UNIVERSITAT ROVIRA I VIRGILI

# THE ROLE OF REVISION IN ENGLISH-SPANISH SOFTWARE LOCALIZATION

**Graciela Massonnat Mick**

GRACIELA MICK

# THE ROLE OF REVISION IN ENGLISH-SPANISH SOFTWARE LOCALIZATION

DOCTORAL THESIS

**Supervised by Dr. Anthony Pym**

Intercultural Studies Group

PhD program in Translation and Intercultural Studies

**Universitat Rovira i Virgili, Spain**

Department of English and German Studies

Tarragona 2015

# Abstract

The main task of this empirical research project is to explore the Spanish translation revision/review process of three software solutions developed by Siemens PLM Software Inc. We will focus our attention especially on the role of Spanish in-country reviewers or revisers as one of the main agents for localized output. The in-house translator and in-country reviewer team is emerging as a concept of interest to researchers, language teachers and translation practitioners. Translation revision efforts are becoming increasingly more relevant in a software localization scenario. The main research questions in this project are: Does the Spanish version communicate what the English does? Why do some Mexican customers prefer to use the English-language software applications? To evaluate the language appropriateness and functionality of the user interface of the PLM software products in the Spanish-localized versions, we conducted a detailed language evaluation of sixty UI segments translated and revised by in-house translators and in-country reviewers respectively. The data analysis indicates that translation and language errors were corrected during the revision stage. Furthermore, an electronic assessment questionnaire was completed by a select group of Siemens PLM software Spanish-speaking customers. The evidence from the survey instruments suggests that the localized version of the user interface reads fluently and naturally. However, the main statistical difference between the source and the target text was found in the number of functional errors. For this reason, some Spanish-speaking end-users actually switch to the English version of the software solutions. And finally, to identify which language version is most used by Mexican customers we collected and analyzed a number of problem reports submitted by our application users during a six-month period. The evidence from the problem reports suggests that the number of PRs is low for that particular time frame and that there is no indication of any functional issues. The research findings should have important implications for the practice of software translation revision and for raising awareness that localization is a team effort involving more players than just translators and revisers.

*Keywords*

Software localization, translation revision and review, in-house translators, in-country reviewers, product lifecycle management software, UI segments, errors, problem reports

UNIVERSITAT ROVIRA I VIRGILI

Professor Anthony Pym
President European Society for Translation Studies
URV. Av. Catalunya 35
43002 Tarragona, Spain
anthony.pym@urv.cat

September 20, 2015

I hereby certify that the present study *The Role of Revision in English-Spanish Software Localization*, presented by Graciela Mick for the award of the degree of Doctor, has been carried out under my supervision at the Department of English and German Studies of the Rovira i Virgili University, and that it fulfills all the requirements for the award of Doctor.

# Acknowledgements

I would like to thank Prof. Anthony Pym for his patience, expertise, encouragement, advice, support, dedication and innumerable hours spent on this project.

I also want to thank Christian Redmann (Director of the Localization Department for Siemens PLM Software Inc.) for his diligence in obtaining the necessary permissions that allowed me to contact the Siemens Spanish-speaking customers and invite them to participate in the survey questionnaires.

Eurídice Aviléz (Siemens Mexico) and Aurea López (Siemens Spain) for their collaboration in obtaining the list of Spanish-speaking end-users.

I am extremely thankful to Madir Mabbott and Lindsay Sandhurst (Siemens United Kingdom), survey managers in England, who patiently taught me how to use the internal survey tool.

Advice given by Dale Honeycutt, Joel Boechers, and Valerie Stoehr has been of great help in writing the electronic survey questionnaires.

And finally, my completion of this thesis would not have been accomplished without the data provided by the Siemens PLM Spanish-speaking customers who participated in the surveys.

# Table of contents

# List of tables

# List of figures

# List of abbreviations

| | |
|---|---|
| ANOVA | Analysis of Variance |
| ANSI | American National Standards Institute |
| ASQ | American Society for Quality |
| ASALE | Asociación de Academias de la Lengua Española |
| ASTM | American Society for Testing and Materials |
| ATA | American Translators Association |
| BEA | Bilingual Education Act |
| BLS | Bureau of Labor Statistics |
| BOM | List of Materials |
| CA | Computer Associates |
| CAD | Computer-aided Design |
| CAE | Computer-aided Engineering |
| CAM | Computer-aided Manufacturing |
| CAT | Computer-assisted Translation Tools |
| CAx | Computer-aided Technologies |
| CEN | European Committee for Standardisation |
| CEO | Chief Executive Officer |
| CERF | Common European Framework of Reference for Languages |
| CGSB | Canadian General Standard Board |
| cPDM | Collaborative Product Data Management |
| CRT | Cathode Ray Tube |
| CUC | Computer User Company |
| DEC | Digital Equipment Corporation |
| DG | Directorate-General |
| DGT | European Commission's Directorate-General for Translation |
| DIN | *Deutsches Institut für Normung* |
| EC | European Commission |
| EDS | Electronic Data Systems |
| EN | European Norm |
| GILT | Globalization, Internationalization, Localization and Translation |
| GPS | Global Positioning Systems |
| GUI | Graphic User Interface |
| HD | High Definition |

