts. This quote contains two elements which play an important part in an ecosystemic description of the translation process: artefacts and other people (in professional contexts, these are normally various cooperation partners, see Risku 2004:19). Artefacts can be understood as any objects made or used by humans for a particular purpose. Such objects range from calendars and spectacles to languages and objects of art to the products of modern information technology (Risku 2004:20). Cooperation partners in the translation process are, for example, commissioners of translation services, project managers, proofreaders or co-translators. As mentioned above, such artefacts and cooperation partners are assigned central importance in ecosystemic theories of translation, such as Risku’s (2004) theory of situated translation. This theory is a cognitively-oriented extension of German functionalist theories of translation and it is the most prominent and most comprehensive ecosystemic translation theory to date. In addition to situational factors such as artefacts and cooperation partners, situated translation also considers factors internal to the individual – for example, the translator’s physical and psychological condition – to be relevant for a holistic description of the translator’s cognition (see Risku 1998:16). Situated translation could explain, among other things, why a competent translator who is tired or under time pressure fails to produce a high-quality translation (see Serrano Piqueras 2011:35). Such physically or psychologically-induced performance errors of translators who, in principle, possess the translation algorithms or frames required for a high-quality translation, could not be described and explained in the two preceding paradigms.

In figure 4 below, I depicted the translation process from an ecosystemic perspective:
The overall process of translation is depicted here as a form of intelligent situational action (Risku 2004:73). Accordingly, the translator is conceptualized as a situated agent, who creates a target text in a specific target-cultural context (Risku 2004:75). In figure 4, I listed the cognition-relevant external factors artefacts and cooperation partners and the internal factors physical and psychological condition. An artefact with high relevance for the translation process and for the translator’s cognition would be a translation memory (TM) system. In the discussion of the translation example in sections 2.1 and 2.2, we did not ask how the target text was actually produced, i.e. whether the translator wrote it by hand or used a text processing program such as Microsoft Word or a translation memory system such as SDL Trados Studio. However, from the perspective of situated translation this question is of central importance. If we assume that the translator produced the translation using a TM system, it is possible that the explicitation shift observed in the example was not actually performed by the translator. Maybe the translator found the translation of the text string CO$_2$ generated from a primary fossil fuel by means of a concordance search or in a 100% or Fuzzy Match provided by the translation memory. In this case, it would be futile to resort to a specific translation algorithm or knowledge frame in order to explain the observed explicitation shift. Another relevant artefact in the translation process is a style guide, which may, for example, contain the instruction to write the German target text in a more explicit way than the English source text. This information may then confirm or expand the translator’s register knowledge and may prompt the translator to perform the explicitation shift. A relevant cooperation partner in the translation process would be a project manager, who is usually the main contact person for translators in the course of a translation project. This
project manager may spontaneously ask the translator to deliver a text sample of 2000 words by the end of the day for the purpose of quality assurance. This may put the translator under time or performance pressure and therefore may have an adverse effect on the translator’s mental state. Another relevant cooperation partner, especially in large-volume translation projects with tight deadlines, would be a co-translator with whom our translator may have to coordinate stylistic, terminological and other aspects.

In figure 4, I only depicted some of a plethora of factors with potential influence on the translator’s cognition. In any case, it should have become clear how the focus of situated cognition differs from the two preceding paradigms and that describing and explaining the translation process from an ecosystemic perspective may be a highly complex endeavor. In the light of the holistic and dynamic perspective that situated cognition takes on human cognition, this current cognitive scientific paradigm should have a very high potential for describing the real-world translation process from a cognitively plausible perspective. Situated translation has already exploited this potential for the general field of translation, whereas the model I will present in the next section attempts to apply the paradigm of situated cognition and the theory of situated translation to the more specific field of LSP translation.

3   The Cologne Model of the Situated LSP Translator


3.1   Process perspective: The process chain of specialized communication

The model is divided into two levels. The lower level depicts the translation process as a sub-process of the “process chain of specialized communication” (cf. Schubert 2007:132). This process chain
Figure 5: The Cologne Model of the Situated LSP Translator
forms the superordinate structure in which the *translational ecosystem* is embedded. This lower level is depicted from a temporal perspective, which means that the individual phases of the process chain (create, transfer, organize/use) and the working phases of the translation process are arranged in chronological order. The creation phase involves all processes in which specialized documents are created, proofread, revised, summarized, etc. (Schubert 2007:132). From a translational perspective, this is the phase in which the source texts of the LSP translation process are written. The transfer phase involves all processes in which specialized documents are transferred from a source language into a target language and involves primarily the tasks of specialized translation and specialized interpreting (Schubert 2007:133). The organizing/use phase involves organizing operational information flows by providing and keeping available specialized documents for use (Schubert 2007:133). The translation process is subdivided into several working phases which are derived primarily from Reinke (2004) and Serrano Piqueras (2011). These working phases involve 1) the phase of project initiation, which includes the initial client communication, the project analysis, the negotiation of fees and delivery deadlines, etc.; 2) the phase of general preparation, in which the files provided for the translation project are checked for completeness, folder structures are created, etc.; 3) the phase of translation preparation, in which, among other things, the source text and the client instructions are analyzed, a macro strategy is defined and terminology and other research is conducted; 4) the phase of actual translation; 5) the phase of quality control, in which the target text is checked for formal and content-related correctness; 6) the phase of final administrative tasks, which involves delivery and archiving of the translation, invoicing, etc.; and 7) the follow-up phase, in which the translator is concerned with potential client feedback, complaints, etc. In the Cologne model, I depicted the maximum number of work phases of the translator. Depending on the actual translation setting, some of these phases may not apply or may be more or less prominent.  

---

4 In Schubert’s integrated model of mono- and multilingual specialized communication, this phase is only called *organize* (2007:133). I intentionally added the term *use* since the term *organize* does not make it sufficiently clear that a translated text is usually not only made available for use but is actually used by the commissioner of the translation, the target-text recipient(s), etc.  

5 For example, compared to freelancers, in-house translators are not normally required to acquire new clients or negotiate with existing clients, so that the project initiation phase usually does not apply for these translators.
3.2 Cognition perspective: the translator and relevant factors of the translational ecosystem

The upper level of the model is depicted from a cognition perspective. Here, the actual constituents of the translational ecosystem (the translator and his/her working environment) are listed. The relevant components of the working environment are the translator’s cooperation partners, social factors, various artefacts as well as physical and psychological factors.

3.2.1 The translator

The translator as the central agent of the translational ecosystem is depicted in his/her dual function as ST recipient and TT producer. In the head of the translator, I listed several factors which are primarily anchored in the person of the translator and which I consider to be of central importance to successful translational action. The first factor concerns the translator’s knowledge frames already discussed in section 2.2. In line with the situated translational basis of the Cologne model, frames are understood here as dynamic structures the various elements of which do not have to be stored in the translator’s mind (i.e. in his/her long-term memory) but can be “outsourced” into various artefacts of the translator’s working environment. Typical instruments of knowledge management which are regularly employed by translators are, for example, terminology management systems or mind/concept mapping software (see sections 3.2.5 and 3.2.6 below). Another central factor is the competence of the translator, which can be defined as “all the knowledge, abilities and strategies a successful translator masters and which lead to an adequate performance of translation tasks” (Alves et al. 2000:13). However, in line with the ecosystemic grounding of the Cologne model, Göpferich (2008:13) points out that there is no “competence in itself” but that such competence is always co-determined by factors in the working environment (see also the discussion in section 2.3). The third important factor is the translator’s macro strategy. This strategy is of central importance to functionalist theories of translation and acts as a superordinate mechanism controlling the application of various micro strategies in the translation process (see Höng 1995:50ff.). However, in functionalist theories outside of situated translation, macro strategy formation is linked primarily to the analysis of the source text and the translation brief and determines, at a rather general level, whether to produce a documentary or an instrumental translation (see Nord 1997). From the perspective of situated translation, on the other hand, the formation of a macro strategy can be influenced by all factors of the translational ecosystem and the macro strategy itself does
not merely determine whether to orient the target text towards the source culture or towards the target culture. For example, due to time pressure, a low translation fee or low quality requirements of the client, the translator may make the macrostrategic decision to produce a lower-quality translation than his/her translational competence would permit (a decision which can certainly be criticized but which is not unheard of in real-life translation). Macro strategy formation in situated translation is thus a more complex and less “tidy” process than in other functionalist theories. At the same time, it should also capture the professional reality of translators more closely.

3.2.2 The translator’s cooperation partners

Translation is a complex process embedded in the superordinate process chain of specialized communication. In this context, Risku (2010:106) points out that cooperation between the different agents in this process chain is of central importance for coping successfully with the complexity of the translation process. The important role of cooperation in translation entails that translation theory must not only focus on the translator as the central agent of the translation process but also on the cooperation partners which form part of the translational ecosystem:

If translation scholars take the other players (authors, readers, clients) in the translation process properly into account, they will be in a position to explain how professional translators are able to develop their flexibility, creativity and sense of responsibility without losing touch with the real world. (Risku 2010:106)

In the Cologne model, I assigned the translationally relevant cooperation partners to the three phases of the process chain of specialized communication. I have drawn here on the six (minus the translator five) roles from Holz-Mänttäri’s (1984) theory of translational action (initiator, commissioner, ST producer, TT user and TT receiver) and added to these the roles of co-translator, proofreader and project manager. In the various working phases of the translation process, the translator will cooperate with different partners. In the project initiation phase, for example, the translator will cooperate primarily with the commissioner/project manager of the client, whereas in the follow-up phase, s/he may have to communicate with the proofreader, the TT user or the TT receiver. The cooperation partners that the translator works with in the translation process are also determined by the translation setting and the structure of the superordinate process chain in which the translator is embedded. For example, translators working in a translation agency will primarily cooperate with internal project managers and rarely with the initiator or com-
missioner of a translation, whereas freelancers will probably work with all partners depicted in the model. How a translator performs in dealing with these partners is determined, among other things, by his/her “translation service provision competence”, which involves knowledge of “how to organize approaches to clients/potential clients”, knowledge of “how to negotiate with the client”, etc. (see EMT Expert Group 2009:4).

3.2.3 Social factors: working environment and professional status

The social factors working environment and professional status are closely related to the cooperation partners in the translation process. As the terms field, capital and habitus in the model indicate, I draw here on the concepts which the French sociologist Pierre Bourdieu (e.g. 1979) developed in order to model social space (for a discussion of Bourdieu’s framework in the context of translation studies, see Prunč 2007:309).

The field is conceptualized as a playing field with certain rules. On this playing field, various actors with different degrees of power interact with each other (see Prunč 2007:309). For our purpose, the relevant field is obviously the translation/localization industry. The actors in this field are, on the one hand, the end clients or initiators, i.e. those actors who demand translation services, and, on the other hand, the actors providing these translation services. This would be, for example, large translation agencies (Multi Language Vendors, MLVs), small translation agencies (Single Language Vendors, SLVs), language services in companies and in the public sector, translator networks and freelance translators. Translators can work in-house or as freelancers for end clients, translation agencies or language services, with the translation fee, the required scope of service and the time frame allowed for the translation usually decreasing as we move from end clients and language services via MLVs to SLVs.

The power that the actors in the field can draw on is called capital in Bourdieu’s framework. Here, a distinction is made between economic, cultural and social capital. Depending on the status that a given society assigns to these forms of capital, they can be transferred into a certain amount of symbolic capital (see Prunč 2007:312). The question of relevance in the present context is how much symbolic capital the translator can draw on when cooperating with the partners in the translational ecosystem – in other words, which expert status the cooperation partners assign to the translator. This expert status will eventually influence the translator’s translational habitus, i.e. his/her behavior in the field of the translation/localization industry. This translational habitus reflects, for example, whether the translator can
cooperate with his partners on equal terms or whether s/he is regarded as a proper expert in their eyes.

3.2.4 The artefact group *explicit steering instruments*

As discussed in section 2.3, artefacts play a vital role in describing the translation process from an ecosystemic perspective. Since there is a plethora of potentially relevant artefacts in the translational ecosystem, I assigned the most important artefacts to various groups, which I will discuss in the following sections.

The first artefact group is called *explicit steering instruments*. I draw here on Schubert’s (2007:136) insight that specialized communication is usually a form of controlled communication in which several steering instruments are employed. The first instrument depicted in the model is the source text which, according to Schubert (2007:94), is the primary steering instrument in specialized translation. This means that the translator, when verbalizing specialized content in the target text, acts within a rather narrow corridor which is determined primarily by the specialized content of the source text. Other explicit steering instruments that may influence the translator’s target text production are client instructions, which may contain content-related, linguistic, design-related and organizational requirements (Schubert 2007:95). The client instructions depicted in the model are linguistic instructions since these are the most prominent instructions in specialized translation. Style guides, for example, are very common in translation practice. These documents standardize diverse aspects such as spelling and punctuation, date, time and currency formats, the style of the target text, etc. Glossaries and termbases, on the other hand, serve to standardize target-language terminology. These artefacts introduce terms specified by the client into the target text. The same holds for previous translations, which are often provided in the form of translation memories. If the client instructs the translator to adopt 100% Matches as well as terms and phrases found by means of concordance searches or in Fuzzy Matches, these translation memories also exercise a controlling influence on the linguistic makeup of the target text (see the discussion in section 2.3). Examples of the last explicit steering instrument depicted in the model are terminology standards, guidelines for technical writing or general instructions on style (Schubert 2007:98). Again, these documents will determine, to some extent, the linguistic form of the target text.

3.2.5 The artefact group *translation technology in a narrow sense*

The artefact group *translation technology in a narrow sense* (which could also be called *computer-assisted translation (CAT) tools*) plays a central
role in the Cologne Model of the Situated LSP Translator since translation technology has become an indispensable component of the translation process. Accordingly, O’Brien (2012) conceptualizes modern translation work as a form of “human-computer interaction”. There is broad consensus among translation researchers and practicing translators that the proliferation of computer-assisted translation has changed the nature of the translation process quite drastically (see Christensen/Schjoldager 2010:1). For example, the use of translation memory systems may entail, on the positive side, a higher process standardization, productivity and cross-document consistency and lower translation costs and, on the negative side, a possibly higher focus on individual translation segments (to the detriment of overall textual cohesion) or the uncritical adoption of low-quality translation units from contaminated TMs (see Christensen/Schjoldager 2011:128). Terminology management systems support the translator’s knowledge management and knowledge organization and can be used to “outsource” various elements of the translator’s knowledge frames (see section 3.2.1 above). Alignment tools can be used to create translation memory databases from separate source and target documents by matching corresponding segments and exporting them into a TM file (Reinke 2013:30). MT (machine translation) systems change the translation process even more drastically than TM systems since, in this case, the translator’s task is reduced to pre- and post-editing while the actual translation is performed by a machine (see Schubert 2007:171). Finally, PM (project management) components offer workflow management functions and functions for managing translation, client and translator files (Reinke 2013:30).

From the perspective of situated translation, translation technology in a wider sense, or CAT tools, forms an important part of the translational ecosystem and hence of the translator’s cognition. This is summarized quite concisely in the following quote by Pym:

[...] new translation technologies such as translation memories, data-based machine translation, and collaborative translation management systems, far from being merely added tools, are altering the very nature of the translator’s cognitive activity [...].
(Pym 2011:1)

3.2.6 The artefact group translation technology in a wider sense

The artefact group translation technology in a wider sense includes all other software tools besides specific CAT tools which the translator uses in the translation process. As the use of these more general software tools usually does not alter the actual translation task in any significant way (as compared to CAT tools), I consider the relevance of
these ecosystemic artefacts for the translator’s cognition to be lower
than that of translation technology understood in a narrow sense. 
However, Krüger/Serrano Piqueras (2016:15) point out that, by ade-
quately choosing and effectively using such general software tools, 
the translator can simplify or streamline various aspects of the trans-
alisation process. This can be illustrated by means of a file manager. 
In the preparation phase of a translation project, translators have to 
create multiple folders, they have to copy, move and zip/unzip nu-
umerous files, etc. A standard file manager such as Windows Explorer 
may be less suited for these tasks than a split-screen file manager 
such as the open-source tool Double Commander⁶, which speeds up 
these tasks considerably. Also, the translator’s email program, inter-
net browser and other general software usually offer a considerable 
potential for optimization. Further important artefacts in the group 
translation technology in a wider sense are controlled language checkers 
as typical quality-control instruments of the mono- and multilingual 
LSP communication process (see Drewer/Ziegler 2011:227ff.). In 
addition to the terminology management systems included in the ar-
tefact group translation technology in a narrow sense, mind mapping and 
concept mapping software are further important instruments sup-
porting the translator’s knowledge management. Finally, web con-
cordancers such as WebCorp Live⁷ allow the translator to access the 
internet as a macro-corpus and to query it for linguistic or conceptual 
information (see, for example, Krüger 2012:518–520).

3.2.7 The artefact group digital research and communication resources
The artefact group digital research and communication resources contains 
digital resources that translators can access for the purpose of re-
search (both linguistic and conceptual) in translation as well as digi-
tal resources that translators can use in order to communicate with 
fellow translators, with (potential) clients, and so on. It is certainly 
true that the internet has become the most important digital research 
source in professional translation. At the same time, electronic cor-
pora are gaining in importance not only in translation research but 
also in translation practice, where they are used increasingly as tools 
for documenting translation tasks. In applied corpus-based transla-
tion studies, various researchers propose a structured approach to 
compiling corpora of parallel/explanatory texts from the internet 
(see, for example, Krüger 2012:515–518). This approach combines 
these two digital research resources in a meaningful way. The notion

⁶ doublecmd.sourceforge.net [accessed 6/17/2016]
of digital communication resources intends to do justice to the prolifera-
tion of translator communities or translator forums such as ProZ. com or TranslatorsCafé (see Pym et al. 2016), where translators can meet and discuss with their peers, find new clients and job offers, etc. Also, there is a proliferation of translator blogs, where translators discuss current matters of relevance to the translation industry such as machine translation, crowd sourcing, amateur translation, and so on (see Flanagan 2016). These blogs (and also the forum discussions on platforms such as ProZ.com or TranslatorsCafé) increasingly contribute to the opinion-forming process in the translator community and may thus influence the translator’s individual habitus.

3.2.8 The artefact group general working aids

The artefact group general working aids lists various elements of workplace design, such as office equipment, furniture and peripheral devices. From a situated translation perspective, Risku (2004:20) points out that workplace design can also be considered as an important artefact in the translator’s working environment. In translation studies, there is a relatively new research strand which is concerned with the ergonomics of the translation process (Ehrensberger-Dow/Massey 2014a, 2014b; Ehrensberger-Dow/O’Brien 2015). Within this research strand, which I will call translational ergonomics for the purpose of this article, there are three research foci, i.e. cognitive, physical and organizational ergonomics. Issues pertaining to the artefacts in the present artefact group are investigated in the context of physical ergonomics, which is defined by the International Ergonomics Association\(^8\) as “human anatomical, anthropometric, physiological and biomechanical characteristics as they relate to physical activity”. In this context, Ehrensberger-Dow/Massey (2014b:61) point out that “physical factors, such as the design of desks, office chairs, computer keyboards, and mice, as well as context factors, such as changes in noise levels, lighting and temperature, can influence performance and present risk factors for health problems”. For example, in a keystroke logging test, Ehrensberger-Dow/Massey (2014b:72) found that, within a time frame of 15 minutes, professional translators type approximately 1,000 characters and spaces and make over 80 mouse clicks (see also Ehrensberger-Dow/O’Brien 2015:104). This finding is indicative of the heavy strain on hands and wrists in professional translation work\(^9\) and calls for a good ergonomic design of peripheral devices such as keyboards and mice. Also, Ehrensberger-Dow/

---

\(^8\) [http://www.iea.cc/whats/index.html][1] [accessed 6/17/2016]

\(^9\) Which leads to a higher risk of hand and wrist tendonitis in translators; see, for example, Pineau (2011).
Massey (2014b:69) observe that their test subjects worked with several documents and programs at the same time and had to switch constantly between windows, “implying a concomitant reliance on short-term memory to retain the information between the switches”. This constant switching and the cognitive load on short-term memory could be reduced, for example, by equipping the translator’s workplace with one or more additional screens.

### 3.2.9 Physical and psychological factors

The last ecosystemically relevant factors in the model are various *physical* and *psychological* factors. Risku (1998:16) points out that external factors such as time pressure or internal factors such as a lack of motivation are no disturbances to but rather integral components of cognitive processes. There are some links between the physical and psychological factors listed in this model, the artefacts in the group *general working aids* and the various ergonomic factors of the translation process discussed previously. For example, the translator’s physical condition can, among other things, be influenced by the relative ergonomics of furniture such as his or her chair or desk and by the relative ergonomics of peripheral devices such as mice, keyboards and screens (see Ehrensberger-Dow/O’Brien 2015:107 and the discussion in section 3.2.8 above). Other factors listed here also can be linked with translational ergonomics and in particular with the area of organizational ergonomics, which “is concerned with the optimization of sociotechnical systems, including their organizational structures, policies, and processes.” (Ehrensberger-Dow/O’Brien 2015:100).

For example, the ErgoTrans project conducted at Zurich University of Applied Sciences found that the translator’s motivation may be impacted by a “[l]ack of organizational and client awareness [...] (low appreciation, unrealistic deadlines)” (ErgoTrans 2015:4). In the Cologne model, this aspect can be linked to the discussion of the translator’s *working environment and professional status*. If the translator’s cooperation partners do not assign him or her a proper amount of symbolic capital (in the form of a proper degree of expert status), this will certainly be detrimental to the translator’s motivation. Also, Ehrensberger-Dow/O’Brien (2015:111) report on a survey on translational ergonomics which found that the majority of the participants experience time pressure, stress and nervousness. Again, this can be linked to the translator’s working environment, i.e. to the specific structure of the translation/localization industry (the “field” in Bourdieu’s words), where multiple outsourcing stages are common. Usually, the end clients set the most generous deadlines, with these deadlines getting shorter and shorter as a translation is outsourced to
a Multi Language Vendor, from there to a Single Language Vendor, and so on. In other words, there seems to exist a link between general physical and psychological factors of the translator, the artefacts in the artefact group general working aids, and the translation-specific social factors working environment and professional status.