| | |
|---|---|
| HT | Human Translation |
| HTML | Hypertext Markup Language |
| IBM | International Business Machines |
| ICE | In Context Exact Match |
| ICR | In-Country Reviewer |
| IDC | International Data Corporation |
| i18n | Internationalization |
| IMF | International Monetary Fund |
| ISO | International Organization for Standardization |
| IT | Information Technology |
| LCD | Liquid-crystal Display |
| LIP | Linux Information Project |
| LISA | Localization Industry Standards Association |
| LOC | Lines of code |
| LOV | List of Values |
| LSP | Language Service Provider |
| l10n | Localization |
| MS | Microsoft |
| MT | Machine Translation |
| NASA | National Aeronautics and Space Administration |
| NASA JPL | NASA Jet Propulsion Laboratory |
| OS | Operating System |
| PC | Personal Computer |
| PE | Post-Editing |
| PLM | Product Lifecycle Management |
| PR | Problem Report |
| QA | Quality Assurance |
| QC | Quality Control |
| QE | Quality Evaluation |
| RAE | *Real Academia Española* |
| RAND | Research And Development |
| ROI | Return On Investment |
| SAGE | Semi-Automatic Ground Environment |
| SBR | Software Bug Report |
| SDC | Systems Development Corporation |

| | |
|---|---|
| SDL | Software and Documentation Localization |
| SDRC | Structural Dynamics Research Corporation |
| SE | Solid Edge |
| SICAL | *Système canadien d'appréciation de la qualité linguistique* |
| SMT | Statistical Machine Translation |
| SPR | Software Problem Report |
| ST | Source Text |
| SYSTRAN | System Analysis Translator |
| Tc | Teamcenter |
| 2D | Two-dimensional |
| 3D | Three-dimensional |
| TM | Translation Memory |
| TPS | Translation Service Provider |
| TQA | Translation Quality Assessment |
| TQM | Total Quality Management |
| TS | Translation Studies |
| TSP | Translation Service Provider |
| TT | Target Text |
| UI | User Interface |
| UGS | Unigraphics Solutions |
| UN | United Nations |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UOM | Unit of Measure |
| URL | Uniform Resource Locator |
| US DOL | United States Department of Labor |
| US/USA | United States of America |
| VOC | Voice of the Customer |
| WIP | Work in Progress |
| XML | Extensible Markup Language |

# Chapter 1: Introduction

"The process of translating comprises in its essence the whole secret of human understanding of the world and of social communication."

Hans-Georg Gadamer (1975: 497)

## 1.1. Overview

This thesis addresses professional translation revision policies and practices in a localization environment. We will detail how and why this process is implemented and why it is significant in conveying the right information in the Spanish-localized version of three software products developed by Siemens PLM Software Inc., thus enabling the end-user to operate those programs properly.

Unilingual or monolingual revision (also known as 'review') and bilingual or comparative revision (or simply 'revision') complement each other in a localization project. The function of translation revision as used in this paper is 'business', that is, a most comprehensive procedure for ensuring the effective usage of the Spanish localized software as a way of determining success or failure (Mossop 2010: 109-110).

We hope this case study will not only shed some light on translation revision issues but also assist in discovering the main causes of problems and finding workable solutions in both localization and didactic settings.

This chapter examines the complexity of product lifecycle management software applications in the global marketplace. It briefly explains the importance of localization for thousands of businesses and millions of users around the world. It also introduces the translation and revision processes within a localization scenario. The statement of the problem, and the research questions are presented later in this chapter.

## 1.2. Product Lifecycle Management (PLM) Software

At the very core of any PLM system lies the concept of sustainable development, considering that our planet's resources are limited: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report 1987: 54). Product

Lifecycle Management (PLM) software applications "provide a framework for companies to manage all their products across their lifecycles, since companies tend to design and produce different products" (Stark 2005: vi). These applications are used by hundreds of organizations and employees operating in different industries all over the world. PLM software applications offer teams from different companies the ability to work together in a more dynamic and effective way (ibid.: vi). Digital programs provide manufacturers from across the globe with benefits such as reduced product costs, fast new product introductions, better quality products, increased revenue, and more accurate data, while allowing them to compete in a global market (Van Kooten 2010: 2).

Our research is based on the translation revision and review practices implemented in the flagship software products developed by Siemens Product Lifecycle Management Software Inc., a business unit of the Siemens Digital Factory Division based in Plano, Texas, US, with 71,000 customers worldwide. We will analyze and discuss those practices through examples extracted from both the English and the Spanish-localized versions of NX™, Solid Edge® and Teamcenter® software products. Solid Edge®, NX™ and Teamcenter® are trademarks or registered trademarks of Siemens Product Lifecycle Management Software Inc. or its subsidiaries in the United States and in other countries. Due to space constraints, we will be using the abbreviated forms: SE (Solid Edge®), NX (NX™) and Tc (Teamcenter®).

The capabilities of these industrial software applications enable engineers and designers to create digital prototypes comprising thousands of parts and components. Digital prototyping is a new approach to how to design, develop, visualize, simulate, and make changes in a product rapidly and cost-efficiently. Besides enormous cost savings, this method translates into productivity improvements and reductions in cycle life times for all corporate customers.

NASA JPL (Jet Propulsion Laboratory) relied on the Siemens integrated software solutions to design the Mars Rover spacecraft that landed on Mars on August 6, 2012, "after an eight month, 350 million mile journey with an amazing descent through the Martian atmosphere and landing in the Gale Crater … a crucial step in NASA's plan for a future manned mission to Mars, ca. 2030" (Grindstaff 2012b: 3). NX solutions were used to "design, develop, simulate, test and build the spacecraft named 'Curiosity' along with Teamcenter to provide product and process information management" (ibid.: 3). In the words of Charles Grindstaff, CEO of Siemens PLM

Software Inc., "[t]he collaborative methodologies developed by JPL provide a fine example of our HD-PLM vision at work, helping our customers make smarter decisions that result in better products – which, in turn, lead to a much higher probability of mission success" (2012a: 5). This implies that 1) to translate NX and Teamcenter is not the same as changing one file format into another: NX is a tool for designing very highly complex 2D and 3D models that help manufacturers improve productivity, bring innovative products to markets faster and reduce costs; and 2) one must be particularly aware of the difficulties that the terminology in these programs poses for translators, revisers and industry experts in a localization setting.

### 1.3. Relevance of this study

It is anticipated that the findings of this research might be of interest to the following stakeholders:

1. For translation researchers, practicing translators, these findings should add some empirical knowledge about translation revision and review processes in the localization industry.
2. For corporations, knowledge about the issues that affect translation quality might bring about changes in organizational policies to better serve the specific needs and goals of their customers.
3. For Language Service Providers (LSPs), the data in this research might lead to implementing a better workflow between their freelancer translators and their corporate clients.
4. For colleges and universities, the findings of this research may shed some light on important areas of translation revision, review and technical education. In other words, it could point to what curricular changes, if any, need to be made in content and design in order to meet the corporations' demands for software translators, revisers, and reviewers, both in-house and freelance.
5. For application users, our findings might help them understand the difficulties that must be overcome in any software localization project and realize that when languages are being translated, it means that they are being preserved.

In general, we hope that this study helps enrich our readers' knowledge of their own language and culture as well of those of others.

### 1.4. Limitations of this study

User interface text, online help, user or technical documentation and tutorials or courseware, graphics, and audio files (captions) are the main components of most software localization projects. For purposes of this study, we will analyze and evaluate both the English and the Spanish-localized user interface texts of the flagship products developed by Siemens PLM Software Inc. However, the other components will remain outside the scope of this research. Additionally, any error related to layout and/or formatting, font size, truncation, spacing or alignment of the digital text is not our concern herein. It should be mentioned that software testing, which is difficult due to the complexity of any software product, is not covered in this thesis.

### 1.5. Thesis structure

The remainder of this thesis is organized as follows: Chapter 2 presents a general historical background of the computer, software, and localization industries, as well as a summary of the agents involved in the localization process: translators and revisers. Chapter 3 reviews previous research about the main key elements of this thesis: the role of translation revision in a localization environment, types of translation revision and error. In Chapter 4 we formulate our hypotheses, analyze our research design and operationalization methods making use of both qualitative and quantitative tools. Chapter 5 explains the results obtained from three different sources: electronic survey questionnaires, the analysis of revised UI content and problem reports. In Chapter 6 we test the hypotheses proposed and the presents a discussion based on the major findings of this thesis. And finally, Chapter 7 summarizes the main conclusions and offers recommendations for future research that emerged from this thesis.