4 On the convergence of LSP translation and technical writing

I now conclude the – quite lengthy – discussion of LSP translation from a cognitive scientific perspective and in particular from the perspective of situated cognition/translation. It should have become obvious that an ecosystemic description of the translation process is more complex and less “tidy” than descriptions based on the preceding cognitive scientific paradigms of symbol manipulation and connectionism. At the same time, such an ecosystemic description should capture the professional reality of translators more closely. In this section, I will be concerned with the increasing convergence of LSP translation and technical writing, which is the second focal point of this article. As mentioned in the introduction, some researchers, such as Schubert (2007:103), claim that, even though they are distinct fields, LSP translation and technical writing actually exhibit more commonalities than differences. This is illustrated with the following table used by Schubert (2007:103) to compare the constitutive and optional features of LSP translation and technical writing.

<table>
<thead>
<tr>
<th>Feature</th>
<th>LSP Translation</th>
<th>Technical Writing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple languages</td>
<td>+</td>
<td>O</td>
</tr>
<tr>
<td>Source document</td>
<td>+</td>
<td>O</td>
</tr>
<tr>
<td>Information research</td>
<td>O</td>
<td>+</td>
</tr>
<tr>
<td>Writing for target audience</td>
<td>O</td>
<td>+</td>
</tr>
</tbody>
</table>

As can be seen in this table, Schubert considers the presence of multiple languages a constitutive feature of LSP translation (which should be a rather uncontroversial claim) but multiple languages may also be present in technical writing. This may be the case, for example, when the developer documentation of a machine is provided in English but the operation instructions should be written in German or when the technical writer producing these German operating instructions has to do research in English documents or receives answers in English to his or her queries to the client. Also, Schubert considers the presence of a source document a constitutive feature.
of LSP translation (again, an uncontroversial claim) but such a source document may also be present in technical writing, for example in the form of the above mentioned developer documentation, which could serve as the basis for drafting the final operating instructions. According to Schubert, information research is a constitutive feature of technical writing but merely an optional feature of LSP translation. It is certainly true that a technical writer who has to compose a new document from scratch may have to conduct more research than a translator who can always rely – at least to a certain extent – on the source text as the “primary steering instrument” of the translation process (Schubert 2007:94; see also the discussion in section 3.2.4 above). However, it follows from the fundamental underdeterminacy of language (Carston 2002:19) that the linguistic signs at the surface of a text are merely impoverished “prompts” which require additional knowledge if we want to give them a coherent interpretation. If we assume that a prototypical LSP translator does not have all of this “frame knowledge” (see the discussion in section 2.2 above) stored a priori in his or her head, information research will almost certainly be required in most LSP translation scenarios as well. Therefore, I would argue that information research is a constitutive feature of both technical writing and LSP translation. Finally, Schubert claims that writing for a target audience is also a constitutive feature of technical writing but merely an optional feature of LSP translation. Again, this claim may not be quite uncontroversial. If we ask a proponent of functionalist translation theories such as skopos theory, (see, for example, Nord 1997), they will probably claim that writing for a target audience is also a constitutive feature of translation and that without knowledge of the audience or the purpose of the target text, translators are just “translating into the blue” (cf. Albrecht 2005:45). So, it could be argued again that writing for a target audience is a constitutive feature of both technical writing and LSP translation. Be that as it may, what seems to be clear from the discussion of table 1 above is that technical writing and LSP translation do indeed exhibit a lot of commonalities. Furthermore, Schubert (2007:103) points out that the two professions rely on a shared set of competencies. For example, for technical writers a good text production competence is certainly of paramount importance but they also require a good text reception competence for properly understanding developer documentations, reference texts and other documents. In the same vein, translators do not only need to be able to understand a source text but they must

10 After all, the addressees of a translation are one of the most important components of the translation brief, which is of central relevance to functionalist translation theories (see Nord 1997:60).
also be able to produce a target text which adheres to the prevailing genre conventions and register requirements of the target language (my own courses in specialized translation show that students have to acquire this text production competence often painstakingly over longer periods of time). Also, there are more specific competencies which are shared by LSP translators and technical writers. For example, the tools and research competence listed in Göpferich’s (2008) translation competence model – which covers the knowledge and skills related to translation-specific conventional and electronic tools, such as text-processing programs, translation memory systems, terminology management systems, internet search engines or corpora – will certainly also be required by technical writers. In translation didactics, considerable work has gone into differentiating the concept of translation competence, for example in the form of the translation competence models developed by Risku (1998), PACTE (2003), Göpferich (2008), the EMT Expert Group (2009) and Kiraly (2013).

In technical writing research, on the other hand, the development of technical writing competence models still seems to be in its early stages. The most extensive endeavor in this respect is probably the TecCOMFrame project, which aims to “develop standard curricula based on a common academic qualification and a competence framework” and which is intended to “enable and support transparency, recognition, and transferability of the qualification and competencies of technical communicators”.

5 The paradigm of situated cognition in technical writing research

Having surveyed the various commonalities between LSP translation and technical writing, I will now discuss the application of the situated cognition paradigm in technical writing research. The most prominent work in this field is probably Zehrer (2014), who explicitly introduces the term “situated technical communication” (Zehrer 2014:111) and who stresses the fact that technical writing is a situated process influenced by the immediate context and the organization surrounding it. Based on these premises, Zehrer develops a model

---

11 For a critical discussion of the competence concept in translation studies, see Herold (2010).
A Situated Cognition Perspective on LSP Translation and Technical Writing

of knowledge communication in the situated technical writing process, which is depicted in figure 6.

Figure 6: Zehrer’s (2014:134) model of the situated technical writing process

I will not discuss Zehrer’s model in detail here (for an exhaustive discussion of this model, see Zehrer 2014:134ff.). Instead, I will highlight some parallels between this model and the Cologne Model of the Situated LSP Translator. As we can see, the technical writing process is embedded in a specific context, which is indicative of the macroscopic perspective of Zehrer’s model and which could be equated with the general notion of situation in the Cologne model. Also, Zehrer lists several constellations of interaction such as discussions, research and email correspondence. These constellations of interaction would correspond roughly to the processes of cooperation between the translator and the other agents (initiators, commissioners, project managers, co-translators, proofreaders, TT users, TT receivers, etc.) incorporated in the Cologne model. Finally, Zehrer depicts different knowledge carriers which include people, documents, the physical and media context, and so on (see Zehrer 2014:135). These knowledge carriers correspond broadly to the different agents, the explicit steering instruments and the physical and psychological factors in the Cologne model, although the latter exhibits a higher granularity than Zehrer’s model, which subsumes several quite different elements under the cover term “knowledge carriers”. Anyway, it seems that, just as the professional fields of LSP translation and technical writing resemble each other, there exist a lot of commonalities between the Cologne Model of the Situated LSP Translator and Zehrer’s model of the situated technical writing process. In the following section, I present a draft model of the situated technical writer, which is derived from the Cologne Model of the Situated LSP Translator. This model is not intended to achieve the same level of descriptive and explanatory power as genuine models of the technical
writing process such as Zehrer (2014). It merely intends to illustrate that, with a few adjustments, models originally tailored to the situated LSP translation process can basically be used to capture the situated technical writing process as well.

5.1 A draft model of the situated technical writer
The draft model in figure 7 depicts the ecosystem of the situated technical writer and also uses the process chain of specialized communication as the basic structure in which the situated technical writing process is embedded. In the present model, the central phase is the creation phase, which is subdivided into the work phases of the technical writing process. It seems that, with minor adjustments, the categories from the situated LSP translation process can be used to describe these different work phases.\(^{14}\) The creation phase may be followed either directly by the organizing/use phase (in case of monolingual technical documentation) or first by a transfer phase and then by the organizing/use phase (in case of multilingual technical communication). The relevant cooperation partners of the technical writer, which were subsumed under the term “knowledge carriers” in Zehrer’s model above, are, for example, a co-writer, proofreader or project manager in the creation phase, a translator or project manager in the transfer phase or a target version receiver or user in the organizing/use phase.

Social factors such as the working environment and the professional status of the technical writer will certainly also play a role in the situated technical writing process. It is my general impression that technical writers tend to have a higher standing in the eyes of their cooperation partners and in the eyes of the general public than translators, probably because they usually create a new work piece from scratch and are supposed to require a reasonably high domain or subject-matter competence to do so. Translators, on the other hand, constantly have to fight the widespread prejudice that they just “transcode” a text which is already there. As a result, the prototypical technical writer’s habitus may be characterized by a higher level of self-confidence, which may positively affect his or her cooperation with the relevant partners in the professional environment.\(^{15}\) Explicit steering instruments also play the same vital role for technical writ-

\(^{14}\) Again, which of these phases actually apply in real-world scenarios will depend on the actual setting of a technical writer (freelance, in-house, etc.).

\(^{15}\) However, at the European Colloquium 2016 in Berlin in April 2016, I learned that this may be a rather German-centric perspective. In Finland, for example, the profession of technical writer exists but is virtually unknown to the general public (see Virtaluoto 2015). This means that in Finland technical writers are even less visible than translators, with potential consequences for their symbolic capital and their professional habitus.
Figure 7: A draft model of the situated technical writer
ers as they do for translators. Technical writers regularly also have to adhere to steering instruments such as style guides, termbases, writing guidelines, standards, and so on (see Schubert 2007:87). However, the source text as the primary steering instrument of the LSP translation process is missing in technical writing. Of course, the client may provide a developer documentation which serves as the basis for drafting the final document, but technical writers usually do not have to adhere as closely to such a pre-text as translators generally have to adhere to a source text. A further important artefact in the situated technical writing process is what I call “authoring technology”, both understood in a narrow and in a wider sense. For not only modern LSP translation but certainly also modern technical writing can be conceptualized as a form of “human-computer interaction” (O’Brien 2012; see also the discussion in section 3.2.5). Typical tools of the trade of technical writers would be content management systems, authoring memory systems, terminology management systems, controlled language checkers, and so on (for an overview of the various tools of the technical writing process, see Drewer/Ziegler 2011). The effects of the artefacts in the remaining two artefact groups digital research and communication platforms and general working aids as well as the effects of physical and psychological factors will also be quite similar for LSP translators and technical writers. Therefore, I will not discuss these artefacts and factors any further here.

6 Conclusion

This concludes my overview of LSP translation and technical writing from a situated cognition perspective. As indicated at the beginning of the article, the discussion of LSP translation was much more exhaustive than the discussion of technical writing because a lot more work has gone into the interface between cognitive science and translation studies and because my academic and professional background is in translation and not in technical writing. It should have become clear that LSP translation and technical writing show a lot of commonalities, both in the competencies required for the two professions and in the relevant situational factors of the working environment. Also, theoretical reflections on the two fields increasingly foreground the situatedness of the respective agents and processes and draw on current cognitive scientific theories in order to make theoretically sound statements about this situatedness of their objects of study. The similarities between LSP translation and technical writing and between LSP translation studies and technical writing research are evidenced by the Cologne Model of the Situated
LSP Translator and Zehrer’s model of the situated technical writing process. Both models are broadly compatible as both are based on the cognitive scientific paradigm of situated cognition and list similar factors with relevance to the respective processes they describe. Finally, my draft model of the situated technical writer was intended to show that my own model of the situated LSP translator may only require some slight adjustments in order to depict the situated technical writer – although this draft model certainly does not achieve the same level of descriptive and explanatory power as genuine models of the technical writing process. Given the multitude of similarities between the professional fields of LSP translation and technical writing and the shared academic perspectives on the two fields from a cognitive scientific perspective, there should be a lot of potential for future cooperation and synergies between LSP translation studies and technical writing research.

7 References


Ehrensberger-Dow, Maureen; Massey, Gary (2014b): Cognitive Ergonomic Issues in Professional Translation, in: Schwieter, John W.; Ferreira, Aline (Eds.): The


A Situated Cognition Perspective on LSP Translation and Technical Writing


From Interpreting Studies to Translation Studies: a Model for Quality Assessment

1 Introduction

The Call for Papers of the international conference on “Translation and Interpreting: Convergence, Contact, Interaction” (Trieste 26–28 May 2016) opens as follows:

Translation and interpreting scholars often attend different conferences or different sessions within the same conference. Opportunities for contact and comparison between specialists in the two disciplines are therefore lacking. (TransInt2016)

Translation specialists and interpreting specialists do not talk to each other, or so it seems. They concentrate on the respective fields and often show little or no interest in or awareness of what is going on in the sister discipline. Yet, they would have much to learn from each other and much to contribute to each other’s work. Not because translation and interpreting are one and the same thing, because obviously this is not the case – the two are separated by significant differences in terms of medium, time constraints, cognitive processes, situationality, the (im)possibility of revision etc. Nor would contacts be mutually beneficial simply because in current professional practice translation and interpreting can often “be found in relations of overlap, hybridity and contiguity” (TransInt2016). No, there is another, more fundamental reason. All translators basically do the same thing, all interpreters basically do the same thing, and the thing translators do is the same thing interpreters do. Exchanges and cooperation between Translation Studies scholars and Interpreting Studies scholars would be productive and mutually advantageous for the simple reason that translators and interpreters do the same thing, albeit in different ways; they wage the same war, albeit by different means.¹ They both move from a text, they cross language and cultural barriers and

¹ The common nature of what translators and interpreters do was already recognized by Kade (1968) who coined the German term Translation to cover both Übersetzen (translation) and Dolmetschen (interpreting).
end up with another text for another end user. Whether translating a play or an instruction manual, whether interpreting a head of State at the UN General Assembly or a defendant in court, translators and interpreters are always required to do the same thing: “source-text induced target-text production for a third party”, as Neubert (2000: 10) would have it, and by doing so they make accessible what would otherwise be inaccessible.²

Taking into account the essential sameness of the activity carried out by translators and interpreters – not in terms of the way in which it is carried out, but in terms of its nature and goals – it would be desirable to have common reflection and analysis, and it would be advisable for translation scholars and interpreting scholars to cross their disciplinary boundaries and share ideas, knowledge, methodologies, tools and results.

This is exactly the purpose of this article: to describe a model that was developed in the field of Interpreting Studies and submit it for consideration to the Translation Studies community as a contribution to their reflections on the quality issue and as a potential tool to be used to assess the quality of translations.

2 An interpretation quality model

This model for interpretation quality assessment was developed some twenty years ago (Viezzi 1996) in the context of conference interpreting, but, given the fact that interpreters are always fundamentally performing the same interpreting function, it was believed to have the potential to be useful in other settings as well. It was thus proposed for non-conference settings in general (Viezzi 2013) and, more recently, for dialogue interpreting in particular.³ Now, for the reasons set forth in the Introduction, the model is being proposed for translation as well.

Quality has been a constant theme in both Translation Studies and Interpreting Studies, and scholars have often stressed how difficult it is to deal with the issue in a satisfying manner. As regards interpreting, for example, Shlesinger (1997: 123) underlined the “elusive” nature of the concept, whereas House referred to the difficulties related to the subjective element that seems to be inevitably associ-

² Neubert’s words actually refer to translation, but they also clearly describe the essence of interpreting.

³ The possible use of the model for dialogue interpreting was discussed by this author in a paper delivered at the 2015 InDialog Conference, “Community Interpreting in dialogue with technology” (Berlin, 20–21 November 2015). The paper was entitled “Towards a quality assessment model for Public Service Interpreting”.
ated with the perception of quality: “it seems unlikely that translation quality assessment can ever be completely objectified in the manner of the results of natural science subjects” (1977: 64). A possible solution to the problem was suggested by Hatim and Mason, who proposed “to elaborate a set of parameters for analysis which aim to promote consistency and precision in the discussion of translating and translations” (1990:5), which is what was done for interpreting with this model.

The model moves from the assumption that quality is a relative, not an absolute concept. In particular, quality may be seen as consisting of the characteristics enabling a product or a service to meet explicit, implicit or potential needs. In order to deal with the issue of interpretation quality, it is therefore necessary first of all to identify the nature and functions of interpreting and then identify the needs that interpreting is supposed to meet.

A quotation from Neubert and Shreve – actually referring to translation, just as was the case for Neubert’s quotation in the Introduction – seems perfectly to seize the nature and functions of interpreting: “cross-cultural, cross-linguistic, text-producing activity” (Neubert and Shreve 1992: 43). To which another definition may be added that introduces the fundamental element of setting or communicative situation: according to Gile, translation and interpreting are “a service provided to particular people in a particular communication situation” (1995: 19). As regards the needs to be met, they are necessarily communication needs: the speaker’s need to be understood and the listener’s need to understand. Interpreters may meet those needs by pursuing, and achieving, four goals which logically derive from the nature and functions of interpreting as identified in the quotations from Neubert, Neubert and Shreve, and Gile: equivalence, accuracy, appropriateness and usability.

The four goals may be regarded as the four fundamental goals of all interpreting, irrespective of the setting and irrespective of any particular circumstance: whether working in the simultaneous or in the consecutive mode, whether dealing with a monologue or with a dialogue, whether in Parliament, in a hospital or at a negotiating table, all interpreters consciously or unconsciously pursue those goals – all interpreters aim at producing a target text that is equivalent to the source text, accurate, appropriate and usable. As quality may also

4 “L’ensemble des propriétés et des caractéristiques qui confèrent à un produit ou à un service l’aptitude à satisfaire des besoins exprimés ou implicites (ou potentiels)” (Lord 1993: 33): it is the definition of quality proposed by the Association Française de Normalisation (AFNOR).

5 The fact that a definition of translation is also a perfect definition of interpreting is not a paradox. As mentioned above, translators and interpreters do the same thing.
be seen as a function of the attainment of goals, equivalence, accuracy, appropriateness and usability also serve as quality criteria or determinants of quality. In other words, the quality of an interpreter’s performance will depend on the extent to which the four goals are achieved.

2.1 Equivalence

The first interpreting goal and first determinant of quality, equivalence, has to do with the relationship between the target text and the source text.

The concept of equivalence appears to have been largely ignored in Interpreting Studies, although the main tenet of the théorie du sens – interpreting is understanding sense and reformulating it (cf. for example Seleskovitch and Lederer 1986) – would seem to recognize that equivalence, or even identity, of sense (not form) is the raison d’être of interpreting.¹ As regards Translation Studies, equivalence has constantly been at the core of scholarly reflection, and there is no doubt that it should be considered one of the most controversial concepts: it has been regarded as the conceptual basis of translation (by House 1997); it has been variously qualified: formal and dynamic equivalence (Nida 1964), denotative, connotative and text-normative equivalence (Koller 1979), grammatical, textual and pragmatic equivalence (Baker 1992) etc.; it has been mistaken for identity and therefore rejected as unsuitable (e.g. Snell-Hornby 1988); it has been regarded as just one possible goal to be pursued in translation (Vermeer 1996); it has been regarded as the necessary link between any target text and its corresponding source text (Rabadán 1991) etc. The list could go on: the range of opinions, positions, nuances is really impressive.

In the quality model presented here, equivalence is definitely not taken or mistaken for identity, nor is it seen as a one-to-one correspondence of formal and superficial elements in the source and target texts. Equivalence is seen as a relationship to be pursued in terms of overall sense and communicative function. A target text may be said to be equivalent to the source text when it reproduces its overall sense and its communicative function (informing, explaining, convincing etc.).

Equivalence would seem to be an obvious goal for interpreting, given the fact that interpreting is generally characterized by the copresence of source-text producer, source-text listener, target-text producer and target-text listener, with the source and target texts being produced simultaneously or in quick succession. It is difficult to

¹ The théorie du sens was developed in the 1960s by Danica Seleskvitch and her colleagues at ESIT, Paris, and may be regarded as the first real interpreting theory.
imagine different communicative functions being deliberately and
legitimately pursued by the source text and the target text when
source-text addressees and target-text addressees are both present.
Furthermore, people expect the interpreter’s text to be equivalent to
the speaker’s text; people expect the speaker and the interpreter to say
the same things. International relations would probably be impossible
without the presumption of equivalence.

2.2 Accuracy
The second interpreting goal and second determinant of quality, ac-
curacy, is also to do with the relationship between the target text and
the source text. Accuracy is about the accurate reformulation of the
information content of the source text with regard to items such as
figures, names etc.

Considering accuracy a goal to be reached and a quality criterion
to be met may seem obvious. The accuracy issue, however, should
also be addressed, taking into account on the one hand the time con-
straints and the cognitive complexity characterizing interpreting in
general and simultaneous interpreting in particular, and, on the other
hand, taking into account relevance. Relevance is crucial in assessing
the importance of an accurate reformulation or the importance of an
inaccurate reformulation, an approximation or an omission. It is an
important issue, because assessing interpretation quality in terms of
accuracy cannot simply consist in recording discrepancies between
the source text and the target text, à la Barik (1971), but must be
based on an analysis of the weight and value of such discrepancies.
In general, it is the context and the role played by information items
in the text that determine what the needs are in terms of accuracy.
Some examples may be useful to clarify this point.

Imagine a conference organizer taking the floor to inform
the conference participants about the conference dinner and saying
something like “tonight we will have the conference dinner in a
restaurant located 22 km from here”. The interpreter mentioning a
distance of “some 20 km” or a distance of “24 km” would definitely
be inaccurate, but the importance of his/her inaccuracy would be ab-
solutely negligible and would not have any significant impact on the
quality of his/her performance. It may be assumed that the speaker’s
intended meaning is not providing information about the exact dis-
tance to the restaurant, but giving a rough idea of the distance, the
time required to reach the restaurant etc. And the listener is prob-
ably not interested in the exact distance – s/he is simply interested

According to the théorie du sens the speaker’s intended meaning (ou vouloir dire, in French) is, above
and beyond words, the fundamental element of sens, i.e. what is to be reformulated.
to know that the distance is some 20 km, rather than 2 km or 200 km. Not to mention the fact that a solution such as “some 20 km”, that is the expression of an order of magnitude, is often recommended to students and often used by professionals as a safe (and non-wrong) way to tackle the usual difficulties interpreters have when confronted with numbers.