### 1.6. Statement of the problem

Despite the time dedicated to translation revision and review processes by both in-house translators and in-country reviewers of the Spanish-localized versions, the number of Mexican customers who prefer to use the Siemens PLM Software English-language versions remains high. In Spain, however, there is a larger group of customers that uses the Siemens PLM Spanish-localized language applications in their daily work. It should also be noted that our products are localized into ‘standard’ Spanish for use in Spain and in North, Central and South American countries. Other digital publishers offer their Spanish-localized content in two language variants: peninsular or European Spanish and Latin-American Spanish. The difference between these two varieties is comparable, up to a certain extent, to the regional variations found between British and American English.

Even though Spanish was originally the language spoken in the Iberian Peninsula, there are more speakers in Latin American today than in Europe. Spanish is spoken by about 440 million people in the world, out of which around 43 million live in Spain, that is, almost 10% of the total Spanish-speaking population. Due to the regional Spanish varieties, we use a neutral or standard Spanish in our localized versions so that well-educated Spanish speakers on both sides of the Atlantic can understand it easily.

As indicated above, most Mexican PLM customers prefer to use the English-version applications even though their primary language is Spanish. The percentage of customers who purchase a certain local version has an impact on the localization plan and budget. Publishers decide in advance what languages are going to be localized based on financial profitability, since the economic purpose of localization is to capitalize on sales outside of the US. Localized software products that do not sell a required number of licenses might not be completely localized in the future or, in other situations, the national-language versions might show the flavor of the country with the highest number of customers.

Most end-users of our software applications are planning and operations engineers, graphic designers, managers and/or software instructors. They work in various industrial sectors: automotive, healthcare, transportation and logistics, aerospace and defense, renewable energy technologies, solar, mining, oil and gas, etc.

Our research is aimed, primarily, at discovering the reasons behind the Spanish-speaking Mexican users' language preference. To accomplish this, we asked a modest group of Spanish-speaking customers to fill out an online survey questionnaire. In order to comply with the rules set up by Siemens PLM Software Inc., we distributed our electronic assessment questionnaires only among those Spanish-speaking customers who had agreed to be contacted. What this means is that our target population does not include every single Spanish-speaking customer who uses the Siemens Software PLM applications. Every year the company conducts a survey called "The Voice of the customer" (VOC) to gather feedback on the performance of their current software applications. It also aims at capturing and communicating their end-users' needs and wants, which become the basis for generating new products. If a customer checks the "Agree to be contacted" box, they are added to the list of end-users, and, when applicable, those customers are contacted, as they were in our case.

In Chapter 4 of this thesis we will describe the linguistic problems found in both the source text written in American English and the localized-Spanish version that might have a negative impact on the end-user. We will also explore why certain revised segments might be adequate and correct in the review file, but awkward or unnatural when displayed in the specific context of the actual software application environment.

Some software localization tools have interactive interfaces allowing translators to see the graphical user interface in context, which is a practical advantage. However, not all applications are built with the same architectural approaches and design patterns: no software translation tool can read and understand all file formats. Many graphical user interface files are too large for particular tools to handle. For example, one translation project might contain up to 1,700,000 words split into 300 or more files. More often than not, translators and in-country reviewers work blindly with a long list of text segments without being able to see the localized text in its real context.

Translation revision and review are essential components in the overall quality assurance process. However, due to time constraints, those cycles are often shortened. As O'Sullivan notes, the lack of implementation of both revision and review processes by the right parties might result in "loss of business, loss of profit" and also, loss of reputation, for when end-users judge the quality of a software product, they are not judging the translator, but the company (1992: 108-112).

Interestingly enough, there are also other factors that might imperil the overall quality of the end product, such as an overabundance of English neologisms or newly coined terms. These technical words and phrases are difficult to translate because entry in any bilingual dictionary happens probably a year after the initial launching of a particular software product (Bankole 2006: 5). The use of confusing abbreviations and acronyms, undetected typos in the source text are increasing challenges met by translators, revisers and reviewers in their trials over accuracy and consistency.

## 1.7. Performance metrics

As stated earlier, one of our research goals is to identify the reason why many Spanish-speaking customers prefer to use the English-language version of the Siemens PLM software products. Learning what end-users think outside of a formal translation and revision-controlled scenario is beneficial for any company, independently of its size.