Imagine now a medical conference, with a speaker presenting a study and saying that in order to test a given substance he treated a group of patients administering them a daily dose of 22 mg of that substance. The accuracy needs here are absolute. An interpreter talking about “some 20 mg” would convey a piece of information that is substantially useless from a medical point of view, and an interpreter talking about “24 mg” would convey a piece of information that is definitely wrong and might considerably change the medical sense of the speaker’s words. What the speaker wants to say – his/her intended meaning – is that the dose was 22 mg, not 20 or 24. The fact that a 2 km difference is acceptable whereas a 2 mg difference is not, has to do, as previously said, with relevance and the importance of that piece of information in conveying the speaker’s intended meaning in a particular communicative situation.

One more example where the issue of accuracy and the issue of appropriateness (see below) are closely related. Imagine a speaker talking about “50 feet”. Imperial measures are still used in many parts of the English-speaking world, but are largely meaningless in the rest of the world, at least outside some specific fields. An interpreter talking about “50 piedi” or “50 pieds” or “50 Fuß” etc. would be absolutely accurate and, in most cases, absolutely unintelligible; an interpreter talking about 15.24 m with reference to a machine, a diameter or some technical aspect would be absolutely accurate; an interpreter talking about 15.24 m with reference to the distance between here and there would be absolutely accurate and, in most cases, absolutely ridiculous.

Interpreting does not take place in a vacuum – it takes place in a given communicative situation, and it is with reference to the communicative situation that everything, including quality, should be considered and analyzed. 8

2.3 Appropriateness

The third interpreting goal and third determinant of quality, appropriateness, is to do with the relationship between the target text and the listeners, seen on the one hand as participants in a specific com-

---

8 In Pöchhacker’s words: “[S]ituation analysis should be viewed as a crucial component of any theory endeavoring to explain what the interpreter is doing how, when and why” (1992: 217).
municative situation and, on the other, as members of a different lingua
culture.

An appropriate target text is a target text that takes into account
the norms governing the specific communicative situation as well as
listeners’ expectations and social and cultural barriers potentially hin-
dering communication:

\[T\]he speaker has to decide how to package the message in such a
way that it is likely to be understood by the hearer in the context of ut-
erance, while couching the message in a socially appropriate manner. This
means taking into account what the hearer can reasonably be expected
to know, as well as the nature of the social roles that the speaker and
hearer are playing. (Brown 1996: 24)

Brown’s quote has nothing to do with interpreting, yet it perfectly
describes what is meant here by appropriateness. The fact that the
quote is taken from a book on conversation analysis should come as
no surprise: interpreting is, fundamentally, speaking; interpreting is
governed by the same norms and rules governing ordinary mono-
lingual communication: we always (try to) adapt to the situation, to
our interlocutor etc. Of course interpreting also has an interlingual
component, and what interpreters say is always based on what the
speakers say, but communication between interpreters and listeners is
a monolingual act of communication taking place in a social context
just like any other act of communication.

Producing an appropriate target text therefore means taking
into consideration aspects such as language quality, language register,
the so-called culture-bound terms etc. Some examples will clarify all
this.

The United Nations has almost 200 members and only 6 official
languages, with English being without any doubt the most widely-
used language among delegates. Interpreters working into English
must realize that most listeners are actually listening to a speech in a
foreign language. In such a situation, an appropriate target text is a
target text where language is not too sophisticated or excessively idi-
omatic, but widely understandable even by those who do not have a
perfect command of it.

An appropriate target text is a text in which the interpreter uses
the kind of language used by the participants. In Italian, for example,
many medical concepts and situations may be expressed either with a
popular term or with a technical term (for example, “headache” = mal
di testa vs cefalea; “heart disease” = mal di cuore vs cardiopatia; “brain” =
cervello vs encefalo etc.). Interpreters working in a medical conference
are actually confronted with a forced choice – they must speak like the medical doctors who are listening to them. When referring to a “headache”, they must therefore use the word cefalea. The use of mal di testa would not hinder communication in any way, but it would be inappropriate, it would not meet the participants’ expectations.

Taking into account the listeners’ characteristics and expectations may occasionally lead to something unusual or unexpected. At the time of the Lewinsky scandal, President Clinton appeared before the Grand Jury. His deposition was broadcast, with simultaneous interpreting, by two or three Italian TV channels and the interpreters working for one of the channels were invited to watch their language because there could be children among the TV viewers and children were not to be exposed to inappropriate language (cf. Viezzi 2013).  

Finally, producing an appropriate target text means overcoming obstacles related to cultural items, to references to realities that are typical of a country or culture and unknown elsewhere and, in general, related to a knowledge gap (e.g. a British speaker using a cricket metaphor, an American speaker mentioning some talk show celebrity, a speaker quoting a line from a poem or mentioning a local hero etc.). The interpreter’s task is to establish communication and make understanding possible in spite of all this – no easy task, not least because of the time constraints characterizing the interpreter’s work.

2.4 Usability

The fourth interpreting goal and fourth determinant of quality, usability, also has to do with the relationship between the target text and the listeners.

Producing a usable target text means producing a target text that is easy to follow, easy to understand, easy to decode – a text that does not create any particular difficulties for the listener. Actually, usability is a feature of any text or speech, irrespective of it being the outcome of the interpreting process. Fundamental factors of usability are coherence, cohesion, intonation, rhythm, pauses, speed, etc. Just like any other usable text, a usable target text is coherent, cohe-

---

9 Media interpreting may be considerably different from interpreting in other settings. The Clinton example above is a typical case of displaced situationality (which is the rule in translation, but the exception in interpreting outside a media context), with two asymmetrically related events: a primary event (Clinton’s deposition before the Grand Jury, with everybody speaking the same language) and a secondary event (the simultaneous interpretation of the deposition for an Italian audience). The setup had many interesting features: the secondary event depended on the primary event and had no influence whatsoever on it; interpreting was needed not to establish communication between the participants in the primary event, but to inform outsiders about what was going on in the primary event – interpreting was therefore documentary rather than instrumental (cf. Viezzi 2013); the primary event was a judicial event, the secondary event was an infotainment event etc. Similar examples, again from Italian TV, are the Formula One press conferences (cf. Straniero Sergio 2003) or the Oscars telecast.
sive, delivered with appropriate intonation, with well-placed pauses, not too fast or too slow, etc.

Two aspects deserve special attention here. The first is about content or, better, about the way in which the target text is organized, and a useful reference is Grice’s maxim of manner: 1. Avoid obscurity of expression; 2. Avoid ambiguity; 3. Be brief (avoid unnecessary prolixity); 4. Be orderly (1975: 46). Following Grice’s maxim seems to be the key to producing a usable target text. Once again, therefore, there is a reference to conversation analysis, and once again it should be kept in mind that in many respects, interpreting is an act of communication like any other. The second point in Grice’s list deserves a comment. Ambiguity, vagueness, and indeterminacy are often deliberate characteristics of the source text, in particular in political discourse (Wodak 1989). It is certainly not the interpreters’ task to avoid ambiguity that is deliberately introduced by speakers in their speeches and used as a tool of political communication strategy (this is a question of equivalence); the interpreters’ task is to avoid their own ambiguity and pursue the utmost clarity and comprehensibility.

Another interesting aspect of usability, in particular in simultaneous interpreting, is speed. If the source text is very fast, the interpreter wishing to say everything would have to speak at the same speed or perhaps even faster. As a result, the target text would be complete, but probably not usable. Hence the need to make a choice: “a clear and intelligible text with some information loss may be more useful to the audience than a target text that aims at completeness at the cost of clarity and intelligibility” (Stenzl 1983: 29). In a way it is a forced choice, since a non-usable text is of course, by definition, useless.

3 A translation quality model?

Now the question addressed to Translation Studies specialists is: can the model be used for translation as well? Or, in other words, are the four determinants of quality – equivalence, accuracy, appropriateness and usability – relevant to translation? Perhaps a few more comments may contribute to their answers.

The debate on equivalence has already been mentioned. Clearly the topic is to be handled with care. However, if equivalence refers to the reproduction of the overall sense and the communicative function of the source text, then there is no doubt that there may be a role for equivalence in translation. Furthermore, as has been said, equivalence is what is expected as the outcome of a translation process. The idea of displaced situationality leading to a target text pursuing
From Interpreting Studies to Translation Studies: a Model for Quality Assessment

A communicative function that is different from the one pursued by the source text may not be preposterous, but certainly it is not what is expected. Just as is the case for interpreting, the expectancy norm in this respect, that is, the expectation as to what the translation should be like (Chesterman 1997), is such that the reader expects the target text to say the same thing – or almost the same thing, as Eco (2003) would have it – as the source text. It may be regarded as one of the foundations of our culture: Anna Karenina is Anna Karenina, whether in the Russian original or in the Italian translation; a contract and its translation are the same contract etc. Professionals may have a more nuanced opinion, but non-experts have no doubts in this respect.

As regards accuracy, it also has a legitimate place among the determinants of translation quality, not to mention the fact that translators are not confronted with the same difficulties as interpreters when reproducing information items – they do not need to resort to approximation as a coping strategy etc. In other words, if there may be good reasons explaining or even justifying an interpreter’s inaccurate or approximate target text, no such reasons exist for the translator. Approximation may occasionally be needed in translation as well, though. Here is a short passage taken from a detective story.¹⁰ The two characters are a kidnapper and the lady he was holding hostage:

she could hear his breathing through the dense silence and darkness. Nine or ten feet away from her, no more. She closed her eyes, but that didn’t make any difference. (emphasis added)

Faced with the choice between the meaningless nove o dieci piedi, neuf ou dix pieds, neun oder zehn Fuß etc. and the absurd 2.74 m or 3.05 m, approximation is of course the only possible option.

Appropriateness is also a relevant concept in translation and therefore a determinant of quality. Just as interpreting is speaking, translating is writing, and writing for somebody. The target-text user’s characteristics, needs, expectations and knowledge have to be taken into account for communication to be effective. This may even lead to changing the content, to some extent, but it happens all the time in advertising, for example, not to mention localization which, basically, simply means producing appropriate texts. Of course the legitimacy or the desirability of such operations may be discussed at length. To what extent is it legitimate or desirable to turn an Easter bunny into a chocolate egg in an attempt to translate Easter symbols and make them

¹⁰ The passage is taken from Borkmann’s Point (Pan Books), the English translation of Håkan Nesser’s Borkmanns punkt.
accessible? It probably depends on the text type, the translation purpose etc. The theme is fascinating, but it goes beyond the scope of this article.

Finally, usability. To some extent usability is synonymous with readability or comprehensibility, and is (or is not) a feature of all texts, irrespective of their being the outcome of a translation process. Obviously some of the aspects considered for interpreting are not relevant to translation, e.g. speed or intonation, but aspects such as coherence, cohesion, non-convoluted syntax etc. are absolutely crucial in translation as well. There is no doubt that usability is relevant — as has been said, a non-usable target text is useless. Whoever has struggled to make sense of an unintelligible instruction manual will agree.

The four determinants of interpreting quality thus seem to be relevant to translation as well and they seem to be the goals that all translators, consciously or unconsciously, pursue and try to achieve. Whether translating a technical text or a literary text or any other text, all translators try to say (almost) the same thing as the author of the source text, and in the same way, they try to reproduce all pieces of information, they try to adapt the text to the readers’ knowledge and expectations, they try to produce a text that is clear and understandable etc.

The interpretation quality model would thus seem to be a translation quality model as well. Whether it is true is for Translation Studies specialists to decide.

4 References


1 Introduction

Research interest in the international and multicultural aspects of technical communication remains at the forefront of discussion today. In effect, one of the most common – and challenging – tasks of the technical communicator is to present technical and scientific information to colleagues and clients from other cultures. This task is made all the more difficult given that people from different cultures present the same information in often very different ways. Although the way or order in which something is said in one culture is expected or appropriate, to convey the same information in the same manner to another culture can be perceived as wholly unexpected, even inappropriate.

How people structure and present ideas in a given language – that language’s rhetorical structure – has been considered as important as the vocabulary and syntax of the language itself for some time now (Campbell 1998, St. Amant 2006). Indeed, rhetorical expectations influence everything, from the way a particular sentence should be constructed in particular situations, to the order and placement of information in a discoursal interaction, to the choice of particular genres (Driskill 1996, St. Amant 2015). However, as noted by St. Amant (2015) and others (Tebeaux 1999, Ulijn 1996, Woolever 2001), rhetorical expectations are also specifically a function of the culture, and not just of the language. Given culture’s symbolic nature (Geertz 1966), which contrasts with language’s more explicitly visible structures, rhetorical expectations can be notoriously difficult to make explicit. Their elusiveness, especially in cross-cultural contexts, presents a challenge for technical communicators; individuals (often unknowingly) use the symbolic rhetorical expectations of their own native language and culture to determine whether or not the information presented by members of a different culture is credible and effective.
A number of studies have attempted to address this issue cross-culturally. Although clear rhetorical differences are expected to distinguish western cultures – such as the U.S. or Germany – from eastern countries like China (Barnum & Li 2006, Chu 1999, Hart 2006, Wang & Wang 2009, Woolever 2001), what is less obvious is that speakers of the same language, depending on their cultural background, may not share rhetorical expectations about acceptability or credibility in how to convey information (St. Germaine-Madison 2006, Driskill 1996, St. Amant 1999). Likewise, even between languages considered etymologically and perhaps even somewhat culturally “close”, such as French and English, differences in rhetorical expectations can make it very challenging for technical communicators to construct a writer persona that will be perceived as credible and effective by speakers of the other language.

Much of the literature on intercultural technical communication has focused on cultures that are quite distanced from one another. Even so, a case can be made that equal attention also needs to be paid to “closer” intercultural contexts, like French and English-speaking cultures, where differences in rhetorical expectations make technical communication equally challenging. Unfortunately, a focus on closer intercultural contexts is largely absent in the current research literature in technical communication. Such differences have, however, been well-documented in related fields of study, such as international scientific publishing (Flowerdew 2013, Lillis & Curry 2010) and languages for specific purposes, notably contrasting French and English (Carter-Thomas & Rowley-Jolivet 2013, Jenkins & Hinds 1987, Salager-Meyer et al. 2003, Van Bonn & Swales 2007). In these studies, the differences between French and English are approached from a micro-level angle, in order to make English-language norms explicit for non-native writers of English: lexical bundles, citation practices, pronoun usage, cohesion, anaphors/deixis, and so on. While such linguistic and discoursal elements are a very important part of rhetorical expectations, rhetorical expectations are also shaped by culture and thus contain an important symbolic, or indexical, aspect (Geertz 1966, Ochs 2012), as well.

One theoretical frame used in cultural analysis to symbolically describe the relationship between linguistic form and sociocultural context is indexicality (Bucholtz & Hall 2005, Duranti 2003, Blommaert 2010, Ochs 1992, 2012, Silverstein 2003, 2006). Using the lens of indexicality, it can be shown that the linguistic features that characterize the rhetorical expectations of a writer’s particular culture (e.g., native “French” technical writers, native “English” technical writers) in fact reflect that culture’s specific environment, for example with regard to education and literacy practices (Moreno 2010).
How people learn to write in a school setting has important implications for how they conceive of the rhetorical expectations that will later shape their writing as technical communicators. To explore this topic, this paper reports on results from a small-scale indexical study of the features of a learner corpus of French L1 scientific writing, using methods described in Dressen-Hammouda (2014). A corpus of 14 graduate student research papers from a Master’s program in technical communication and multilingual information design has been analyzed to determine which features typical of school writing might be found in scientific writing produced by native speakers of French.

This paper will first briefly describe indexicality as a research tool, and will then compare the features of English argumentation and French argumentation, based on published literature. These features are then compared to the learner corpus. The results of this study are intended to contribute to efforts in better helping French L1 technical communicators master the complexities of constructing appropriate (i.e., rhetorically expected) scientific and technical documents in English.

2 Indexicality as a research tool

Indexicality is little known outside of sociocultural linguistics (Blommaert 2010, Bucholtz & Hall 2005, Duranti 2003, Ochs 1992, Schieffelin 1990, Schieffelin & Ochs 1986, Silverstein 2003, 2006), but is beginning to be used with great promise both in applied linguistics (Dressen-Hammouda, 2014, Lillis, 2008, Starfield, 2011) and in composition & rhetoric (Davila, 2012). Indexicality’s potential for intercultural research in technical communication stems from its capacity to capture the broad impressions about social identity conveyed through writing by means of specific linguistic cues. Such cues index a wide range of sociocultural information, including information about social background, professional identity, cultural identity, affective and epistemological positioning, gender, ethnic background and social identity (Blommaert 2010, Ochs 2012). Effectively participating in a community requires the ability to wield its indexes in a plausible way (Dressen-Hammouda 2014).

Because it presupposes links between linguistic features and sociocultural context, indexicality is a useful research tool for examining how a technical communicator’s native cultural environment, notably with regard to its education and literacy practices, influences not only her or his own rhetorical expectations, but also others’ expectations as well.
Indexical analysis is essentially ethnographic in outlook, in the sense that as a situated analysis it must devise a holistic view using both a “thick” and “rich” (Geertz 1973, Sarangi 2007) investigation of the culturally-situated workings of social practice. To gain more insight into the indexicalities of practice, such an approach is necessarily tripartite, and places side-by-side (1) an analysis of the linguistic cues attested in a discourse (e.g., a corpus of scientific or technical writing) and (2) qualitative analyses (e.g., a sociohistorical analysis of the culture or social group’s practices, writings, traditions; an analysis of its culturally significant behaviors through ethnography, participation-observation, or in-depth interviews). The relationship observed by the research between quantitative and qualitative results must then be (3) triangulated, or validated, using various methods, such as a reception study (Paul et al. 2001; Tardy & Matsuda 2009) or other approach bringing the data back to the original community members for validation (Scollon & Scollon 2001).

3 Methods

The current study has combined the first two parts of these methods in order to begin offering a sociocultural explanation for the indexical features observed in a learner corpus of French L1 scientific writing. The first part of the study, using published research literature, sought to formalize and describe the context for indexical differences between scientific discourse in French and English. The results of this analysis were then compared to the features of the learner corpus: 14 graduate student research papers from an M.A. program in technical communication and multilingual information design. Three of the papers were written in English, 11 in French. Because French university students have little practice doing academic or other types of writing during their Bachelor’s degree, apart from end-of-term timed exams, it was assumed that the corpus would show features typical of school writing in a French context. A next step of the study will be to identify whether these same features can also be found in experienced (i.e., published) scientific writing produced by native speakers of French, and to validate their sociocognitive reality using a reception study.
4 Results

4.1 Features as described in the literature

Much has been written about preferences for reader-centered writing in English-language technical communication (Anderson 2014, Mazur 2000, Smith-Worthington & Jefferson 2010), where writer-centered discourse is considered to be less desirable as an approach today. Similarly reflecting cultural preferences for reader-centered writing, the research literature published by English-speaking scholars largely describes French as a writer-centered language, whereas English is viewed as a reader-centered language (Carter-Thomas & Rowley-Jolivet 2013, Hinds 1987, Jenkins & Hinds 1987, Salager-Meyer et al. 2003, Van Bonn & Swales 2007).

What is quite striking is that when the same topic is discussed by French-speaking scholars, French is instead presented as reader-centered (Bachschmidt 1999). What this apparent contradiction appears to indicate is a different conception of what it means to be “a reader-centered language” for each cultural context. In his contrastive analysis of a corpus of scientific articles in French and English, for example, Bachschmidt (1999) points to writers in English showing their awareness of the need to be reader-oriented by anticipating all reader objections and reactions in advance. In addition, he describes the reader-centered argumentation strategies in English as being essentially non-inclusive of the reader, because they call on readers only to bear witness to the demonstration being laid out before them. Readers are to follow the demonstration step-by-step, which allows them to validate the writer’s claims – if they are convinced by the logic behind the demonstration. Bachschmidt also notes that in scientific English, the writer mostly disappears from her or his text, leaving behind just the argument being made.

In contrast, the French writer of scientific discourse demonstrates reader-centeredness quite differently. As discussed by Bachschmidt, by remaining more present in her or his text, the French writer seeks to construct the text with the help of the reader. Unlike the English-speaking writer, who carefully lays out the steps of the argumentation to follow, putting up logical “road signs” along the way, Bachschmidt found in his contrastive corpus that the French writer does not make explicit the causal and logical relationships between the various steps of the argument. She or he instead syntactically juxtaposes various propositions, thereby allowing – even obliging – the reader to make inferences about the argument being made.

Of course, French scientific writers write in this way because it is a learned practice, acquired through formal schooling in a particular
cultural setting, much like it is, in its own way, for English speakers raised and schooled for example in North America. Rhetorical expectations about how to construct an argument in French are described in a number of well-known French publications on how to teach argumentation at the French secondary level (e.g., Darras et al. 1994, Delcambre 1989, Golder 1992). The specific and culturally-situated (i.e., French) way of creating a shared discursive space between reader and writer is described in the following two passages, taken from the above-cited publications:

*It's not a question of convincing any particular reader, but of making the writer's position acceptable by presenting and evaluating alternative positions. ... To argue is not to instrumentalize someone else's claims, nor is it the place for self-expression, but is about creating a space for debate. It's about staging, or even better yet, measuring the terms of the debate.* (Darras et al., 1994: 152)

When a writer wishes to assert an opinion, and to get the reader to share that opinion, two language functions are essential: justification, where one statement is used to support another; and negotiation, which allows the writer to distance himself, more or less, from his discourse, thus opening up a "negotiable space" for the reader. (Golder, 1992: 119)

What we can retain from these passages, in addition to the observations made by Bachschmidt (1999), is that in contrast to English-language rhetorical expectations about how an argument is to be constructed, French-language writers attempt to lead their readers through their argument in a way very unfamiliar to English speakers, instead proposing a co-exploration of a point of view. By more directly, or dialogically, invoking the reader in the text, the French writer will seek to create an appearance of co-negotiated meaning, rather than distancing her or himself from the argument in order to allow it to "speak for itself". The next section explores these observations in a learner corpus of graduate research papers.

### 4.2 Indexes of French argumentation strategies

Based on the published descriptions of argumentative writing at the secondary level in French, the features described above were sought in a corpus of 14 graduate student research papers from an M.A. program in technical communication and multilingual information design. For reasons discussed in the methodology section, it was assumed that the corpus would likely show features typical of argumentation learned in a French school context. Three of the papers were written in English, 11 in French. While indexes of French ar-
argumentation strategies were sought in all the research papers, for the purpose of discussion in this article, only examples from the English sub-corpus will be discussed, given what the features of these papers might have to say about difficulties in managing rhetorical expectations for native French speakers writing in English.

The following “indexes” of French argumentation and reader-writer dialogue were identified; these indexes were understood as giving voice to the concerns sketched out in the previous section. Two broad categories of indexes were identified. The first category includes those indexes which show that the writer is attempting to co-explore a point of view; the second involves those indexes which explicitly “bring the reader into” the text so as to give evidence that the writer is attempting to co-negotiate meaning, rather than impose it:

(1) Co-exploring a point of view
- Constructing a claim by presenting a series of points presented using sentence-level juxtaposition, with the claim as consequence made explicit only at the paragraph or section conclusion;
- Juggling two or more opposing claims by exploring evidence;
- Using few connectors, apart from additives and enumerators (cf. Van Bonn & Swales 2007);
- Similarly, using few transitions between sections; students instead prefer to use subheadings.

(2) Bringing the reader into the text, so as to co-negotiate meaning:
- Imperatives
- Inclusive “we”
- Modality, showing distance from claims, or caution
- Rhetorical questions

The frequency of these indexes is shown in Tables 1 and 2 below. While the first category of indexes (Table 1) includes more discourse-level elements, or “rhetorical moves”, the indexes in the second category (Table 2) include mostly morphosyntactic-level elements, apart from “rhetorical questions”, which occur at the level of discourse.

<table>
<thead>
<tr>
<th></th>
<th>Juxtaposition</th>
<th>Juggling claims</th>
<th>Few connectors</th>
<th>Subheadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>French (11)</td>
<td>9</td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>English (3)</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total (n=14)</td>
<td>12</td>
<td>4</td>
<td>10</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 1: Indexes of co-exploration
As can be seen in Table 1, whether the students were writing in French or in English, they largely adhered to the rhetorical expectations of French argument structures. This was particularly evident in their use of juxtaposition to present points to develop their claim, without linking those points using connectors or logical transitions. In fact, students largely preferred to use subheadings to indicate the relationship between different sections/ideas, often “overusing” subheadings in comparison to English-language expectations.

One exception is found in the overall very infrequent use of the move, “juggling claims”. This rhetorical move requires the writer to juggle two or more opposing claims while exploring evidence, without necessarily making the viewpoint evident or taking sides. Rather, the argument “emerges” at the end of the section as the obvious conclusion to the issue. It can be surmised that the low incidence of this type of index results from the fact that as a rhetorical strategy, it may in fact be quite complicated to master well by less experienced writers. For this reason, while it can be observed more frequently in more experienced writing (i.e., scientific publications in French), students demonstrate less of it.

Likewise, Table 2 shows the same propensities for adhering closely to the expected rhetorical and linguistic structures learned for written argument in the French school system. Students extensively used both discourse-level indexes (rhetorical questions) as well as those occurring at the morpho-syntactic level (imperatives, inclusive “we”, modality). The one exception to these tendencies is the complete absence of imperatives by the students who chose to write their research papers in English. As the students were no longer available for a follow-up interview, no insight into this difference can be offered at this time.

Table 2: Indexes of invoked reader presence

<table>
<thead>
<tr>
<th></th>
<th>Imperatives</th>
<th>Inclusive “we”</th>
<th>Modality</th>
<th>Rhetorical questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>French (11)</td>
<td>8</td>
<td>11</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>English (3)</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total (n=14)</td>
<td>8</td>
<td>14</td>
<td>13</td>
<td>9</td>
</tr>
</tbody>
</table>

One final comment about the features of the English sub-corpus is in order. It is somewhat remarkable that this group of students appeared to adhere even more strictly to French-language rhetorical expectations when writing in English than their counterparts who chose to write in French. What might be deduced from this is that writing in an additional language often causes writers to expend
more effort attending to concerns such as grammar and vocabulary. Difficulty in attending to all aspects of writing at once (grammar, vocabulary, discourse structure, genre, situation and context) may cause them to unconsciously fall back on an overreliance on their first-language discoursal and rhetorical structures. This possibility provides another potential argument for the existence of a learner’s “inter-indexicality” (Dressen-Hammouda 2016), much like her or his interlanguage (Selinker 1972).

4.3 Examples from the corpus

Examples of indexes of French argumentation strategies will be discussed in the present section, using three excerpts taken from one student’s research paper in the English-language sub-corpus.

Students enrolled in the Master’s program in technical communication and multilingual information design carry out a research project over a two-year period. In the first year, students take courses in how to carry out documentary research, formulate a research question, integrate outside sources and synthesize ideas from a variety of sources while avoiding plagiarism. At the end of the first year, they produce a 25-page research paper on a topic of their choosing, related to the field of technical communication. Over the course of the second year, they then develop their research topic by devising a relevant methodology, carrying out an empirical study, writing up their results (in a 15-page research article) and presenting them during an oral defense.

The context for the corpus described in this paper is the 25-page research paper produced at the end of the first year. The papers included in the corpus were all “first” versions, i.e., they were produced without correction by the instructor. The following excerpts and analysis are based on the research paper of a single student, who chose to focus his research project on the usability of technical illustrations for adults with autism.

In the first excerpt, taken from the introduction, the writer attempts to situate the importance of the chosen topic for his audience (cf. Swales 1990). In this passage, we can observe that the writer juxtaposes a number of points, without explicitly signposting his ideas, for example without using phrasal transitions or connectors. In fact, the only obvious attempt to link the ideas appears at the end of the excerpt (“so”, in line 9). Sentences have been numbered for convenience.
Excerpt 1. Juxtaposition of points with main claim made as a conclusion

1. Currently researchers care more about autism than a few years ago, thanks to scientific progress and disorders development.
2. The majority of works we can find is mostly about medical and psychological aspects of the autistic population. 3. Many research papers explain their brain functioning, detail their physiological features, and look into their ability to have social contacts.
4. Concerning the visual process of adults with autism, many focused on facial detection and people perception.
5. The relation between autistic individuals and their cognitive approach, and technical design is still an unknown domain. 6. The major visuals studied by professionals are educative supports. 7. These researches have helped a lot of autistic children for many years, but adults are pushed into the background. 8. The majority of people with autism lives like everyone else, but perceives the world differently. 9. So studying a support that each adult already saw once in his life can help to know whether this specific support is adapted to their needs and their understanding.

Indeed, to develop the topic in this passage, the writer relies solely on a theme-rheme progression, where sentences 1-4, 6-7, and 9 share a common thematic subject (i.e., researchers), and nearly all rhematic development refers to autistic individuals. An exception to this pattern is found in sentences 6 and 9, which refer to the specific medium used to communicate information to children and adults with autism.

The second excerpt is taken from the theoretical background section, where the writer summarizes the main points identified in the literature. In this passage, he restates the research topic (i.e., “it is important to target the types of visual design encountered by adults with autism, such as technical illustrations, in order to determine whether or not this particular mode of communication is adapted to their needs”). In this second excerpt, the writer continues to use the same development strategy as seen previously, in which a number of ideas are juxtaposed without making the logical links between ideas explicit, as can be seen in sentences 10-15 (below).

However, when the author attempts to make the case that the research topic is important (s. 16-19), we can observe the use of a second type of rhetorical strategy often found in French argumentative writing: rhetorical questions. This type of cue indexes the writer’s intention to bring the reader into the text, so as to co-negotiate the meaning being constructed:
Excerpt 2. Rhetorical questions

10The theory of information design reveals this new way of communicating, and highlights the importance of accessibility. 11Content design should be intended for everybody, including autistic people.

12For this theory, all is about presentation. 13Texts and visuals are as important as layout for a perfect information design. 14The result and the perception of message are what matter the most. 15The satisfaction, the way of thinking of the audience is crucial. 16But here is the problem. 17For designers, the audience is a neurotypical population, that is to say the majority. 18But what about minorities? 19What about autistic people?

A final type of cue that indexes a French writer’s culturally-specific relationship to the reader is the use of inclusive “we”, which is largely absent from modern scientific discourse in English (Dressen & Swales 2000). In French, inclusive “we” is often presented as the third-person impersonal “on” (e.g., “Lorsqu’on lit un livre ou un article…”). Because English lacks this morpho-syntactic category, French writers often translate it as “we”. While one might question whether this student writer really intended to use an inclusive pronoun here, his particular choice of constructions (s. 23 “in our current French culture”; s. 27 “helps us”, “makes us analyze”; s. 28 “it allows us”) reveals that he really does have an inclusive “we” in mind; in effect, these ideas would necessarily be expressed using the first-person plural pronoun “nous”, or plural adjective “notre”:

Excerpt 3. Inclusive “we”

20According to Moyer (2010), illustrators must follow another rule for creating supports. 21When we read a book or an article, we begin from the start until the end. 22We follow an order. 23In our current French culture, there are known rules, which have to be applied to technical creation. 24Indeed, images should be drawn from the left to the right, from the top to the bottom, or in clockwise direction, because it is how we read and detect information. 25But more useful is to add numbers to visuals. 26Designers must use it, plus arrows and all graphical elements which could help user understanding. 27Following these orders helps us to organize a mental process, which makes us analyze step by step the components we detect in the order of their presentation on the paper. 28It allows us to visualize how to assemble the product of a technical illustration. (Hegarty 2004)
5 Discussion and conclusion

The main point made in this paper is that it would be exceedingly difficult for a non-French speaker to grasp this writer’s message, without access to the culture-specific ways in which his ideas are constructed. Because the language used by the writer is English, however, the contrasts between French and English are made all the more explicit: French rhetorical structures are used, but in English, potentially causing them to be perceived as rhetorical violations by readers expecting English-language norms.

Clearly, language correction alone cannot fix “what is wrong” when writers write in a language that is not their mother-tongue. An English speaker may misread the text, instead seeing an apparent absence of argumentative strategies, with the text appearing more descriptive than she or he would expect in this type of rhetorical context. As a result, before attending to language concerns, one would first need to reveal and “translate” this student’s ideas before rephrasing them using expected rhetorical structures in English.

By approaching this task from the viewpoint of indexicality – and its focus on revealing “hidden”, or symbolic, sociocultural meaning – it would be possible to devise a pedagogical strategy that goes beyond grammar correction, and perhaps even beyond a comparison of French and English scientific discourse, to help writers get a better sense of why things are said or written “in that way”. Writers could thus come to better understand what is specific about the rhetorical patterns of their own language, and how they might put themselves into the “mind frame” of another culture’s rhetorical expectations.

The results of studies such as these can contribute to efforts to help technical communicators master the complexities of constructing appropriate (i.e., rhetorically “expected”) scientific and technical documents in languages other than their own.

6 References


Moreno, Ana (2010): Researching into English for research publication purposes from an applied intercultural perspective, in: Ruiz-Garrido, Miguel; Palmer-Silveira, Juan; Fortanet-Gómez, Inmaculada (Eds.): *English for Professional and Academic Purposes*. Amsterdam: Rodopi, pp. 57–71.


Starfield, Sue (2011): Doing critical ethnographic research into academic writing: The theory of the methodology, in: Belcher, Diane; Johns, Ann; Paltridge, Brian


Rule-based Machine Translation in a Student Project
Analyzing and Optimizing the Output by Means of Pre-editing the Source Text

ABSTRACT
This paper describes how machine translation (MT) is integrated into a course project in the Master's program of the International Technical Communication course of study at the Flensburg University of Applied Sciences. The students in the MA program can choose to study full-time or part-time, i.e. all courses are being taught as distance learning courses and in-class courses alternately. This concept is one of the reasons that the students are very different regarding their professional background, their age, years of working experience etc. Some students have already been working as translators for years or decades while others have just finished a BA program as a technical writer or translator, and again others have so far been working as engineers or teachers.

This aspect produces very interesting comments in the chat room and in class as well as in the results of their work and in their final reports. An observation that one can make and that can be seen as a side-effect when students who have such varying curricula and different professions who are working together is, that their view of the actual project work is fairly different as well. While technical writers nowadays focus on controlling the language prior to the actual writing process, technical translators do not have in mind that the source texts they have to use as a working basis, follow any rules at all. This may be because of the negative experiences technical translators have made in the past regarding the quality of the source texts. However, this is an additional outcome of the course and mentioned here, yet it is not intended to be examined in detail in this article.

The course project is based on the idea of combining controlled language (CL) and a pre-editing step in order to achieve an effective way to prepare contemporary technical documentation for rule-based machine translation (RBMT). I will explain what I mean by “contem-
porary” within the context of technical documentation and why this attribute plays an important role within the decision-making process to integrate CL, pre-editing and MT in the course project, which also includes practical exercises for the students. In addition, the reason why RBMT is the MT method chosen within the context of multilingual text production is explained.

1 Introduction

Over the last few decades, the number of tasks professional translators or technical writers have to fulfill during their everyday work has risen and single tasks are more complex and thus require broader knowledge. Not only the environment with regard to multilingual technology and communication systems but also international and global requirements have led to more extensive learning contexts both for translators and for writers. They all have to manage projects, define the language and terminology to be used, and they have to have knowledge of language, translation and project management software and systems. Today, technical writers not only have to be at least bilingual experts in writing well-structured technical texts, they also have to create style guides and need to know how to optimize information distribution and knowledge transfer. All this can be found in courses of study in the field of international technical communication that bring about international technical communication experts. Content that is generated and/or translated by these experts varies very much regarding the demands every author or translator, or customers, or target groups make on the output. To be able to evaluate the output and to achieve uniform results, which are necessary for objective findings, we need to work with rules that allow for generic evaluation. Within the field of technical writing and translation controlled language is one means that can be used to produce consistency and quality, and also for evaluating technical documentation. Controlled language is one aspect in the course of studies – writing technical texts without considering the fact that a subsequent translation process only works properly if the source text follows certain rules, in most cases results in texts that are of course comprehensible and readable, yet not necessarily easy to translate, neither for humans with or without computer-assisted translation (CAT) systems nor for MT systems. As this probably affects more than 70% of technical documentation that is currently being written, there has to be an ap-

---

1 According to a survey by tekom, more than 70% of the employees working in technical documentation departments are not educated technical writers. (tekom: 2013)
proach on how to interact within the translation process so that the source texts meet the language requirements of the different translation resources to be used afterwards.

2 Content of the course project

Starting with the properties of natural languages (NL), the students are given an introduction into MT systems in general, and in RBMT systems in particular, to understand how languages are incorporated in the systems and in the whole translation process. This is necessary because the students will have to experiment with the use of controlled language as a pre-edit step prior to the RBMT.

2.1 Natural languages

Natural languages have certain properties that may cause misunderstandings among the recipients regarding the intended message sent by the sender. One of the main problems with natural languages is ambiguities. Lexical ambiguities, for example, can easily be solved by defining unique terms to be used in a specific subject area. Other types of ambiguities such as syntactical, semantic or contextual ambiguities need to be revised and changed. In addition to language variants that should be avoided, various language styles may lead to a lack of understanding for the target audience.

2.2 The MT system

This section discusses why RBMT is used and why this RBMT system is Lucy LT.

Statistical machine translation (SMT) systems work with huge databases to look up whether the desired contents can be found anywhere in the databases. Nowadays, because they have been fed with numerous texts for a long time, SMT systems do find translations for sentences like the following German sentence: “Beim Zusammenbau neue Dichtungen verwenden, alte Dichtungsreste am Flansch abschaben.” In Google translate, which is an SMT system, you get a translation that reads: During assembly using new gaskets, old seal remnants scrape the flange.

This sentence is one of the sentences in the text the students, who participated in the last course, had been working with. The sentence is a very typical sentence that can be found in a technical document that deals with engines, for example. In simple terms, Google

---

2 Google translate is a service by Google Inc. providing translations for written text in many language combinations.

3 Example taken on May 20th, 2016.
Translate compares the words in the source sentence with those in the database, calculates the probability of the word order and outputs the result as shown above.

However, what does the German sentence mean? And does the translation reflect the original meaning? The source sentence consists of two main clauses separated by a comma, which is not unusual in German, especially in technical documentation. The English translation contains several mistranslated parts, which is fairly normal for machine translated texts. The main difference to the German text is that the sentence in English consists of a sub-clause and a main clause. In addition, the dependencies that are generated by this sentence structure lead to the old seal remnants becoming the subject whereas in the German source no direct subject is contained since the usage of the word abschaben does not address the reader directly.

This is only one example, yet it shows that a statistical approach is not very helpful as the system produces any target sentence. There are no linguistic rules programed in SMT systems – this means that you cannot solve known reoccurring problems by modifying the source text. The application of writing rules makes no sense and this is the reason why we have chosen to use RBMT for our course project.

The MT system used in this course project is Lucy LT. Lucy LT is a rule-based MT system with a long history. The system’s origin is METAL, a system that had been developed by the Linguistic Research Center of the University of Texas, Austin. “It was based on the interlingua philosophy and was also influenced by the then current theories of Transformational Grammar. A system for German-English translation based on these ideas was implemented during the years 1972-1975” (Whitelock, Kilby 1995: 171).

For our purpose to work with the language pair German–English the METAL system delivered the best working base; it was used until the end of the millennium at the Flensburg University of Applied Sciences. Lucy LT is the successor of METAL and the decision was made some years ago to continue using this system for course work with the students.4

A very helpful feature within the software is the so-called Scratchpad, where one can translate e.g. single sentences and display the analysis and transfer tree of the source and target sentence. This helps to understand how the translation process is performed by the system with regard to syntax rules, etc.

4 Another system that can be and is used in other scenarios is Systran Business Translator by Systran.
The following figure shows an example of an analysis tree the system generated on the basis of the following sentence: Ölsieb sorgfältig in Benzin oder Verdünner reinigen. The tree shows how the system examines sentences, word categories etc. and how the single parts are arranged together.

The following tree shows the transfer tree, that is the translated sentence as it had been generated by the system. The English sen-
entence is: *Clean oil pump strainer carefully in petrol or dilution.* This is the translation of the source sentence after some terminology was added to the system.

### 2.3 Controlled language

Technical documentation today often requires that authors need to be questioned regarding the original intended meaning of their texts. Even well written and apparently good quality texts may contain ambiguities that can only be solved by the authors themselves. In order to find a way to obtain a certain quality level, efforts have been made to define rules on how to use language, avoid ambiguities and achieve a high quality level both in the source and in the target texts (cf. Babych, Hartley, & Sharoff, 2009). There are guidelines on how to write rule-based texts in German that have been published by associations like tekom\(^5\) or one can use software like Acrolinx\(^6\) to check the correct application of controlled language.

With the focus on machine translatable source texts, we speak about controlled source languages, which are a special type of controlled languages. Modifying the source texts in this case does not take place in order to provide intelligible texts for human translators but to enable the machines to better cope with the texts (cf. Schubert 2009, pp. 134–135).

Technical writers are asked to apply CL to avoid ambiguities, inconsistencies, redundancies, and other misleading language usage that may cause problems in understanding. However, we are currently very far away from the point that the majority of technical writers apply these rules, as mentioned above. The future experts of international technical communication need to know what results can be achieved by applying CL, not only for the original texts but also for successive translations carried out either by humans or machines.

### 3 Course project scenario

Let me first introduce the target audience, i.e. the students who take part in this course. These students who are studying International Technical Communication in this Master’s program have quite varying backgrounds regarding their general knowledge of multilingual text production and translation processes as well as in their professional experience level – we have translators as well as technical writers, and so-called career changers as the Master’s program can also

---

\(^5\) Gesellschaft für Technische Kommunikation – tekom Deutschland e.V.

\(^6\) Acrolinx is a language checking program distributed by Acrolinx GmbH, Germany.
be studied part-time by people who are already working, either as employees or freelancers. What the students are supposed to gain from this course is not only knowledge about how MT systems work but also to gain a deeper knowledge of why certain properties of NL can be a problem in the source and in the target texts respectively for the source and target text audience, and how the use of CL can help to solve those problems.

**Methodology**

The course guides the students through the following steps:

a. After a short briefing about NL and CL theories and an introduction to the various kinds of MT systems in general, the students receive instructive and descriptive excerpts from a contemporary technical text (service manual or similar) in order to execute a first machine translation using Lucy LT. The subject area the technical text is taken from is not of special interest, because the dictionaries provide a broad variety of technical subject areas.

b. Then the first actual work done by the students is making entries in the dictionaries that are part of the MT system, either by replacing or by adding wrong or missing terminology within the monolingual, bilingual and transfer lexicons. Here the students enter the canonical forms, make simple lexical additions to the new terminology, e.g. by entering the word stem, affixes, etc. or by specifying the lexical category as for example AST, NST or VST for adjective, noun or verb stem. Because of the fact that we do not educate computer linguists, the work with the dictionaries should not superimpose the actual subject matter of this course.

c. After having finished the dictionary work, the students are instructed to perform another translation and to view and analyze the results. In many cases the resulting texts at this point are not comprehensible for persons who do not have the same context as the students. Some sentences are perfect and some are completely incomprehensible. The Scratchpad in Lucy LT allows the students to translate small segments of the source text and to display the analysis tree and the transfer tree where the system behavior can be followed.

d. Now, the main experimenting part begins. As mentioned above, the quality level of the translated contemporary technical texts reached so far is often poor so that the students

---

7 In the first part of the course, it is a German text, in the second part the source text is English.
now start to apply CL rules combining style and grammar to the source texts in order to achieve higher quality target texts. They shorten sentences, simplify the syntax, find solutions for various kinds of syntactical ambiguities, try out the system behavior when using transitive and intransitive verbs, avoid complex phrases and tenses, eliminate redundancies, change the grammatical gender, and so on. This experimenting step is very important for the following reasons:

– The students reduce their distance to the software in a positive way. Observations over the last years working with students have shown that they normally have great respect for computers and software.
– They learn that they are able to make changes and to interact with software.
– The students see that changing things may bring about better results.