To measure the success rate of the localization effort, translation and revision processes only, we surveyed a small group of Spanish-speaking Siemens PLM Software Inc. customers for their feedback on how they perceive and interact with both the English- and Spanish-language software products. In other words, we set to find out if our software products are linguistically correct, naturally sounding and/or suitable for the application user.

Our customer feedback surveys will help us collect information on the users' level of satisfaction or dissatisfaction with our content deliverables. After a thorough analysis of this factual information gathered through survey instruments, we will be able to evaluate the relationship among our variables, and determine what changes might be introduced in our translation and revision/review stages and how to harmonize our customers' experience. End-user input is critical for determining what their expectations are. These observations will also help us find ways to raise awareness of the Spanish-language readership as well as the level of satisfaction of those customers who already use the localized versions. Those variables include: adequacy, fluency, grammaticality, acceptability, completeness, consistency, usability/functionality, and appropriateness for culture/audience.

The second vehicle for monitoring customer satisfaction is analyzing Problem Reports resulting from translation errors that are submitted by end-users against the Spanish-localized software products during a six-month period. Obviously, a higher number of reports will indicate some translation, revision and review concerns.

It is expected that a detailed analysis of three files containing user interface text in English and Spanish will be valuable in identifying errors and other linguistic inadequacies in the translation output. Comparing both the source and the target texts has a three-fold purpose: 1) to decide if the meaning has been preserved in the translation; 2) to determine which portions of the translated text have been modified by our local revisers and the reasons for these interventions; and 3) to define to what extent errors, cases of ungrammaticality, omissions, ambiguities and the like found in the target text are the result of the source text or the result of a wrong translation.

And finally, a measure of economic success is the sales in dollar amount of the Spanish-localized software products over a certain period of time, as well as return of investment (ROI) metrics. However, for legal reasons, we will not discuss this sensitive issue. We will measure only customer satisfaction with the Spanish-localized Siemens PLM software products using the instruments mentioned above.

### 1.8. Research questions

The main research questions are:

1. What language version (English or Spanish) of the user interface do the Spanish-speaking customers prefer to use? And why? (Level of acceptability of translation)
2. Is the technical terminology used consistently throughout the Spanish-localized user interface? (Level of consistency of terminology)
3. Does the Spanish-localized user interface sound fluent and natural? (Level of adequacy and fluency of the translation)
4. Are there any functional errors in the Spanish-localized user interface that might be caused by the language and/or terminology used? (Level of usability)
5. Does the Spanish-localized user interface take into account the customers' cultural sensitivity? (Level of cultural sensitivity of translated text)
6. Is the Spanish language used in the user interface similar to the language used in the customer's country of origin? (Level of appropriateness of translation)
7. Are Spanish-speaking customers satisfied with the Spanish-localized user interface of the PLM software products? (Level of satisfaction with translated text)
8. Do the UI segments reflect the meaning of each segment of the source text? Is the wording of the Spanish-localized user interface of the PLM software products easy to read? (Level of completeness and readability of translation)

### 1.9. Research plan

The table below summarizes all the evaluation components of the thesis, showing how we have collected the data – through online surveys, problems reports and revised UI segment files. We will analyze the research data based on the variables indicated in the above research questions. In doing so, we might also learn if there are any pitfalls and where to find them.

Figure 1. Research plan

| Digital Content | User-centered Evaluation | Text-centered Evaluation |
|---|---|---|
| •Adequacy<br>•Acceptability<br>•Appropriateness<br>•Completeness<br>•Consistency<br>•Cultural sensitivity<br>•Fluency<br>•Readibility<br>•Usability | •Survey questionnaires<br>•Problem Reports (PRs) submitted by end-users | •Analysis of three files containing user interface strings<br>•Translated by in-house translators<br>•Revised by in-Country Reviewers |

The end-user/reader-centered evaluation and the text-centered evaluation described in Figure 1 should offer a clear outline of the main linguistic and cultural issues found in the source and target versions.

Following Yin's design for case studies, our unit of analysis is the translation revision process and the results thereof, namely the final user application (1994: 20). Both external (user-centered) and internal (text-centered) evaluations allow us to collect multiple data sources for analyzing the one process: translation revision (ibid.: 1994: 93).