4 The course project in practice

In this section I would like to show examples of the practical work performed by the students. The language combination relevant in this course project is German-English. As mentioned before, the students focus on modifying a given source text using CL rules in order to improve the machine translatability of source texts. The students work with the RBMT system Lucy LT; however, this work could also be done using any other RBMT system as mentioned before.

We start with step 1, the introduction to MT systems, a quick overview of traps of natural language and the start guide for using CL. This introduction is important to ensure that all students have the same knowledge level when starting the actual project.

The students get a copy of the original technical text file, examine the contents with regard to the subject matter and questions that may arise are answered within the group. After having prepared the MT system for the translation such as specifying the subject area, or making some basic language pair settings, or defining display options, the students then have the MT system translate the original source text without modifying the text in advance. The sentence used in the following section has been taken from an automotive manual but from a linguistic point of view it could be part of any contemporary technical documentation. The sentence serves as an example only.
Example source sentence:
DE: Deckel vollends abschrauben und das darunter eingesetzte Ölsieb vorsichtig herausziehen.
(Meaning: You have to screw off some kind of lid and pull out an oil strainer that is located underneath the lid.)

1st translation by Lucy LT with subject area TECH-CAR for automotive industry selected:
EN: Completely screwing off flats and pulling out the oil pump strainer fitted in under that cautiously.

We find that we have one or two minor problematic terminology components within this text:
- Deckel could be translated with flat; however, in the technical subject area it does not seem to be the proper translation.
- Ölsieb should read oil strainer only, you do not need the word pump.

The terms are probably already contained in the lexicons so that they can be adapted, or if they are new, they need to be entered into the system.

Apart from the term flat the terminology in the result is ok, yet the sentence structure and grammar is not. This leads to the decision that the first translation of the correct and understandable source sentence makes no sense.

Step 2 thus involves entering the terminology into the three dictionaries, two monolingual lexicons and one transfer lexicon. In these dictionaries the students enter the canonical forms as well as basic grammatical information like the lexical category (in this case NST for noun stem) for every term. For our sentence, in detail this means the following.

The term Deckel needs to be examined in more detail to understand what kind of Deckel is meant. Thus, the students have a look at the preceding paragraph to find out to which component of the engine the Deckel belongs. Two sentences before you can read that it is the Ölsiebdeckel. A decision has to be made whether it is allowed to say Deckel only or if the term Ölsiebdeckel should be entered in the system.

As the word Deckel is part of the oil strainer, it is best to first change the English term for Ölsieb to oil strainer (see above). Having done this, the translation of the sentence of course is the following:

2nd translation
EN: Completely screwing off flats and pulling out the oil strainer fitted in under that cautiously.

If we now say that Deckel should be simply translated as e.g. lid, the target sentence would of course be correct. However, if a subse-
sequent machine translation step into another language is planned, in that step the system again would not be able to determine the correct translation of *lid*. That is the reason why *Deckel* should be stored as *Ölsiebdeckel* with the translation *oil strainer lid*. After that has been done, the source and target sentences read as follows:

DE: *Ölsiebdeckel vollends abschrauben und das darunter eingesetzte Öl-
sieb vorsichtig herausziehen.*

3rd translation

EN: *Completely screwing off* *oil strainer lids* and *pulling out the oil strainer fitted in under that cautiously.*

At the end of this step, the students have added or replaced some terms in all three dictionaries.

We now have the correct terminology for the changed words, yet we still have the problem with sentence structure and verb usage.

At this point the real experimenting step starts. The students perform the following substeps as often as they find possibilities to make amendments to the source text without changing its intended meaning:

1. They enter the changed source text sentence by sentence again and again into the source text window of Scratchpad.
2. They have Lucy LT translate the text.
3. When the sentence has been translated, the analysis tree and the transfer tree may be used as support, when the students analyze the system behavior and their source and target texts. The students can write down all important observations, copy useful and less useful examples of the source and the target texts as well as the analysis trees into their working files so that they have something to work with and to refer to in their course reports.

The following section shows how our example sentence could be changed, i.e. pre-edited and what the results of the translations are. I speak about pre-editing here and not about applying CL, because the students are not asked to apply language rules that follow CL only, but they may also change the source to the extent that the grammar is still correct and the original meaning is retained. For every source and target sentence listed below you can read some comments referring to the meaning, language and quality that have been made during the translation procedure.

When we compare both sentences with regard to correct transfer of information for each word, we can see that the system did not

---

8 It is also possible to enter more than one sentence into Scratchpad, yet the number of characters is restricted.
recognize the German word Ölsiebdeckel as a singular word, because
the determiner is missing. The normal determiner for the singular
word is der and for the plural usage it is die. In this sentence, however,
Ölsiebdeckel is used in the accusative case so that the determiner must
be den. The German sentence then changes to:

DE: Den Ölsiebdeckel vollends abschrauben und das darunter eingesetzte
Ölsieb vorsichtig herausziehen.

The resulting English sentence is as follows:

4th translation

EN: Completely screwing off the oil strainer lid and pulling out the oil
strainer fitted in under that cautiously.

Now we have the singular form and thus one lid only. To use a deter-
miner and/or to avoid sentence structures without determiner is one
rule in the tekom guideline “Regelbasiertes Schreiben – Deutsch für
die Technische Kommunikation” (Rule-based writing – German for
technical communication) (tekom 2011: 44-45). The reasons given
for this are that sentences are easier to understand if determiners
are used, especially if the purpose is to have the texts translated into
foreign languages.

There are some more occurrences in the sentence that cannot
be declared as being translated properly by the system. The German
verbs abschrauben and herausziehen are so-called imperative usages of
the infinitive form, i.e. if a verb is used this way, the user knows that
something has to be done. This follows a CL rule that states that
instructions are to be formulated this way (tekom: 2011, 60). The
system translated the sentence using the gerund. This problem can
be easily solved because in Lucy LT there is the option “Translate in-
finitive as imperative” in the language setting parameters menu. After
having checked this option, we get the following translation.

5th translation

EN: Completely screw off the oil strainer lid and pull out the oil strainer
fitted in under that cautiously.

This setting is perfect for the German sentence structure. The only
part of the English sentence that is still not correct and seems to be
fairly confusing is fitted in under that.

If we have a closer look at the source and transfer trees, we find
that the German adverb darunter requires a pronoun in the English
sentence. In addition, because of the fact that eingesetzte is translated
using the verb fitted in, the target sentence does not only sound incor-
rect. How can this problem be solved? It cannot be solved by making
any further settings in the system. That is, the source sentence needs
to be modified so that the translation is correct both from the grammatical point of view and from the comprehensibility point of view.

At this point we can think about examining the German sentence to find out whether it follows the rules of CL or not. The German sentence we are looking at is the last modified version of the original sentence, i.e. the following:

DE: Den Ölsiebdeckel vollends abschrauben und das darunter eingesetzte Ölsieb vorsichtig herausziehen.

The sentence is not very complex; we have the conjunction *und* that coordinates two main clauses. It seems to be correct; however, it does not follow CL rules. According to the rules coordinating clauses should be avoided except for equivalent main clauses that contain instructions that are to be carried out at the same time i.e. simultaneously (tekom 2011: 53).

The consequence of applying this rule is to make two sentences out of the one original sentence. Without making any other changes, the resulting sentences will be the following:

DE: Den Ölsiebdeckel vollends abschrauben. Das darunter eingesetzte Ölsieb vorsichtig herausziehen.

The resulting English sentences translated by Lucy LT are:

6th translation

EN: Completely screw off the oil strainer lid. Pull out the oil strainer fitted under that cautiously.

We still have one problem left that is even of more importance now that we have two sentences. The adverb *darunter* which refers to anything mentioned before, now refers to a word that is contained in a main clause that is a full sentence and can now even be recognized as a full sentence. The word *it* refers to the word Ölsiebdeckel, which is quite obvious, because we only know about one sentence that is placed before the sentence in which the adverb *darunter* occurs. However, in normal circumstances complete texts consist of more than two sentences and because of the fact that references are not always easy to trace, another CL rule exists, stating that pronominal references involving more than one sentence should be avoided (tekom 2011: 36).

Human translators of course do understand to which part of the sentence the word *darunter* refers. However, machines do not have this knowledge. So the next version of the 2 sentences reads as follows:

DE: Den Ölsiebdeckel vollends abschrauben. Das unter dem Ölsiebdeckel eingesetzte Ölsieb vorsichtig herausziehen.
Rule-based Machine Translation in a Student Project

7th translation

EN: Completely screw off the oil strainer lid. Pull out the oil strainer used under the oil strainer lid cautiously.

In the new translated version it can be seen that *eingesetzt* has been translated with used, which is not correct, because the meaning of the intended information differs from that of the translation. If we look at the German word *eingesetzt* with regard to meaning, it tells us that the strainer has been fitted at that place. The Verb *einsetzen* has several meanings, so that it can be considered as ambiguous. The best solution in this case would probably be to use another verb. If we use *anbringen > angebracht* instead, we can write the following sentences:

DE: Den Ölsiebdeckel vollends abschrauben. Das unter dem Ölsiebdeckel angebrachte Ölsieb vorsichtig herausziehen.

8th translation

EN: Completely screw off the oil strainer lid. Pull out the oil strainer positioned under the oil strainer lid cautiously.

This is not ambiguous and thus better than the sentence before.

The sentence could also be changed to include a relative clause like:

Den Ölsiebdeckel vollends abschrauben. Das Ölsieb, das unter dem Ölsiebdeckel platziert ist, vorsichtig herausziehen.

This would generate the 9th translation of the sentence:

EN: Completely screw off the oil strainer lid. Pull out the oil strainer which is placed under the oil strainer lid cautiously.

There are at least 10 other possibilities to write the intended content in other words. The examples given represent only a selection.

5 Conclusion

The course project presented is intended to make the students aware of translation scenarios other than human translation or computer-assisted translation. It is supposed to introduce the students to machine translation, let them form their own informed opinion about MT by showing them how the system behaves and how an advanced human interaction may increase the quality of the outcome. Since the students are to be regarded as experts in international technical communication, they should not only have an interest in the translation process but also in the process of generating source texts of a certain quality level – depending on various factors like target audience, text type etc.

The following three statements were made by students who took part in one of the courses:

83
Student A: (Technical Writer):
At the beginning, I didn’t realize that difficulties might occur when translating a text into any other language. Thus, not being able to recognize translation problems in the source text seems to be a broad problem. So, maybe many technical writers also think like I do, that the quality of texts that are being translated using MT can only be improved by post-editing. Now, after my work of changing, trying out and having had successful as well as negative moments, I have a much better sense what translation-oriented text production means.

Student B:
Wrong wording and ambiguities may cause misinterpretation, not only for the machine but also for human translators. Technical writers are natives, however, translators who are working with the source text are non-natives.

Student C:
I was adhering to writing rules of controlled language and thought that my source text was of good quality. When analyzing the translation results it became obvious that it still contained ambiguities and other things causing problems during the translation process.

From my point of view it is a valuable side-effect that the students generate different quality levels when experimenting with the texts, so that future research in this area could probably bring up an approach to define different quality levels and to find better ways to generate multilingual text units from existing documentation on demand.

6 References
An Illustrated Technical Text in Translation: Choice Network Analysis as a Tool for Depicting Word-image Interaction

1 Introduction

Illustrations are an integral feature of technical communication. When these multimodal products are translated, translators process both verbal and visual information. Yet, translation studies have yet to assess if and how images are involved in the translator’s interpretation of the multimodal source text and, consequently, translation solutions. The study set out to test one possible method of inquiring into the effect of word-image interaction on the translators’ choices, namely Choice Network Analysis (CNA), introduced by Campbell (2000a, 2000b; Hale & Campbell 2002). CNA compares the translations of the same source text by multiple translators: Different translation solutions are collected into a network-like flowchart, which allows an empirical derivation of the options, the set of possible solutions, that were available to the translators when translating each verbal item. The data of the study consisted of translations of illustrated technical text, produced by a group of Master’s level translation students during a specialized technical translation course from English to Finnish. When applied to the data of the study, the choice networks represent the options that the multimodal source text offered for the translators. The study set out to assess if these options were based entirely on verbal information or on a negotiation of meaning from two different modes. The study is a part of the author’s forthcoming doctoral research project investigating how an illustrated technical text is processed in translation.

2 Choice Network Analysis of the translations

The source text for the translation assignment presented the illustrated operating principles of two different types of wet magnetic separation devices, concurrent and counter-current wet magnetic drum separators. The devices are used in the mining industry for ore
beneficiation and their working principle is based on the induction of magnetism. The source text, including its illustrations, was produced specifically for the purposes of this research with the help of the staff of the Geological Survey of Finland. The source text was presented as a chapter of a mining engineering text-book. It consisted of just over 500 words and two large colored images.

In order to assess just how much the visual information may guide the translation process, the relationship between the words and the images of the source text was modified in certain parts of the multimodal source text. For instance, in one section of the source text, visual information was deleted from the image: the verbal text accurately described a particular part of the operating process, but the corresponding information could not be found in the image. In two parts, the image and the verbal text were modified so that the information provided by the two was contradictory. Further, the shape of some parts of the device were modified in the image so that they no longer fully corresponded to their verbal description. The rationale behind these modifications was that the asymmetry of information might make it easier to distinguish which mode the translation student considered to be of more relevance during translation.

Examining the translations of this source text by Choice Network Analysis enabled two things: First of all, it allowed to establish which options this particular multimodal source text offered for these particular translation students. The study was interested in examining if the multimodal source text offers options that the verbal text alone does not, in other words, examining if the translation solutions seemed to be based on purely verbal information or on a negotiation of meaning from two different modes.

The analysis of the data implied that the translators processed both modes of the source text, and formed their translation solutions based on information negotiated from their combination. When translating the names of the different parts of the equipment, for instance, some of the options displayed by the choice networks corresponded to the verbal information as closely as is possible between two different languages. Yet, some of the options deviated from the verbal information to a lesser or greater degree. A comparison to the image revealed that these options, in fact, corresponded to the way the information was represented visually. The study found that visual information could modify verbal information; in the most extreme cases, visual information could cause verbal information to be disregarded altogether. All in all, the study concluded that the images were capable of reattributing the meaning of verbal items in translation.
3 Overview of the research project

Ketola’s doctoral research project examines the translation of illustrated technical texts from three different perspectives. In addition to the analysis of the translations introduced above, the project has modeled the translation process theoretically and examined how the translators themselves conceptualized the word-image interaction during translation.

The first part of Ketola’s doctoral research project (Ketola 2016) outlined a cognitively grounded theoretical framework for the translation of illustrated technical texts by examining what has been proposed about translation as cognitive activity, and comparing this with two cognitive models of illustrated text comprehension, namely the Cognitive Theory of Multimedia Learning (e.g. Mayer 2002, 2005) and the Integrated Theory of Text and Picture Comprehension (e.g. Schnotz 2005). The article proposed that, based on how cognitive studies of illustrated text comprehension have defined the way in which illustrated texts are perceived, we may assume that the input for the translation of illustrated technical texts consists of both verbal and visual information and that, consequently, the translations of these texts are built on information negotiated from the combination of two different modes.

The second part of the research project (Ketola 2015) analyzed the translation diaries – the translators’ own reflective accounts of the translation process – written during the translation assignment. The article examined how the translators themselves conceptualized the interaction of verbal and visual information during the translation process. The research approach chosen for this purpose was phenomenography, which aims to describe the different ways in which people conceptualize different phenomena (e.g. Marton 1988, 1994). The phenomenographic analysis of the translation diaries identified two distinct ways of conceptualizing the interaction of verbal and visual information: either conceptualizing words and images as an entity to be perceived as a whole, or conceptualizing words and images as competing sources of information. All in all, the analysis implied that the images were essentially involved in the translation process. The students did not relegate the images to a merely decorative role; instead, they conceptualized them as an important part of the source text, capable of amplifying, specifying and even annulling elements of the verbal source text.

The final part of the research project will combine, compare and contrast these three perspectives – the theoretical model, the analysis of the translation diaries and the analysis of the translations.
An Illustrated Technical Text in Translation: Choice Network Analysis as a Tool for Depicting Word-image Interaction

– in order to outline a preliminary model of how a translator’s interpretation of a multimodal source text consisting of both visual and verbal information is built.

4 References


A Tracking Study on Technical Content Navigation Behavior

1 Background

Digitalization and connectivity affect all aspects of our lives and all industries. The digital revolution also impacts technical communication in that it establishes a new kind of interaction between users and a product. User expectations are changing accordingly. Surveys and recent studies reveal a trend towards dynamic content delivery systems. Customers not only ask for better search capability, possibly using faceted search, they also request content on mobile devices as well as videos, audio, and animations. For example, the recent eDoc Project on the (electronic) delivery of user information carried out by tekom, revealed the users’ demand for “just in time”, context-sensitive, and individualized information. Information should be designed in a responsive manner to provide an optimal viewing and interaction experience across multiple media that mutually complement each other (Fritz & Klumpp 2015). The eDoc guideline foresees that user information will be delivered increasingly electronically across different output media, to the extent that electronic delivery will become the standard. In line with this finding, the DCL and CIDM 2015 Trends Survey observes a move from PDF to HTML publishing.

2 Pros and cons of PDFs

Some of the often-heard shortcomings of PDF (and paper) in comparison to online documentation are its limited navigation options and multimedia support as well as its low degree of responsiveness. Once designed as a world standard for long-term archiving, PDF is now more and more seen as an outdated format, mostly due to the availability of an immense variety of ways to deliver user information electronically that meets the users’ altered needs. However, despite the excellent availability of relevant technologies and the fact that people have been predicting its demise for a long time, PDF is still the most popular format used on the Web today. According to the

---

1 This article appeared previously in February 2016 in tcworld magazine with the title “Are PDFs a thing of the past?” Reproduced with kind permission by tcworld magazine.
tekom Spring Survey (Straub 2015) and the DCL and CIDM 2013, 2014 and 2015 Trends Surveys respectively, most content is still published in printed form or as PDFs delivered through the corporate website. Of course, every delivery format brings its own pros and cons. It is assumed that from a user’s perspective, reading PDFs is similar to reading a paper copy. Usability arguments in favor of PDFs are the search options, the possibility of printing on paper, the offline functionality and the large selection of PDF readers available. Cons are the dependency on the availability of a device, the risk of incorrect selection when downloading lists, and the poor responsiveness (Fritz & Klumpp 2015).

3 A tracking study

In order to gain more insight into the pros and cons of delivery formats in general and PDFs in particular, as well as into how information is gathered in a user manual, it is helpful to empirically test how users handle documentation. So far little research has been done to investigate this. To fill this research gap, we conducted an experimental study using screen tracking software to track the dynamics of users’ navigation paths through a PDF document. The objective of this pilot study was to assess participants’ viewing, scrolling, clicking and tapping behavior, their choices and lingering time and to relate the information obtained to subsequent task performance (viz. an information search task) at a later stage. Furthermore, we can learn from the navigation behavior whether participants prefer modern video formats over the more traditional PDFs to acquaint themselves with (new) technical content. Moreover, screen (inter)actions were captured to measure content usage and (re)viewing times.

4 The navigation metaphor

For our pilot study, we took the navigation metaphor as our point of departure. Following Guiard & Chapuis (2007), we assumed that users navigate over a path when they move through the 2D content space of an electronic document covered with technical information to be discovered:

Traveling one’s virtual camera in Euclidian 3D space, hovering over the flat landscape of a document, in such a way as to shift spatially and rescale one’s view of the document. (Guiard, Du & Chapuis 2007: 2)

The path is understood to be summative, i.e. the information is cumulated in time during the navigation process.
5 Research questions

We addressed the following questions that emerged from the navigation metaphor:

▪ How do users navigate through web-based technical content space while performing a typical exploration task?
▪ Which particular contents do they look at in which order and how much time do they spend lingering on those contents?
▪ Do participants prefer PDFs or videos to gather (new) technical information?
▪ Can the preliminary findings of this small-scale study confirm the latest industry trends?
▪ What can content designers learn from users’ navigation behavior to create user-friendly technical content and to guide the development of future formats?

6 Method

We set up a controlled experiment in a typical task-oriented setting of users navigating in a Web environment. The task was designed to reflect a semi-real usage scenario in line with HCI (human-computer-interaction) reality. As a test case, we took two Dutch online PDF manuals of “TV Vlaanderen”, a digital satellite television service provider for the Flanders region in Belgium. Participants could access both manuals (one for the satellite and one for the recorder) and their corresponding videos from one and the same page to assure equal visibility. Moreover, the order of the presentation of the delivery formats was randomized. The PDFs contained embedded illustrations and links to websites.

We selected twelve participants, all students at the University of Leuven in Antwerp without a technical background, and equipped them with a laptop with a headset and audio & video tracking software. They were asked to perform an exploratory information search to acquaint themselves with the content of the documentation and the functionalities of the devices. Consequently, as we asked them to follow an information-gathering approach, the viewing task was goal-oriented only to an extent. We set a time limit of 30 minutes. Once the participants had completed the task, we conducted a short post-test interview, asking questions about format preferences, technical self-confidence (Beier 2004), and user experience in order to learn about users’ subjective experiences and “joy of use”. Upon completion of the viewing task, the participants were also presented with two content questions to check whether they could memorize
highlighted content such as additional didactic information or safety-related information.

Participants’ screen (inter)actions were recorded, using the screen-capturing program Camtasia Studio. The recorded data were analyzed both manually and by using the multimedia annotation tool ELAN. It should be noted that the viewing time per page was measured as the time between two scroll movements across document pages. When participants scrolled within a single page, this was calculated as a single instance of page reading.