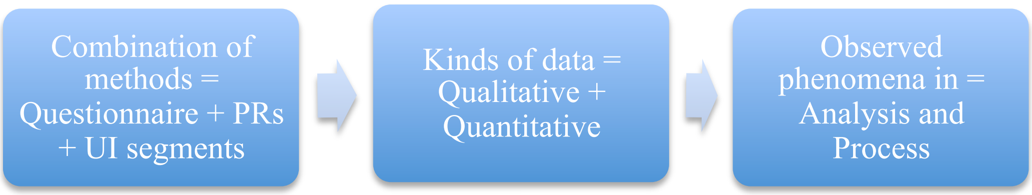
As part of our internal evaluation method, we will compare the features of some segments that have different Spanish translations but the same source text; describe the changes made by our in-country reviewers (ICRs); and account for the selection of certain Spanish technical equivalents as opposed to others. As part of this evaluation we will describe how neologisms, and abbreviations have been dealt with. Additionally, we will explore how we balance and maintain the main regional differences between the Spanish technical terms used in Spain and those used in Latin American countries. When appropriate, we will examine other translation revision related issues.

The external evaluation method will be based on the results obtained from the online surveys filled out by a group of select Spanish-speaking PLM software users, and the analysis of some problem reports submitted by our customers.

The quality of the source text has a significant impact on the translated Spanish software product. A grammar error in the English-language version might lead to an incorrect meaning shift in the Spanish-localized user interface. In order to have a more complete assessment of the PLM software products, we offered our respondents the option to select the language version for evaluation in the electronic surveys.

By using a combination of internal and external methods we can "increase precision of the description of a phenomenon under investigation" (Hansen 2009a: 373). How the end-users perceive the Spanish-localized software products as well the analysis of reviewed user interface segments will allow us to provide more conclusive data.

Figure 2. Data and methodology




The goal of combing both quantitative and qualitative data is that they complement each other. We will use the quantitative data to test our hypothesis in section 6.6. Our qualitative data will be useful when answering our research questions and any other complexities arising from the hypotheses themselves.

### 1.10. Why software localization matters

Publishing establishments localize their digital software products for economic reasons: "to increase total revenue and net income" (Sargent 2002: 48) (return on investment or ROI) as well as to improve global market share (Schäler 2004: 29). According to International Data Corporation (IDC), a company providing market intelligence, approximately 48% of software license revenues come from the sales of localized versions, that is, non-English software applications (Sargent 2002: 48). Schäler confirms this by stating that "the overwhelming majority of publishers in the digital world now make more money from the sales of their localised products than they make from the sales of the original product" (2003: 4).

Interestingly enough, "95% of all localised products still originate in the USA" (Schäler 2003: 4). Consequently, the localization market still is "the traditional one-way-street, where (American) English is the only source language" (Schäler 2002: 5). There can be no doubt that the US enjoys a leading position in the packaged software industry. The main target languages are European, Asian, Middle Eastern or Latin

American languages: Dutch, French, German, Italian, Portuguese, Russian and Spanish; Arabic, Chinese, Japanese, Korean; and Brazilian Portuguese.

According to Nettle and Romaine (2000: 2) there are in between 5000 and 6700 languages in the world; most of them do not have a written form, and half of them could disappear within a century: "Ninety percent of the world's population speaks the 100 most-used languages. This means that there are at least 6000 languages spoken by about 10 percent of the people" (ibid.: 2000: 8). At the same time, Apple localizes its applications into more than 40 languages, and Microsoft supports 96 languages in Office 2010 and Windows 7, "from Yoruba to Afrikaans, and from Quechua to Basque" (Microsoft News Center 2012). However, only 37 languages are sold as fully localized versions. As Hall states, "a software product with a few tens of languages supported has only scraped at the surface of global outreach" (2002: 5).

Schäler argues that software localization is indispensable since it allows users from different parts of the world to access to digital information, besides providing business and educational possibilities (2004: 33). Karl-Johan Lönnroth, former Head of the European Commission's Directorate General for Translation (DGT), notes that "[e]veryone is entitled to information in their own language" (in Schäler: 2005: 23). Hall sounds a similar note when he remarks that localization plays an essential role in all aspects of our lives today and therefore it should also be available in speech format for two main reasons: many languages do not have a written form, and some people around the world have very low literacy levels (2002: 7).

Companies and organizations in the public and private sectors, as well as users all over the world, rely on software applications. Software is part of the global market and continues to grow. Localization and translation have become quintessential pieces in the software industry. Commercial software companies meet the needs of non-English speaking customers. Naomi Gleit, Product Manager for Growth and Internationalization at Facebook (until at least July 2012), stated back in 2009 that "[w]e cannot become international if our software is not translated into the languages spoken in the countries we are interested in doing business with. We need to remove this barrier, our team mission is to make Facebook available to anyone in the world" (cit. Fernández 2009: 4).