7 Results
The data we collected for the student participants provide a first insight into the typical content navigation behavior in relatively traditional PDF documents. What is apparent is that all participants adopted a linear reading mode, meaning that they tended to read the manual from beginning to the end, with very little direct navigation to non-adjacent sections of the text or clicking to other available resources (through links in the document). However, we also came across many instances of reviewing certain pieces of content. After they had gone through the PDF, half of the participants navigated again from the end of the document to the beginning as if they were following a breadcrumb trail. A possible explanation for this behavior might be that users tend to keep an overview and look at the document in total. This may, however, be an effect of the task design, as the participants were asked to familiarize themselves with the products by perusing the documentation (i.e. “reading-to-learn” design). Starting from a specific task or problem might generate a different reading behavior, and this will be the subject of future studies. A second observation pertains to the interaction with the available content: the participants, in general, did not interact with the textual or graphical content provided in the document by hovering over or highlighting specific segments. Again, this might be due to the task design at hand, but it seems to be a more general feature of screen-based reading.

In addition to the general observations on navigation behavior, we measured the lingering time (or dwelling time) of the participants on the separate pages of the PDF manuals. We were particularly interested in whether the participants tended to spend more time reading special points of interest in the document, such as warning messages, safety-related information, tips & tricks, and an overview of the content. We singled out five pages in the document (which had 20 pages in total) that contained this type of information, and
which were marked as such (see Figure 1 for the cover page of the manual and the five relevant pages). We then calculated the mean viewing time for each of these pages and compared them to the average length of viewing time per page for the entire document. This gave us an indication of the relative impact of such special points of interest. The findings for this first exploratory study, as presented in Table 1, reveal that only in some cases was there a significantly longer dwelling time on these marked pages, especially on the two pages referring to specific tips & tricks (p. 3 & p. 12).

Figure 1: Pages containing special points of interest

1. De inhoud van uw schotelset

- Digitale ontvanger (type varieert per gekozen set)
- Schotelantenne (64 cm)
- Duo LNB (omvangstkop)
- Startpakket (incl. smartcard, de smartcard bevat zich in de dubbele bodem van de doos van de set)
- Muurbeugel
- 20m kabel (2x20m bij complete set voor hdtv met recorder)

Installatiekit

2. Plaats van de schotel bepalen

Om het TV VLAANDEREN signaal te kunnen ontvangen, is het essentieel dat de schotel “vrij zicht” op de Astra-satelliet heeft. Houd bij het zoeken naar een geschikte plaats voor de schotel rekening met obstakels zoals in de illustratie weergegeven.

Om de richting te bepalen raden we u aan gebruik te maken van het bijgeleverde kompas. Zie ook hoofdstuk 11 en 12 van deze handleiding voor meer informatie over het plaatsen en uitrichten van de schotel.

Tip 1: Directing the satellite receiver

9. De bekabeling trekken

Verbind de kabel(s) aan de Duo-LNB. Indien u een complete set voor hdtv met recorder koopt, dient u de twee meegewerkte kabels aan te sluiten. Het andere uiteinde van de kabel(s) sluit u aan op de ontvanger naast uw televisiebeest. Voor het aansluiten van de ontvanger dient de kabel van buiten naar binnen te worden getrokken. Hiermee is de meeste van de gevol gebeurd.

Wenst u dit echter niet te doen, dan kan een tussenstuk plaatje coaxkabel een oplossing bieden. Dit maakt het mogelijk de kabel tussen ramen en deuren te draaien. De kabels zijn verstrikt bij de betere TV VLAANDEREN verkopers en in de TV VLAANDEREN workshop.

In geval van twijfel:
Door het gat in de muur van binnen naar buiten, in een scherpe hoek naar beneden. Hiermee voorkomt u dat er mogelijk vocht in uw huis binnendrongt.

Tip 2: Drilling a whole for the cable
A Tracking Study on Technical Content Navigation Behavior

Another striking (but not surprising) observation is that the second part of the second PDF the participants looked at was frequently skipped, indicating that motivation seems to decrease over time. Regarding the question of whether participants viewed the user information in an order that was different from the order in which the user information was (randomly) presented to them, our observations show that two-thirds of them made no alternative delivery format choices. Finally, the post-test interview revealed that (i) three-quarters of the content questions were answered correctly, (ii) participants displayed a clear preference for PDFs instead of videos, and (iii) fifty percent of them did not think of themselves as being competent enough to get started installing and operating the devices due to a self-attributed lack of technical aptitude.

### 8 Implications and lessons learned

Notwithstanding the rather small sample of users participating in the study, the results of this pilot study stress the importance for the technical communicator of developing effective user information. The ARCS Model of Motivational Design (Keller 1983, 1987) distinguishes four aspects of effective user information (see also Loorbach, Karreman & Steehouder 2006):

<table>
<thead>
<tr>
<th>Average overall</th>
<th>Contents</th>
<th>TIP 1</th>
<th>TIP 2</th>
<th>Warning 1</th>
<th>Warning 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.28s</td>
<td>27.12s</td>
<td>48.56s</td>
<td>44.97</td>
<td>34.49</td>
<td>20.54</td>
</tr>
<tr>
<td>p = 0.97</td>
<td>p = 0.0376*</td>
<td>p = 0.0318*</td>
<td>p = 0.27</td>
<td>p = 0.16</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Dwelling time
- Attention
- Relevance
- Confidence
- Satisfaction

First, effective user information increases the dynamics of attention and interaction so as to avoid users abandoning and giving up on the task. Second, it demonstrates the relevance of reading the documentation in that it tries to convince users of the usefulness for their purposes and to ensure continuous engagement with the task. Third, effective user information appeals to the emotions (e.g. fear, frustration) of the user and inspires his/her confidence in the task. In this way, it supports participants in feeling the confidence to get started using the product. And finally, effective user information yields greater customer satisfaction.

As motivation was shown to decrease dramatically over time, the addition of motivational elements might be useful to keep the user’s attention (Loorbach, Karreman & Steehouder 2006). Metadata such as breadcrumb trails, tags (e.g. a bookmark, a checklist) and overviews may be useful to help users find content and to make content more searchable, i.e. allow it to be found (again) by browsing or searching. Different user groups might be identified depending on the navigation patterns they follow. In this way, technical documentation may be personalized to adjust it to these different needs.

9 Conclusion

With this pilot study, we intended to provide insights into how users navigate through technical content space in order to search for and process information. We assumed that navigation behavior, keyboard and mouse usage, lingering time, viewing order, reviewing times, and the format choices made are good implicit indicators of user interest and motivation. Navigational behavior gave us information about satisfaction and engagement with the task. Viewing history and lingering time allowed for assessments of attention and relevance. The post-test interview provided us with information regarding confidence in one’s own technical competencies as well as relevance of the information.

10 References


Technical Communication Programs: Building Competencies Needed in the Workplace

1 Introduction

Working life relevance has become a hot topic in the university world in recent years. Causes for this include the massification and diversification of the higher education system, globalization, new modes of knowledge production and professional requirements, and new vocational higher education systems in many countries [1, pp. 147–149]. On the one hand, the relevance of academic skills such as information retrieval or project management in working life settings has been emphasized. On the other hand, universities are increasingly seeking close connections with working life that would enhance and diversify students’ substance know-how within a specific field as well as develop their working life skills [2, p. 73; 3]. Both of these dimensions require a clear definition of the overall competencies within a given field.

In technical communication, efforts have been made to compile a generally and internationally recognized set of relevant competencies. One important element in the building of these competencies is university–industry cooperation. In this article, we will first briefly consider the general dimensions of working life relevance and competence building in academic studies. Second, we will take a look at ways in which these dimensions relate to technical communication studies and the building of professional competencies in the field. Third, we will provide two case study examples of university–industry cooperation that support the development of professional skills and competencies from the universities of Tampere and Oulu in Finland.
2 Academic studies, working life and competence

In recent decades, orientation towards practice has become a more important part of academic study. Practical experience has increasingly been incorporated into classrooms, and higher education institutions have started defining their results of study in terms of acquired competencies rather than acquisition of knowledge. There has also been more emphasis on generic skills such as analytical thinking, written communication skills, and learning to learn [3, pp. 472–473]. At the same time, however, there has been much debate about the extent to which academic studies should prepare students for working life; what the breadth and the depth of studies should be, and what the balance between knowledge and competence building should be [3, p. 467].

The new orientation to acquired competencies has led to several efforts to define key competencies internationally for future individuals and nations overall. In addition to general key competencies, academically educated professionals are expected to possess many academic skills, such as critical thinking and the ability to use, produce and create knowledge. [2, p. 76]. These are also relevant with regard to working life, because specific to university graduates is the fact that they often end up in symbolic-analytic jobs [4], where they identify and solve problems by manipulating symbols. They may represent different types of professions, such as engineers, lawyers, teachers, and writers and editors. [2, p. 75]. A symbolic-analytic expert’s work is very varied and thus requires a wide variety of skills in addition to domain-specific knowledge: collaboration, communication, teamwork skills, ability in critical analysis, conceptualization and synthetization of knowledge, and making conclusions based on ambiguous information [2, p. 76; cf. 5]. There have also been calls to consider technical communication in terms of symbolic-analytic work: Johnson-Eilola [6, pp. 258–261] as early as the 1990s proposed that technical communicators should, for example, engage in usability research, work in distributed teams, and adopt a system thinking approach to recognize and construct relationships in large amounts of information and across different domains [see also 5].

2.1 Technical communication and competence

In technical communication, efforts have been made to compile a generally and internationally recognized set of relevant skills and competencies. Examples of these efforts include Guidelines for professional education and training of technical communicators in
Europe [7] and the Technical Communication Body of Knowledge, TCBOK [8], by the Society for Technical Communication. TCBOK offers an information map that “organizes the domains of knowledge, skills, and concepts necessary for the practice of technical communication”. The most recent effort, namely the Technical Communication Competence Framework, TecCOMFrame [9], will bring a much-needed joint competence framework, which will undoubtedly help unify and raise the profile of technical communication programs throughout Europe.

In addition to these types of projects, competencies have been developed as part of technical communication research. One example is Isohella’s [10] technical communication competency model, in which she uses general competencies as a basis for technical communication competencies. She identifies four competence areas:

- Communicative competence, for example, writing for specific audiences, information design and interviewing skills
- Social interaction competence, for example, cooperation with SMEs and co-workers, and understanding cultures
- Cognitive competence, for example, absorbing information, problem-solving, taking initiative, evaluating one’s work, decision-making and getting work done on time
- Technology competence, for example, assessing and learning new technologies, and information gathering

As Isohella notes, her model is a “one-size-fits-all model”, which takes into consideration the wide range of jobs in technical communication.

Projects and models are necessary, but we also need practical applications as to how these competencies can actually be developed [e.g., 11, pp. 121–124]. According to Tynjälä et al. [2, pp. 84–86], the development of professional expertise encompasses three elements: theoretical knowledge, practical knowledge, and self-regulative knowledge. Theoretical knowledge is universal, formal and explicit, whereas practical knowledge is acquired through practical experiences in particular cases, making it intuitive and implicit in nature. Self-regulative knowledge includes metacognitive and reflective skills. Self-regulative knowledge is developed through various mediating tools that are needed to integrate theory and practice. These tools include analytic writing assignments and group discussions, and for example, students can write a learning journal on their internships where they reflect on their work and learning [2, pp. 84–86]. To achieve a true integration of these three elements, work-based learning (WBL) periods are needed: work-based learning can take different forms, ranging from single courses with small working life projects to more com-
Technical Communication Programs: Building Competencies Needed in the Workplace

Comprehensive programs [1, p. 151, 155]. The examples we offer below cover both ends of this spectrum: the University of Tampere offers a full Technical Communications Program, while the University of Oulu offers individual, practically oriented courses in technical communication and related fields.

Many programs are just learning about work-based learning and university–industry cooperation, while technical communication programs are in an advantageous position: many of them have experience in this area, as the field has a basic practical orientation and university–industry cooperation has been a much discussed topic from early on [e.g., 12].

2.2 University–industry relationship

Several benefits of university–industry cooperation have been recorded. For example, the industry gains broad and profound theoretical knowledge, the university builds contacts with working life and develops its business awareness, and individual learners have a chance for personal development [13, pp. 445–446]. In technical communication, university–industry relationship has been a popular theme in literature, although it is not the only field in which the value of theory is discussed. However, as Savage [14, pp. 152–153] notes, it seems that in technical communication, the conflict between academic and practitioner knowledge seems to be particularly sharp. Reasons for this may include the fact that academics have little industry experience, few of them hold degrees specifically in technical communication, and most practitioners do not have formal education in technical communication. Hayhoe [15, pp. 101–102] reports on misunderstanding, distrust, and even animosity between teachers and professionals. Some teachers may think that a typical technical communicator is “an ignorant anti-intellectual”, while some professionals may think that a typical technical communication teacher is “a head-in-the clouds theorist” out of touch with the real world.

However, this gap seems to vary from country to country: while in the United States, this might be a real problem, in Finland the cooperation between university and industry has been fruitful since the beginning, that is, from the mid-1990s onwards, and reports of this type of conflict are rather foreign. However, there are many experienced practitioners working in the field with little or no training in technical communication, and these practitioners may feel disconnected from academia [16].

Kynell-Hunt [17, p. 54] acknowledges that there has been considerable programmatic shifting with more emphasis on theoretical and rhetorical issues, but at the same time the ties to industry are
strong, for example, textbooks and general methodologies take into consideration the needs of industry. Thus, it seems that university–industry relationship is a layered, culturally dependent, and multifaceted domain. To navigate in this domain, several suggestions have been put forward.

One of the problems related to this navigation is one-sidedness: technical communication programs fulfil the needs of industry, but "as a result, practitioners often just learn from academic programs about what those programs need from practitioners" [18, p. 89]. Practitioners might get the impression that they have nothing to learn from research and teaching. Programs are also doing a disservice to students, who might get skills but are not getting foundational knowledge and attitudes that could help them in building their careers [18, pp. 90–91]. Rehling [18, p. 88] advocates for the notion that academics should be equal partners in exchanges with professionals in the workplace. In order to transform the existing one-way communication channels into a dialogue, Rehling calls for empowering educators to recognize the value of what they can bring to exchanges with practitioners. Her suggestions actually pertain to regular and often used forms of university–industry cooperation, but interestingly she recognizes that these forms have the potential for a two-way effect. Rehling’s suggestions include the following:

1. When using practitioners as teachers, full-time educators can support them with pedagogy and expose them to relevant scholarship. This can assist in some of the problems involved in having practitioners in teaching roles [18, pp. 94–95].

2. Student feedback from internships and mentorships is sought in well-designed programs, for example, learners are asked to reflect on their learning experiences, and in that way, they can contribute to curriculum development. In addition, however, feedback could also be given to workplace supervisors about their workplace practices and roles in training new technical communicators, although as Rehling [18, p. 95] notes, this is a delicate proposition.

3. The use of advisory boards and alumni associations: graduates can help improve the workplace and act as a bridge back to the academy [18, pp. 95–96].

Tynjälä et al. [1, pp. 159–160] also call for a deeper understanding of the knowledge construction processes and dialogues that take place when students and workplace trainers interact. There is a need for large-scale surveys where we can identify employers’ needs, aims and expectations concerning work-based learning and university cooperation.
3 Forms of university–industry cooperation in Finland

Before we go into the forms of university–industry cooperation in Finland, we will first set the scene by briefly discussing the current state of the technical communication field in Finland. This will be done through a recent PhD study [16] and an online survey conducted by the Finnish Technical Communications Society (STVY) [19] in the autumn of 2015. The PhD study is based on three sets of semi-structured interview data, while the online survey had a total of 52 questions, both fixed and open-ended, and all together, 72 respondents from all over Finland.

3.1 Features of technical communication in Finland

The field of technical communication has been relatively established in Finland since the IT boom of the 1990s [20, p. 1; 16]. Although the way the work is organized within specific institutions varies a great deal [e.g., 21, p. 103], there is still enough common ground enabling us to look at technical communication as a field. According to both Virtaluoto [16] and the STVY survey, Finnish technical communicators are content producers [cf. 22, p. 12; 23, p. 124], who typically produce content in English for the needs of the export industry. Global trends, such as outsourcing, offshoring and structured content management [11, p. 116; 24, p. 44] are also visible in the lives of Finnish technical communicators. User instructions for consumer products are increasingly becoming crowd-sourced [cf. 22, pp. 22–23], and gaining entry into the field has become more difficult in recent years due to cutbacks and the general state of the Finnish export industry.

According to the STVY survey, the typical Finnish technical communicator is:

- Between 41 to 50 years of age (46% of the respondents)
- Experienced, with over 10 years of work experience (54% of the respondents)
- Female (70% of the respondents)
- A university graduate with a degree in the humanities (84% of the respondents)

While the majority of Finnish technical communicators has a university degree, 47% of the respondents have no formal education specifically in technical communication. Although the hardware industry has gained ground in recent years [16, p. 47], the software industry is still the largest employer of technical communicators with 43% of the respondents working with software products [cf. 24, p. 21]. The
decline of traditional technical communication posts and the rise of the content management approach has resulted in calls for developing the field in a more sustainable direction: for example, content strategy [e.g., 11, p. 8; see also 5, 16]. Despite the extensive work experience of Finnish technical communicators, however, content creation is still the main focus for 54% of the respondents [cf. 23, p. 124]. Out of the respondents, 61% use structured documentation tools, 75% also create images, and 48% create video clips in addition to textual content.

It is often argued that in order for technical communication to reach the status of a fully-fledged profession, the required education, skills and competencies must be standardized [e.g., 25, p. 310; 22]. The contents of technical communication education, however, have traditionally been quite diversified [e.g., 25, p. 320], and, as discussed above, the connection between formal education and working life has not been very strong [11]. This was also evident in Virtaluoto’s [16] study, where the technical communicators interviewed had learned their profession through practice and had not had much formal training in the field, and thus felt disconnected from academia [cf. 25, p. 310]. On the other hand, there are few full-time positions available in the educational sector, so experienced practitioners do not return to universities to do research and teach future generations [20, p. 4]. This further distances practitioners from academia. Forms of university–industry cooperation are needed to bridge these gaps.

In Finland, technical communication is taught in three Universities – Tampere, Oulu and Vaasa – all of which have organized their study programs independently [cf. 25, p. 320]. While they share some components, the overall scope differs greatly: Tampere offers up to 45 ECTS of studies in the Technical Communication Program; Oulu currently offers individual courses in Information Design, Translation, and Planning and Managing Information Projects; and Vaasa offers a Master’s Degree in Technical Communication. In the following, we will present two practical examples of university–industry cooperation: Case 1 from the University of Tampere with several forms of cooperation, and Case 2, which focuses on the contents of a practical, work-based information design course offered at the University of Oulu, where close ties with the industry are also in place.

3.2 Case 1: University of Tampere
The University of Tampere has trained technical communicators since 1997. The one-year Technical Communications Program (40–45 ECTS) is a minor subject in the Degree Program of English Language, Literature and Translation. Students in the degree program
can take the TC program as part of their Master’s degree. The program comprises nine courses:
- Technical communication and information design
- Technical writing (separate courses for English and Finnish)
- Visualizing documentation
- Programming for technical communicators
- Structured documentation and DITA
- Internship
- Technical communication book examination
- MA thesis seminar

In addition to the basic program, several extension studies programs for the unemployed and those at risk of becoming unemployed have been organized over the years. Recently, the university has also introduced the idea of integrated courses: professionals in the field can take the same courses as basic students for a fee. The initial experiences from this type of cooperation have been very encouraging.

Since the beginning, the Technical Communications Program has been carried out in close cooperation with industry partners. In the following, we will introduce the different forms of cooperation that we have used over the years.

- **Advisory board.** We have an advisory board with 3–5 representatives from industry, some of whom are our university alumni. The use of advisory boards can give strong support in designing programs and they can also help to establish internships and employment opportunities for students [26, p. 279]. The advisory boards are also a way to increase dialogue advocated by Rehling above.

- **Industry and alumni teachers.** Our full-time staff is responsible for teaching over half the courses, but especially for tools training, we use practitioner lecturers. This ensures that students get up-to-date training and in-depth use of tools in the workplace. The teachers also share their stories about their career paths and help students network into the field. As suggested by Rehling, our full-time staff is closely involved in designing the courses, for example, in selecting course materials and deciding on evaluation methods.

- **Company visits.** Once or twice a year we organize excursions to companies where the students get to see the actual work environment of technical communicators and can network.

- **Internship.** After finishing the other courses, students’ knowledge and skills are put to the test in a three-month internship. After the internship, students write a report where they describe the company and the projects in which they have been involved, assess their own strengths and weaknesses, share and evaluate the
employer’s feedback, and finally, assess the knowledge and skills that the Technical Communications Program has given them. In terms of Rehling’s suggestions, the feedback loop back to industry is not there, although the sharing and evaluation of the employer’s feedback is perhaps a step in the right direction. The internship is one application of experiential learning theory [27]: “a learning strategy providing a bridge that can link the theoretical to the practical by combining experience, perception, cognition, and behavior” [26, p. 282]. Therefore, it is a powerful example of work-based learning. In Tynjälä et al.’s [2, p. 85] terms, the internship report is a mediating tool that develops self-regulative knowledge in the knowledge and problem domain specific to technical communication.

- **Master’s theses.** During their internship, students may find a topic that is suitable for their Master’s thesis. It can be related to a problem in the documentation process or the usability of documentation, for example. Thus, the thesis is tailor-made for the company, which can support the student in different ways in completing their thesis. A thesis that is done in cooperation with a company is a prime example of the building of expert knowledge by “theorising practice and particularising theory” as Tynjälä et al. [1, p. 154] put it.

- **Cooperation with the Finnish Technical Communications Society (STVY).** The Finnish Technical Communications Society is a key actor in the technical communication field in Finland. It promotes the profession and the field, enhances professional, national and international cooperation and provides training (STVY) [19]. We have networked with the STVY since the beginning of the program in different formats. The most important form of cooperation is being involved in the organization of the society’s yearly seminar: if the seminar is organized in Tampere, our university offers the facilities and, in exchange, the students participate in the seminar for free and include it as part of their course-work. Students network in the seminar in various ways: they have presented posters, marketed themselves in the stands, and given presentations on their Master’s thesis topics. Thus, we are taking research into the field and creating dialogue between universities and industry.

- **Company projects.** In addition to the higher-level forms of cooperation presented above, we have had numerous company projects as part of course-work over the years. As part of company projects, students have done the following, for example: current state analysis and documentation assessment, informa-
tion architecture development, style guide development, and the creation of personas. Projects are a good example of work-based learning practices.

All of these forms of cooperation are intended to address the achievement of the types of competencies that were included in Isohella’s list above. For example, completion of the Master’s thesis develops cognitive competencies such as problem-solving skills, decision-making skills, knowing what is relevant, and project management skills. Company projects enhance all competencies: communicative competencies (e.g., information design), social interaction competencies (e.g., interviewing, collaboration), cognitive competencies (problem-solving, evaluating) and technology competencies (e.g., information gathering). The higher-level forms of cooperation such as the advisory board, alumni teachers and STVY cooperation overall support networking and the building of relevant and up-to-date substance expertise.

3.3 Case 2: University of Oulu

Technical communication has also been taught at the University of Oulu since the boom years of the 1990s. Unlike Tampere, however, the course contents and availability at Oulu have varied over the years on the basis of, for example, the budgetary situation and the availability of experienced instructors. All along, technical communication has been a minor subject within English Philology, either as a full 25 ECTS package, a 25 ECTS self-study package, or — currently — as a collection of individual courses enhancing the competencies discussed above in relation to Isohella’s article.

On the basis of graduate feedback, the current job market in the Oulu area favors a wide set of language, communication and project management skills not limited to technical communication as such. At the University, where resources for establishing completely new study lines are scarce, there is a need to build the teaching of technical communication, information design, visual design and project management into the current course offering, so that taken together, these courses would offer a relevant study package for future language professionals at the workplace.

The 5 ECTS course Information Design is an example of the type of working life-based courses English Philology is currently developing at the University of Oulu. While the University has struggled with the availability of experienced instructors in the past, the current instructor has over 15 years of practical experience in technical communication and end-user training and holds a PhD in English Philology, which makes it possible to combine a practical orientation
with the latest research in the field. Like Tampere, Oulu also collaborates with the STVY to help students network outside their immediate circles and to provide students with industry feedback. The Information Design course contents cover text accessibility, information design and technical communication. Closely related fields, such as audience analysis and usability, are also explored. The course is a very practical, problem-based look into the work of a language professional, and industry expert and company visits are incorporated into the course to strengthen working life relevance and the students’ connections to the industry already during their studies.

A portfolio of information products is created during the course. The portfolio —ranging from information leaflets to marketing materials, press releases and small-scale user guides — can then be used as a work sample when applying for work in the field; employers regularly request such samples as part of the recruitment process. Even experienced practitioners may have challenges in providing relevant samples, as the documents they have been working on are often proprietary and not available to audiences outside their previous workplace. The aim is to offer a realistic perspective into life outside the university. One of the course assignments is a real-life assignment used in the recruitment process of a Finnish IT company, and the course also contains a component for creating a successful Curriculum Vitae. Together with the STVY, a workshop for updating student CVs is arranged during the course; the students submit their CVs for a review conducted by recruitment professionals and ideas for improvement are then discussed together. Each student also gets individual feedback.

The course assignments have resulted in actual customer projects: for example, the Oulu City website was updated based on a usability study done during the course. At the end of the course, students write a final report, which summarizes what they have learned, allows them to self-assess and offers the instructor feedback for continuously developing the course. The feedback received so far has been very favorable.

4 Concluding remarks

As discussed above, academic programs in technical communication must build general academic skills and competencies in addition to the specific skill set needed at the workplace. One of the aims of academic education is to change and challenge existing practices – its focus is on transformation instead of the mere renewal of existing practices [e.g., 28, p. 6]. This means that while university–industry
cooperation is a necessary element in any technical communication program, the contents of such programs cannot be solely focused on the current needs of the industry. In addition, academic education is relatively stable — the current education system in Finland allows five years for a Master’s degree — while the needs of the industry are in constant flux and also vary from one workplace to the other. This is why technical communication programs must be focused on durable skills and knowledge instead of, for example, specific tool-related skills, which will be obsolete by the time the graduate reaches the workplace [24, p. 47].

In the literature, there has been a call for professionalizing the technical communication skill set instead of the fixed titles or positions in technical communication: focusing on the kind of symbolic-analytic work discussed above, instead of our traditional product-focus [25, p. 321; 5]. In fact, many of the competencies currently taught in technical communication programs — for example, problem-based approaches, audience focus or usability — are transferable skills, which can be applied in any situation. On the other hand, in a practically oriented field such as technical communication, the only way to develop the field in a meaningful direction is to anchor the educational programs to the real-life needs and possibilities of practitioners in the workplace. The practical instruction in our academic technical communication programs has been greatly appreciated by the graduates and their future employers alike: the hands-on experience and industry connections established during studies are invaluable when looking for work. It seems that a balance of academic and practical goals can be reached without sacrificing one for the other.

5 References


1 The project’s background

In 2015, a project entitled TecCOMFrame, to develop a common academic qualification and competence framework for technical communication, received EU funding under the Erasmus+ program. The project is coordinated by tekom Europe, and involves partners from universities in eight European countries.

This paper introduces the project by explaining the background and requirements. It provides an overview of the work the project team has competed to date, followed by a discussion of the team’s challenges and strategies. It concludes with a brief outline of the next steps.

1.1 Why a framework is needed

Because technical communication is quite a new field of work (relative to traditional professions) and because it is a niche occupation, it does not have a prescribed curriculum in most European countries. Technical communication is sometimes characterized as a field that anyone with a knowledge of grammar and an interest in technology can join. Many individuals do so without undergoing specialized training. The number of graduates in technical communication is below the demand of the labor market, as studies by tekom reveal (tekom, 2015). There is a constant demand for technical communicators. In Germany, in the manufacturing sector, technical writers account for 1.3% of all employees while in the software sector this figure is 3.3%. Because there is a shortage of graduates in technical communication, companies hire graduates from related study programs such as translation or engineering.

The range of activities that technical communicators may be involved in is expansive, and can include: writing, editing, information design, user experience, research, marketing, training, programming, translation, web design, instructional design, and myriad related tasks.
Many researchers (Spilka, 2010; Johnson-Eilola and Selber, 2012) agree that in fact the role is expanding further due to technology. The technical communicator’s environment—whether public or private sector, and whether manufacturing or software—will also influence the role requirements. Therefore, technical communicators are likely to find that the role differs, sometimes quite substantially, from workplace to workplace. Thus, when they change jobs, they often have to upskill or retrain. A further complicating factor is that technical communication intersects with other related fields, including translation and localization, instructional design and e-learning, and web development.

In short, technical communication is a broad field in which professionals with different backgrounds work on a variety of activities. To provide the industry and individual technical communicators with an overview of all competencies that a professional working in the field of technical communication may possess, tekom developed a Cross-industry Competence Framework for Technical Communication that “describes the occupational profile and potential job profiles in technical communication”\(^1\). This framework makes stakeholders aware of how broad the field is and which types of training are needed. It is primarily meant for the industry to define job profiles and to learn what training can be offered to employees to enable them to develop relevant competencies. Individual technical communicators may use the framework to decide for themselves how competent they are, or whether they should develop new competencies.

This Cross-industry Competence Framework is vocational in nature and strictly organized according to the information product development process. This framework is not focused on competencies that should be taught in higher education programs in technical communication. Since there is a shortage of graduates in technical communication, it was decided to develop a complementary framework with a different focus and scope. This new framework is focused on describing the full range of competencies that technical communicators with higher-level educational qualifications should master. Based on the description of all relevant competencies, standard curricula could be developed.

In September 2015, a project, coordinated by tekom Europe, was launched. This project aims to develop TecCOMFrame (Technical Communication Competence Framework) and a number of prototypes of curricula.

---

1 See: [http://competences.technical-communication.org/](http://competences.technical-communication.org/)
1.2 The project partners

The project is part of the Erasmus+ program in the area of Strategic Partnerships KA2: Cooperation for Innovation and the Exchange of Good Practices and as such is co-funded by the European Union. By assigning the Erasmus+ project to tekom Europe, the European Union underscores the importance of establishing additional higher-education programs in technical communication across Europe. The project started in the autumn of 2015 and it will continue for three years, until September 2018. The management and coordination of the project is undertaken by tekom Europe.

In addition to the moderator and coordinator from tekom, the primary partners in the project are eight university lecturers and researchers from eight European countries. Table 1 shows their names and the universities they are affiliated with.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Contact person</th>
</tr>
</thead>
<tbody>
<tr>
<td>tekom Europe e.V.</td>
<td>Daniela Straub</td>
</tr>
<tr>
<td>tekom Europe e.V.</td>
<td>Anke Neytchev</td>
</tr>
<tr>
<td>KU Leuven</td>
<td>Birgitta Meex</td>
</tr>
<tr>
<td>Hochschule Karlsruhe – Technik und Wirtschaft</td>
<td>Sissi Closs</td>
</tr>
<tr>
<td>University of Limerick</td>
<td>Yvonne Cleary</td>
</tr>
<tr>
<td>Uniwersytet Szczecinski</td>
<td>Zygmunt Drazek</td>
</tr>
<tr>
<td>Universitatea Politehnica Bucuresti</td>
<td>Voichita Ghenghea</td>
</tr>
<tr>
<td>Université Paris Diderot – Paris 7</td>
<td>Patricia Minacori</td>
</tr>
<tr>
<td>Universiteit Twente</td>
<td>Joyce Karreman</td>
</tr>
<tr>
<td>Aarhus Universitet</td>
<td>Jan Engberg</td>
</tr>
</tbody>
</table>

Table 1: Project partners

Some of these universities have offered programs in technical communication for many years, while others are working to establish programs in technical communication or to offer courses in technical communication that are incorporated into other, related study programs. Therefore, this project brings together lecturers with different levels of integration of technical communication programs in their universities to share their experiences and their ideas on study programs in technical communication.

These eight partners and the project coordinators meet regularly; face-to-face meetings are organized four times a year and web meetings are organized when needed. The partners present their progress at conferences organized by tekom and at other conferences related to technical communication. In a later phase of the project, the partners will organize multiplier events to share the project results. Conferences and multiplier events also offer opportunities to meet other partners in the project: e.g., other European institutions for
higher education, and stakeholders from industry and service companies. These stakeholders can provide feedback on the framework, not only in person, but also through surveys.

Input from these stakeholders is considered to be highly valuable. It is impossible to build a competence framework without knowing precisely which competencies industry and service companies consider most important for contemporary technical communicators, and also what their expectations are for the future. It is also impossible to formulate new curricula without knowing how current curricula across Europe look, and without knowing why these programs are successful or how they should be adapted or improved.

1.3 The main objective, the output and the impact

The main objective of the project is to develop several prototypes of curricula in technical communication that are based on the common academic qualification and competence framework (TecCOMFrame). The first stage of this project involves development of the TecCOMFrame. This framework will consist of descriptions of all competencies that are useful for technical communicators who are educated at higher levels.

Based on the TecCOMFrame four prototypes of curricula for higher education institutions will be developed. The TecCOMFrame will also be the main input of a competence and qualification profiling tool. This tool may be comparable to the profiling tool that is part of the Cross-industry Competence Framework for Technical Communication. The tool can be used by multiple target groups. Technical communicators can use the tool to define which competencies they already have and which they have to develop, while companies can use the tool to define which competencies they should expect from technical communicators, and from higher education institutions. In addition to developing a profiling tool based on the framework, the TecDocNet Guideline will also be updated based on insights developed during the project. Both the profiling tool and the new TecDocNet Guideline will be published at the end of the project, in autumn 2018.

The framework, the prototypes of curricula, the new TecDocNet Guideline and the profiling tool should combine to have a positive effect on the collective understanding of the profession and its requirements. The results of this project are expected to increase the number of study programs in technical communication, and conse-

---

subsequently, the number of graduates in technical communication. The next section outlines the requirements of this project.

2 How to meet the requirements of the framework

The academic qualification and competence framework needs to meet several requirements so that it can serve as a solid basis for developing curricula and can be transformed into a profiling tool.

Firstly, the framework needs to be developed using a justifiable, comprehensible methodical procedure. To define the content of the framework, empirical and iterative data gathering techniques are used. The first step is that the primary partners in the project discuss which content elements should be included in the framework. Subsequently, other stakeholders comment on the partners’ decisions and offer feedback. Based on this feedback, the partners adapt the content and ask other stakeholders again for their comments, in an iterative process. The content should be described in a systematic, comprehensible way; the established and widely used Bloom’s Taxonomy of Educational Objectives in the cognitive area (Bloom et al., 1956) is used to formulate the learning outcomes.

A second, important requirement is that the characteristics and demands of academic training are taken into account; the aim is to develop prototypes of curricula that could be implemented at higher education institutions throughout Europe. This requirement implies that the framework should be focused on competencies related to a broad scope of disciplines and in-depth knowledge and skills within the subject areas. Since the field of technical communication changes rapidly, the framework should include competencies that are responsive rather than fixed, and that can be used in creative, innovative ways to adapt to the role as it changes. Technical communicators who have a university degree should also be prepared for a management role and management tasks. Therefore, the framework needs to include competencies related to management (strategic abilities and knowledge, for example). Apart from competencies that are specifically related to the field of technical communication, general academic competencies should also be included in the framework. These include: profound theoretical knowledge, the ability to use theoretical knowledge to justify choices in practice, the ability to apply research methods, and the ability to reflect and evaluate within the area of work. Because all primary partners are working at universities, they will be able to judge whether the framework meets these requirements. However,
it is also important that stakeholders who are affiliated with other higher education institutions provide feedback on the framework and the prototypes of curricula.

The third requirement is related to the previous one: the framework should have the potential to become a European-wide standard. Therefore, it should be consistent with current European concepts and tools, such as the levels defined in the European Qualifications Framework (2016):

The European Qualifications Framework (EQF) is a translation tool that helps communication and comparison between qualifications systems in Europe. Its eight common European reference levels are described in terms of learning outcomes: knowledge, skills and competencies. This allows any national qualifications systems, national qualifications frameworks (NQFs) and qualifications in Europe to relate to the EQF levels. Learners, graduates, providers and employers can use these levels to understand and compare qualifications awarded in different countries and by different education and training systems. The competence framework should cover the higher EQF-levels, 5, 6 and 7. EQF-level 5 corresponds to the level of a specialization within another study program in higher education. EQF-level 6 refers to the knowledge, skills and competencies that are taught within a study program at bachelor level. EQF-level 7 corresponds with a study program at master’s level. So, the framework will provide the basis for deriving curricula for Bachelor, Master and specialization studies, e.g. for translation and engineering. The highest EQF-level (8) corresponds with a study program at PhD level. This level will not be covered by the framework. It may be included in a later version, but given the current level of development, it is more important to focus on bachelor and master study programs. The number of these programs should increase, before defining PhD programs.

The fourth requirement is that the framework offers a complete overview of all competencies that may be useful for a technical communicator with a higher level of education. The framework should be: comprehensive, showing the full scope of potential relevant teaching disciplines and covering all relevant topics. Not all technical communicators may necessarily need to possess all described competencies and higher education institutes do not need to include all competencies in their curricula. Technical communicators, industry and higher education institutes must be able to select competencies that are useful in their specific situation or from their specific viewpoint. The prototypes to be developed within this project serve as examples of selections of a coherent set of competencies. To ensure that the framework will of-
fer a complete overview, the primary partners, who all have different backgrounds, will include a broad set of competencies. In addition, by soliciting feedback from a variety of stakeholders, the framework can become inclusive and comprehensive.

Another requirement is that the framework should be user friendly; higher education institutions, students and professionals in technical communication, and in related fields, should be able to use this framework effectively and efficiently. The framework should be consistent in its terminology, generic in its content, and easy to understand on an international level. It is the primary partners’ responsibility to ensure that the competencies are well-formulated and easy to comprehend.

Finally, the framework should be useful for industry. The framework should enable students to achieve high-level qualifications and become employable and it should reflect the qualification needs of the industry, resulting in high employability for students. To meet this requirement, it is very important that stakeholders in industry provide feedback at several junctures during the development process of the framework. The next section of this paper describes the first steps towards the development of the framework and the results of those first steps.

3 Towards a first draft of the framework: state of the art

3.1 The topics/subjects relevant for academic training in technical communication

The first step towards a framework was to define the main subjects of relevance when studying technical communication at an academic level, together with the general competencies related to each subject. The project team strived to compose a comprehensive list. At present, the preliminary, unordered list consists of 24 subjects (see Table 2). The project team is aware of many shortcomings: some topics are rather broad, others are rather narrow; some topics may have to be merged, others may need to be split up. Additionally, it is not yet clear which topics are core to technical communication and which are less central. In the second half of 2016, the project team will review the list carefully and will additionally use stakeholders’ feedback to refine and finalize the list.
<table>
<thead>
<tr>
<th>Topics</th>
<th>Short description of the general competencies a technical communicator must have</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Academic research methodology</td>
<td>Understand and be able to apply the types of academic research methods and approaches that are typical in this field</td>
</tr>
<tr>
<td>2 Corporate communication</td>
<td>Understand the basics of corporate communication to provide good services to companies</td>
</tr>
<tr>
<td>3 Document management</td>
<td>Be able to manage large numbers of documents (different types, versions and formats)</td>
</tr>
<tr>
<td>4 E-Learning</td>
<td>Be able to develop and evaluate e-learning modules</td>
</tr>
<tr>
<td>5 Engineering</td>
<td>Understand the basic concepts of engineering disciplines</td>
</tr>
<tr>
<td>6 Ethics and philosophy</td>
<td>Be aware of the ethical implications when making decisions on how to develop technologies and the accompanying information</td>
</tr>
<tr>
<td>7 Evaluation of user experience</td>
<td>Understand and apply concepts of evaluation to create information products that are usable and that result in a positive user experience</td>
</tr>
<tr>
<td>8 Foreign languages</td>
<td>Be able to communicate in other languages than the mother tongue</td>
</tr>
<tr>
<td>9 Generic competencies</td>
<td>Be able to communicate effectively and efficiently with people with varied functions, roles and levels of knowledge</td>
</tr>
<tr>
<td>10 Info-mining</td>
<td>Be able to collect, analyze and select appropriate information to design an information product</td>
</tr>
<tr>
<td>11 Information architecture</td>
<td>Be able to ensure that information is retrievable and accessible, presents a cohesive mental model and is consistent across products and media</td>
</tr>
<tr>
<td>12 Information management</td>
<td>Be able to manage and to overview large amounts of information</td>
</tr>
<tr>
<td>13 Information product development</td>
<td>Be able to select among product development strategies in order to develop appropriate information products for different purposes and audiences</td>
</tr>
<tr>
<td>14 Information technology</td>
<td>Know about hardware and software that is used in technical communication</td>
</tr>
<tr>
<td>15 Interculturality</td>
<td>Be sensitive to differences between cultures</td>
</tr>
<tr>
<td>16 Management</td>
<td>Be able to manage projects, to work with multiple sources of information in the enterprise, and to strategically compete and cooperate with others</td>
</tr>
<tr>
<td>17 Multilingual workflow</td>
<td>Be able to manage communication processes across languages and cultures</td>
</tr>
<tr>
<td>18 Publishing</td>
<td>Understand the process of publishing an information product and the different stages within this process</td>
</tr>
<tr>
<td>19 Quality assurance</td>
<td>Understand quality assurance principles and strategies in order to implement appropriate quality processes and to manage projects well</td>
</tr>
<tr>
<td>20 Standards and regulations</td>
<td>Know the laws, standards and regulations that are relevant for technical communication in order to provide correct information</td>
</tr>
<tr>
<td>21 Technical writing</td>
<td>Understand the concepts of writing styles, writing concepts and writing outputs; and to adopt varied approaches strategies, depending on the context</td>
</tr>
<tr>
<td>22 Terminology</td>
<td>Understand the basic principles and methods of terminology science</td>
</tr>
</tbody>
</table>
### Topics

| Short description of the general competencies a technical communicator must have |
|---|---|
| **Training design** | Understand principles and theories of instructional design to apply these in a systematic way to ensure that the training will be effective, efficient and satisfying |
| **Visualization and design** | Be able to design visual aspects of information products, as part of the overall design process of information products |

#### 3.2 The sub-topics

The project team has also defined related general competencies in addition to the main subjects. Figure 1 shows a complete description of one of the subjects. It is followed by an explanation of each component.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Idea behind</th>
<th>Overall competencies to gain</th>
<th>Sub subjects</th>
<th>Skills / Knowledge to acquire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visualisation and design</strong></td>
<td>Visualisation and design of information products is part of the overall design process of information products; next to text, visuals and</td>
<td>Understand concepts on visualisation and information design</td>
<td>Concepts on visualisation and information design</td>
<td>Understand Gestalt principles; Understand semiotics; Understand visual rhetorics; Understand theories of colour use</td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Technical communicators need to be able to design the figures and pictures, the lay out, and all other visuals aspects of information products, as</td>
<td>To be able to design for different media</td>
<td>Print media design</td>
<td>Apply guidelines on typographies; Apply guidelines on lay out; Design tables and diagrams; Design infographics; Create photographs; Create screenshots; Apply guidelines on safety notes and warning messages</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>The discipline focuses on how to design the visual aspects of several types of information products.</td>
<td></td>
<td>Webdesign</td>
<td>Apply guidelines on typographies; Design tables and diagrams; Design infographics; Create photographs; Create screenshots; Design navigational structure; Apply guidelines on safety notes and warning messages; Design animations</td>
</tr>
</tbody>
</table>

For each of the main subjects, sub-topics are defined and the skills and knowledge that should be acquired related to these subjects are also described. These descriptions are systematic and follow a prescribed format. In Figure 1, the first column identifies the subject, Visualization and design. The next column (Idea behind) states why the subject should be included in the curriculum. The next column states how the learner will use the knowledge gained (Overall competencies to gain). The fourth column divides this subject into sub-subjects, and the fifth column outlines the specific skills that the learner...
acquires for each sub-subject. This model is applied for each of the 24 subjects.

The draft outlined above was presented at the European Academic Colloquium in Berlin in 2016. Attendees at the colloquium offered feedback on the draft. In addition, feedback is currently sought from “silent partners”: practitioners in industry, alumni of technical communication academic programs, managers, and other stakeholders. This feedback will inform revisions. The next section outlines the main challenges encountered in the project to date, and the steps taken to overcome them.

4 Challenges and strategies

As is evident from the foregoing discussion, this project is timely and important. It will help to build a solid academic and curricular basis for the growing field of technical communication. The project has presented some challenges for the partners and coordinators. These challenges relate to: project scope; communication; and institutional and programmatic differences.

4.1 Project scope

Technical communication emerges as a very broad discipline, without a unique definition or agreement on the role requirements, and the competencies needed to execute the role. Therefore, the scope of the TecCOMFrame project is also by definition extensive. The challenge is to develop a framework which is inclusive, usable, and comprehensive. The first draft (developed and presented in May 2016) includes a very broad range of competencies. It is necessarily wide-ranging to include as many competencies as possible. There are also, of necessity, some overlapping areas, which will be reduced and cross-referenced as the framework develops.

As outlined in Section 1.3, the group is charged with completing a very ambitious set of tasks over the three-year timeframe of the project. Because this project is co-funded by the European Union, deliverables, key milestones, and deadlines are non-negotiable. Missing deadlines or failing to produce the required outputs would have serious repercussions. To help overcome this challenge, the group is very fortunate to have a moderator and a coordinator, who have the best overview of the entire project and help partners to stay focused on the project goals and outputs. Tasks are also divided among the group to ensure that no member is overburdened. In many cases, two or more partners work on aspects of the project together to ensure a shared understanding of the tasks. Partners work on tasks outside of
the designated meetings. The next section explains communication strategies within the group, and some inherent challenges in communicating virtually.

4.2 Communication

All project teams have to establish and maintain clear and effective lines of communication to ensure a successful outcome. Adopting and maintaining effective communication strategies is an essential step in ensuring that a project is successful. One significant challenge relating to communication for the TecCOMFrame partners is the limited time to meet face-to-face to work on the project. The project team meets face-to-face for two-day meetings, four times per year. To date (June 2016), three such meetings have taken place. The meetings facilitate discussion and ensure deeper understanding of the requirements, as well as providing time to develop and agree on strategies, and to plan the next steps. The face-to-face meetings have been supplemented by seven web meetings to date (with an additional two meetings scheduled before the end of June, 2016). GoToMeeting—an online web meeting tool that facilitates audio and video communication—is the tool used for web meetings. Web meetings enable partners to outline and progress the work completed between face-to-face meetings. Figure 2 shows a screenshot of one web meeting, when partners were preparing the presentation for the European Academic Colloquium.

Figure 2: Web Meeting, April 11th
Communicating using synchronous technologies like GoToMeeting can be challenging, because team members all need to be available at the same time, and may need to accommodate time differences, as well as infrastructure limitations and occasional technical faults. In addition, such tools can never fully compensate for the richness of face-to-face meetings. Additional asynchronous information and communication technologies (ICTs) support the work. For example, email is used to share information and for administrative tasks, and TeamDrive is used to share resources, such as documents and spreadsheets. These tools are typical of those used for communication in global virtual teams (Shachaf, 2008).

The language used for meetings is English. Although this is the mother tongue of only one project partner, language has not been a barrier to communication. While cultural differences have not adversely affected the work of the group, there are differences in approaches to communication, decision making and consensus building, for example.

4.3 Institutional and programmatic differences

A further challenge relates to the multiple perspectives of the partners and how to reconcile these. As outlined in Section 1.2, this project involves a diverse group of academics, from eight countries. Some partners already run technical communication academic programs, while others are in the process of establishing curricula. Each partner has individual, professional, pedagogical, and cultural beliefs which inform approaches to, and beliefs about, technical communication education. At times, the heterogeneity of the group has slowed progress. For example, a question was raised about the place to give to translation/localization in the TecCOMFrame. Some partners decided to only mention it since the two activities are contiguous. The European Union launched a European Master of Translation program (EMT) to stimulate the increase of quality translator education. The EMT set of competencies does not overlap with the TecCOMFrame. Translation/localization and technical communication are related but not identical disciplines that should therefore develop different frameworks (though it may be very enriching for the two professions to have a good cross-knowledge of their activities to give feedback about the documentation for quality sake).

In the main, the range of experience has had a very positive influence on discussions, and will ultimately make the final framework more comprehensive, inclusive and robust.

During the first project meeting, each partner who runs an academic program offered a brief outline of its content. This activity
highlighted the many commonalities, but also divergences, in approaches to teaching technical communication and designing curricula. No one existing program is archetypal; each has a unique emphasis. Furthermore, each institution has slightly different approaches to program design, duration and delivery. This situation is typical. Yeats and Thompson (2010) found from a survey of 142 technical communication programs in the United States that there is no ‘representative’ curriculum.

In terms of institutional differences, each university has its own academic calendar which makes the task of organizing meetings everyone can attend challenging. Each institution has different requirements for program development and there are some differences in duration also. However, using the European Framework of Qualifications (described in Section 2) gives the project a structure and focus which is institution-independent.

5 The next steps

A draft of the framework was finalized and presented at the European Academic Colloquium for Technical Communication in Berlin in April 2016. Following the presentation, colloquium participants discussed sections of the framework of interest to them. (The whole framework draft was too large for individuals or groups to analyze in the one-hour timeframe allotted to the activity.) Partners also gathered feedback from individuals during this session. Additional presentations at subsequent conferences and events have yielded additional data about the draft framework. The team is committed to gathering feedback from additional stakeholders such as academics in other institutions, industry partners, and alumni.

Ongoing quality assessment activities are based on the feedback gathered to date. For example, feedback from the colloquium contributed to discussions during the subsequent two-day project meeting and this feedback was also incorporated into tasks assigned to partners following that meeting. Each partner is currently reviewing categories within the framework, partly based on feedback from the colloquium.

Based on the feedback, the initial draft will be revised (for example, by adding missing topics or sub-topics; and by reducing or removing overlapping topics, or creating cross-references). The next major milestone is completion of the first draft by September 2016, during the next two-day meeting in Stuttgart. The project group will continue to disseminate findings and to present the project at appropriate venues.
6 References


About the Authors

**Prof. Dr. Geert Brône** is a research professor at the Department of Language & Communication of the University of Leuven (Antwerp campus). His research focuses on multimodal text and interaction analysis, cognitive linguistics and psycholinguistics.

**Prof. Dr. Dacia Dressen-Hammouda** is Associate Professor of English for Specific Purposes at Blaise Pascal University in Clermont-Ferrand, where she heads the M.A. program in Information Design & Multilingual Technical Documentation. She teaches undergraduate and graduate courses in Technical Communication and Information Design. Her current research areas include indexicality and the cultural situatedness of writing, the discoursal construction of expertise, and the effects of intercultural exchange on the construction of appropriate voice. Her forthcoming book is called Learning the genres of geology: The role of indexicality and agency in the emergence of situated writing expertise.

**Anne Ketola** is a Ph.D. candidate in the School of Language, Translation and Literary Studies at the University of Tampere, Finland, and a member of the MULTI (Multimodality in Translation and Interpreting) research group, investigating the role of multimodality within translation studies. Her doctoral thesis examines the interaction of visual and verbal information in the translation of illustrated technical texts. She is also a co-author of the forthcoming monograph *Revoicing Picturebooks* (together with Riitta Oittinen and Melissa Garavini), examining the role of visual information within picturebook translation.

**Prof. Dr. Ralph Krüger** is Professor of Language and Translation Technology at the Institute of Translation and Multilingual Communication at Technische Hochschule Köln (Cologne University of Applied Sciences), Germany. Ralph holds a PhD in translation studies from the University of Salford, UK. His main research interests include the usability of translation technology, the supporting and controlling influences of translation technology on the LSP translation process and the cognitive situatedness of the LSP translator. Prior to joining academia, Ralph worked as in-house translator for a major German translation agency.

**Tytty Suojanen** is Senior Lecturer at the University of Tampere, Finland, and she has a Lic.Phil. and an M.A. in Translation Studies with a specialization in Technical Communication. She has been the head of the Technical Communications Program at the Uni-
versity of Tampere (http://www.uta.fi/ltl/en/tc/introduction.html) since 1997, and is currently finishing her Ph.D. on the interaction of users and writers in user instructions of Finnish household appliances from 1945 to 1995. Her research interests include technical communication history, user instructions as genre, usability, and user-centered translation (Suojanen, Koskinen & Tuominen 2015: User-Centered Translation, Routledge).

**Jenni Virtaluoto** is a University Lecturer at the University of Oulu, Finland, and she holds a Ph.D. in English Philology. Her dissertation *Technical communication as an activity system: a practitioner’s perspective* can be accessed at urn.fi/urn:isbn:9789526209371. She is a Board Member of the Finnish Technical Communications Society with over 15 years of practical experience in technical communication.

**Prof. Maurizio Viezzi** is professor of simultaneous and consecutive interpreting from English into Italian at the University of Trieste (Italy) and adjunct professor of Italian translation and interpreting at the University of Turku (Finland). He has published extensively on different aspects of translation and interpreting and lectured in several European and non-European universities. He was President of the European Language Council from 2013 to 2015 and is currently President of CIUTI (Conférence internationale permanente d’Instituts Universitaires de Traducteurs et Interprètes).

**Marion Wittkowsky** is a lecturer in the Department of International Technical Communication at the Flensburg University of Applied Sciences in Germany since 2007. She teaches courses in technical writing, technical translation, and applied computer linguistics. Prior to her position at the University she worked as a technical translator, project manager and finally as a business unit manager at a language service provider. A major focus of her translation work was post-editing the machine translation of SAP release notes.
Review Board Members

**Prof. Sissi Closs** is Professor of Information and Media Technology at the Karlsruhe University of Applied Sciences and CEO of C-Topic Consulting. She is one of the leading German experts in the field of technical communication. She is an internationally well-known lecturer and consultant for XML and information architecture. Sissi Closs has defined the class concept method® for developing flexible frameworks for Topic and Link classes®. As a specialist for topic-based structuring, she belongs to the DITA pioneers and has designed and implemented the first DITA implementation in Germany at Deutsche Post. She is also the author of a number of books about single source publishing, topic-based structuring, and mobile documentation.

**Prof. Dr. Birgitta Meex** is an Assistant Professor of German Linguistics and Organizational and Technical Communication at the Arts Faculty of the University of Leuven (Antwerp Campus). She is a certified trainer in technical communication (tekom), a founding member of tekom Belgium and the Secretary of tekom Europe. Her research is inspired by the desire to incorporate the disciplines of multimodal discourse analysis and cognitive linguistics. She has published research articles in the fields of cognitive semantics, corporate communication as well as technical and medical communication.

**Prof. Dr. Michael Meng** studied German linguistics and psycholinguistics at the University of Jena and the University of Edinburgh. After completing his PhD on syntactic analysis during reading in 1998, he worked as technical writer and later on as department manager Documentation and localization for a local software company. In 2012, Michael Meng was appointed professor for applied linguistics at Hochschule Merseburg (University of Applied Sciences) where he now teaches courses on text analysis, text production and cognitive psychology in the B. Eng and M. A. programs on Technical Communication.

**Prof. Dr. Klaus-Dirk Schmitz** is Full Professor of Terminology Studies at Technische Hochschule Köln in Germany. His teaching and research activities focus on terminology theory and terminology management as well as on software localization and computer tools for translators. Numerous articles and books where he acts as author, co-author and editor show his excellent expertise in these fields. Prof. Schmitz has also taken a leadership role in national and international forums e.g. as president of the International Information Centre for Terminology In-
foterm (2001–2009), vice-president of the German Terminology Association, chairman of the German Standards Committee on Computer Applications in Terminology and member of several advisory boards.

**Prof. Dr. Klaus Schubert** is a Professor of Applied Linguistics/International Specialized Communication at the University of Hildesheim (Germany). He was a sociolinguist at the University of Kiel (Germany), a computational linguist and project leader at the Research Department of the Software House BSO/Buro voor Systeemontwikkeling BV in Utrecht (Netherlands) and a consultant and technical manager at BSO/Language Technology BV in Baarn (Netherlands). For many years he served as a Professor of Computational Linguistics and Technical Communication at Flensburg University of Applied Sciences in Flensburg (Germany). Main research areas: Applied Linguistics, Translation Studies, Specialized Communication Studies, Interlinguistics.
tekom Publication Program

As of December 2016. The current publication program can always be found on the tekom WebPortal at www.tekom.de/publikationen.html.

Proceedings of the European Academic Colloquium on Technical Communication

Proceedings of the European Academic Colloquium on Technical Communication, Volume 4, 2016 (English)
17 x 24 cm, 137 pages, paperback, 2016. ISBN 978-3-944449-46-3

Proceedings of the European Academic Colloquium on Technical Communication, Volume 3, 2014 (English)
17 x 24 cm, 96 pages, paperback, 2015. ISBN 978-3-944449-44-9

Proceedings of the European Academic Colloquium on Technical Communication, Volume 2, 2013 (English)

Proceedings of the European Colloquium on Technical Communication, Volume 1, 2012 (English)

Brochures

Michael Fritz / Jens-Uwe Heuer-James / Jörg Michael / Roland Schmelting / Matthias Schulz:
Normenkommentar zur EN 82079-1 „Erstellen von Gebrauchsanleitungen“

Guideline Rule-Based Writing – English for Non-Native Writers (English edition)

Leitfaden Betriebsanleitungen
Jens-Uwe Heuer-James / Roland Schmeling / Matthias Schulz:  
**Leitfaden Sicherheits- und Warnhinweise**  

**Leitlinie Regelbasiertes Schreiben –**  
**Englisch für deutschsprachige Autoren**  

**Guide to Mobile Documentation** (English edition)  

**Leitfaden Mobile Dokumentation** (German edition)  

**Leitlinie Regelbasiertes Schreiben –**  
**Deutsch für die Technische Kommunikation**  
ISBN 978-3-9814055-9-0

Michael Fritz / Jens-Uwe Heuer-James / Jörg Michael /  
Roland Schmeling / Matthias Schulz:  
**Normenkommentar zur EN 82079-1**  
„Erstellen von Gebrauchsanleitungen“  

Benedikt Kraus / Klaus-Dirk Schmitz / Ilona Wallberg:  
**Purchase of translation services – A guide**  
(English edition)  

Benedikt Kraus / Klaus-Dirk Schmitz / Ilona Wallberg:  
**Leitfaden Einkauf von Übersetzungsdiensleistungen**  
(German edition)  

**Leitfaden Lieferantendokumentation**  

**DITA in der Technischen Kommunikation –**  
eine Entscheidungshilfe zum Einsatz  
ISBN 978-3-9814055-5-2
Studies

Klaus-Dirk Schmitz / Daniela Straub:

**Erfolgreiches Terminologiemanagement im Unternehmen**

(German edition)
ISBN 978-3-9812683-5-5

Daniela Straub / Wolfgang Ziegler:

**Effizientes Informationsmanagement durch spezielle Content-Management-Systeme**
ISBN 978-3-9812683-4-8

Klaus-Dirk Schmitz / Daniela Straub:

**Successful Terminology Management in Companies**

(English edition)

Michael Fritz / Michael Grau / Daniela Straub:

**101 Kennzahlen für die Technische Kommunikation**

Anthology on Technical Communication

edited by Jörg Hennig and Marita Tjarks-Sobhani

Volume 1 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):

**Verständlichkeit und Nutzungsfreundlichkeit von technischer Dokumentation**

Volume 2 Carl-Otto Bauer:

**Rechtliche Anforderungen an Benutzerinformationen**

Volume 3 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):

**Qualitätssicherung von technischer Dokumentation**
Volume 4 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Informations- und Wissensmanagement für technische Dokumentation

Volume 5 Stefan Zima:
Kommunikation in der Technik – Motortechnik und Sprache

Volume 6 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Lokalisierung von Technischer Dokumentation

Volume 7 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Visualisierung in der technischen Dokumentation

Volume 8 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Technische Kommunikation – international
Stand und Perspektiven (German edition)

Volume 9 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Technical Communication – international
Today and in the Future (English edition)

Volume 10 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Aus- und Weiterbildung für Technische Kommunikation

Volume 11 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Usability und Technische Dokumentation

Volume 12 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Terminologiearbeit für Technische Dokumentation

Volume 13 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):
Arbeits- und Gestaltungsempfehlungen für Technische Dokumentation
Eine kritische Bestandsaufnahme
Volume 14 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Multimediale Technische Dokumentation**  

Volume 15 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Veränderte Mediengewohnheiten – andere Technische Dokumentation?**  

Volume 16 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Technische Kommunikation im Jahre 2041 – 20 Zukunftsszenarien**  

Volume 17 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Zielgruppen für Technische Kommunikation**  

Volume 18 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Content Management und Technische Kommunikation**  

Volume 19 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Technische Kommunikation und mobile Endgeräte**  

Volume 20 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Gesetze, Urteile, Normen, Richtlinien Regelungen für die Technische Kommunikation**  

Volume 21 Jörg Hennig / Marita Tjarks-Sobhani (Ed.):  
**Terminologiearbeit für die Technische Kommunikation**  
2., grundlegend überarbeitete Auflage  

At this time, Volumes 2, 12 and 13 are out of print.  
(As of December 2016)
University Publications
edited by Jörg Hennig and Marita Tjarks-Sobhani

Volume 1 Peter Stadtfeld:
Didaktische Kriterien zur Strukturierung von Bedienungsanleitungen
Eine exemplarische Analyse von Software-Bedienungsanleitungen

Volume 2 Anneke Bosse:
Der Umgang mit Fachausdrücken in Betriebsanleitungen für Personenfahrzeuge
Darstellung und Bewertung fachexterner Vermittlungsstrategien

Volume 3 Sandra Knopp:
Aufbau, Gestaltung und Struktur von Online-Hilfesystemen
Im Kontext der Mensch-Computer-Interaktion

Volume 4 Ralf Geyer:
Evaluation von Gebrauchsanleitungen
Testverfahren und ihre praktische Anwendung

Volume 5 Martin Riegel:
Technische Kurzanleitungen
Eine Entwicklungsmethodik zur nutzergerechten Gestaltung

Volume 6 Christian Bartsch:
Die Verständlichkeit von Software-Hilfesystemen
Eine sprachwissenschaftliche Analyse am Beispiel von Microsoft Word 2000

Volume 7 Anja Edelmann:
Hypertextbasierte Softwaredokumentation
Eine experimentelle Untersuchung zur Rezeption
Volume 8 Müslüm Çap:
Maschinelle Übersetzung auf dem Prüfstand
Die Evaluierung von Personal Translator 2002 Office Plus Englisch

Volume 9 Werner Schweibenz:
Computerterminologie als Benutzungssbarriere.
Eine Studie über die Benutzbarkeit von Online-Hilfeinformationen in Microsoft PowerPoint

Volume 10 Cornelia Kühn:
Handlungsorientierte Gestaltung von Bedienungsanleitungen

Volume 11 Sven Pieper:
Vertrauen in Technik durch Technische Kommunikation

Volume 12 Clemens Schwender (Ed.):
Technische Dokumentation für Senioren

Volume 13 Viktoria Klemm:
Verwendungssituation und Textgestalt
Analysen von Betriebsanleitungen für Personenkraftwagen

Volume 14 Michael Fritz / Claus Noack:
Die Gesellschaft für technische Kommunikation e. V. – tekom
Entstehung und Entwicklung eines Berufsverbandes

Volume 15 Ulrich Bühring / Clemens Schwender:
Lust auf Lesen
Lesemotivierende Gestaltung Technischer Dokumentation
ISBN 978-3-944449-45-6
Volume 16 Jürgen Muthig (Ed.):
*Standardisierungsmethoden für die Technische Dokumentation*
ISBN 978-3-944449-35-7

Volume 17 Anna Astapenko:
*Lokalisierung komplexer Softwaresysteme*  
Technik – Sprache – Kultur  

Volume 18 Monika Reck:
*Internationale Kundenanforderungen an die Technische Dokumentation von Produktionsmaschinen*  
Eine Studie zum erhöhten Kundennutzen durch verbesserte Betriebsanleitungen  

Volume 19 Sonja Broda:
*Mobile Technische Dokumentation*  
Studie zu Einsatzmöglichkeiten mobiler Endgeräte in der Technischen Dokumentation  

Volume 20 Regina Janke:
*Anforderungen an die Terminologieextraktion*  
Eine vergleichende Untersuchung der Bedürfnisse von Terminologen, Technischen Fachübersetzern und Technischen Redakteuren  

Volume 21 Elin Judith Knoll:
*Barrierefreiheit von Software mittelständischer Unternehmen Analyse und Entwicklung eines Testverfahrens*  

Volume 22 Viktor Frei:
*Sprachstandardisierung in der Softwaredokumentation*  
Eine Untersuchung von redaktionellen Richtlinien und Schreibregeln  
Volume 23 Nina Baderschneider:
Die Komplexität der Gebrauchsanweisung
Ein textgrammatisches Analysemodell

Volume 24 Christopher Kurz:
Translatorisches Qualitätsmanagement
Eine Untersuchung der Übersetzungsdienstleistungsnormen
DIN EN ISO 17100 und DIN EN 15038 aus übersetzungspraktischer Sicht

At this time, Volumes 1, 2, 3, 4 and 10 are out of print.
(As of December 2016)