The localization of software applications, online help and courseware is needed to reach a worldwide audience comprised of "1.97 billion Web users in 230 countries who speak 6,700 languages, deal in 147 currencies and live in 24 different time zones" (Gala.com). And yet we are far from reaching this goal.

### 1.11. Translating and revising global English

The global spread of the English language, especially in its various new forms brought about by non-native speakers, "has resulted in changes in the language at phonological, lexical, grammatical and discourse levels" (Patil 2006: 90). This linguistic storm from global English has had a significant impact on the localized-Spanish versions of our software products in different ways. A certain number of technical English terms make their way into these Spanish products because English has become very common on computer displays and other electronic devices. And on other occasions there is no exact Spanish equivalent that might be acceptable to our audience. For example, 'offset', both as a noun and as a verb, is very difficult to translate since it has different meanings according to its context and the application it is found in. The influence of the English language and culture has increased the direct transfer of linguistic forms into the target language. A further example of this trend is the heavy use of abbreviations in the English-language software applications that have been adopted as such in the Spanish-language applications: BOM (Bill of Materials), CAD (Computer-aided Design), CAE (Computer-aided Engineering), CAM (Computer-aided Manufacturing), UOM (Unit of Measure), and WIP (Work In Progress) are just a few examples that have become part of the daily work vocabulary of our non-English end-users.

Belda Medina (2003: 25) mentions the strategic use of compounding or compound words in computer science. Compounding is the combination of two or three independent words such as 'firewall' (cortafuegos), 'videoconference' (videoconferencia), or 'dashboard' (tablero de comandos). He also emphasizes the increasing use of 'cyber-spanglish' words that are adopted by Spanish-speakers and which are derived from English technical terminology, such as 'clickear' (to click), 'chatear' (to chat), or 'resetear' (to reset) (ibid.: 21). Spanish software users often tend to adopt English high-tech words, modify them and make them sound Spanish, in spite of existing Spanish equivalents (Loney 1998: 4). The Internet has brought languages together in a way that is unprecedented, while leaving some languages behind: "The pace of technology development today is pushing the limits of language to translate the names of new services quickly enough in all the countries that are rushing to adopt them" (ibid.: 5).

The Internet and advances in communications technology have expanded our traditional views of the world to create global integration, thus bringing communities, businesses and markets into close contact with each other as never seen before. Citizens from different countries meet at this cyberspace frontier, and soon a communication need arises: they naturally try to greet their peers and mirror themselves in the language and culture of the other. When they cannot do so, the most prominent solution open to them is translation.

At the very first encounter, there might be some confusion. All languages have terms and phrases that can be translated in more than one way. For example, in the late 1990s the English transitive verb 'run' as in 'to run an application' was translated into Spanish as 'correr' instead of 'ejecutar' in many software applications. That is, the Spanish rendering wrongly became 'correr una aplicación', instead of 'ejecutar una aplicación'. It took a couple of versions for Spanish-language translators and revisers to correct this mistake.

Nowadays end-users all over the word are becoming more and more accustomed to hearing and reading English terms when they access the Internet or use their phones or cameras, even those end-users who have never spoken a second language before. Notwithstanding the global spread of English as a lingua franca, translation plays an essential role in empowering those with no or little knowledge of the English language so that they have access to the same information as English-native speakers do. Secondly, translation revision and review protocols are a guiding light when languages meet in the cyberspace frontier. These procedures allow language professionals to enhance the translated text, thus avoiding semantically wrong sentences or phrases that can generate functionality problems. And finally, it is through localization that customers can use and interact intuitively with any software product.

### 1.12. Localization as the new digital frontier

The basic definition of 'frontier' found in any online dictionary is: "the part of a country that borders another country; or a boundary". Software localization could be seen as a new frontier in Translation Studies: the idea of frontier as a place where languages and cultures meet, following Alfredo Jiménez' description: "frontiers are areas of interrelationships and negotiation between two or more parties" (2003: 14). The term 'frontier' is used by Jiménez to refer to a place where peoples, cultures, traditions and languages blend:

> I like the definition of frontier as a place or land where peoples from different cultures meet and interact. This type of encounter has been a universal phenomenon since the beginnings of human history, which is essentially a history of encounters. (Jiménez 2003: 2)

This concept is also echoed by Payàs when she states: "la frontera es también el lugar en que ambos (traductor-autor, sus lenguas y culturas) se ven, se reconocen y, al hacerlo, se dicen: existes" (the frontier is also the place where the two (the translator and the author, their languages and cultures) see each other, recognize each other, and thereby say to each other: you do exist) (1997: 4-5). Payàs states that both the source and the target languages find each other and interact mutually, accepting each other's otherness. She also remarks that frontiers do not act as a separator but rather bond people and languages together while exposing their differences at the same time. Trujillo Vargadá refers to translation as an open door to communication among peoples, as translation transmits information of what is going on beyond political and cultural frontiers:

De esta forma, la traducción supone una puerta abierta a la comunicación entre los pueblos, con todo lo que ello implica. Es la vía principal para recibir información actualizada de todo lo que ocurre más allá de las fronteras. (2005: 4)

In this manner, translation is seen as an open channel for communication between peoples, and all that this implies. Translation is the principal channel for learning all that is happening beyond our frontiers. (Our translation)

In like manner, Jody Byrne deals with the concept of localization and discusses it as a venue where "language, culture and technology join forces" (2009: 1). Since a frontier is a point of convergence of receptors from all walks of life and who speak diverse languages, there are always complications or disagreements that might arise. Should the translations that ensue from frontiers really reflect those problems and imperfections? Or is it possible to render a draft translation that is absolutely impeccable in meaning, wording and punctuation?

In her article "El traductor indigno", Payàs is asked this question: "Can any translated text be perfect without revision and review?" to which she responds that no translation is perfect (1997: 9). And Sievers adds "[p]erfection would assume a maximum equivalence on all levels, but such a maximum can never be achieved due to the complexity of language, its dependence on constantly changing cultural norms, and because of the human factor in form of translators and receptors" (2006: 2). The purpose of translation revision and review is nevertheless to look for and correct linguistic and semantics errors that might have been generated during the translation stage, thus enhancing the text (Mossop 2010: 201). That translation stage belongs in the frontier space where languages and cultures come together for the first time through some digital text. We echo here the words expressed by the Spanish theologian and academic Fray Luis de León (1527–1591): A translator's words should sound as if they had been originated in the Spanish language, that is, they should sound natural and not foreign or alien ("…y hazer que hablen en castellano y no como extranjeras y advenedizas, sino como nacidas en él y naturales" (in Alcántara Mejía 2003: 62). Within a localization setting, translators and local revisers team up to render the readable content into the target language so that it is as close as possible to the original. Mossop states that translators engage in mental editing while translating (2010: 70-71). They will then compare the content of the source text with that of the target text and make the necessary corrections. The text translated in the realm of that frontier will then be taken out for revision and review by a professional other than the original translator. The revision process will cover issues related to meaning, errors, style and presentation (ibid.: 109). The final version, once accepted and approved by the commissioner, will be the one used in publishing, whether in print form or in digital format. In summary, the draft translation will no longer be an expression of the linguistic and cultural frontier; it will have been filtered and moved out from the confusion of the borderland towards systems of translation values, strategies, standards and rules. However, in spite of that considerable effort, will the revised translation be acceptable to the intended readership?

In the following chapter we will briefly outline a history of the US software industry, followed by a description of some of the translation issues found in the translation and revision of graphic user interface content as well as other technical and linguistic related aspects of the localization process. A look at the significant role played by In-Country Reviewers (ICRs) within the US localization industry will be part of this chapter.

# Chapter 2: Translators and revisers in the US software industry

"Applications, after all, are what make the computer worth having; without them a computer is of no more utility or value than a television set without broadcasting". (Mahoney 2002: 92)

## 2.1. Introduction

In this chapter we will review some early developments in the history of the US software industry and show how the rapid changes that affected this industry paved the way for the birth of software publishers. Then we will briefly outline some translation issues of graphic user interfaces as well as other technical and linguistic aspects of the localization process. Similarities between the software design process and the translation/review process will be discussed later in the chapter. We will close with a description of the roles played by the members of the localization translation team responsible for translating, revising, reviewing and testing software products, focusing on in-house translators and in-country reviewers.

## 2.2. Computer software development organizations

The computer software industry is one of the largest, most powerful and influential industries in the world. The proliferation of computer software and services companies in the late 1950s 1960s gave birth to a booming international industry of which the US has been the world leader throughout its history (Gesmer 1995: 1). In the words of Randell, "in just 40 years a major new industry had come into existence, one that the world came to depend critically upon" (2002: 48).

In its 2010 edition, Forbes 2000 magazine ranked the top eleven software companies in the world: CA Technologies (previously known as Computer Associates International Inc.), IBM, Microsoft, Google, Oracle Corporation, SAP AG, Accenture, Computer Sciences Corporation, Yahoo!, Tata Consultancy Services and Hewlett Packard. Out of these eleven software companies, nine are American.

Lisa Wilson describes the software industry as "a subset of the computer industry and the third-largest US manufacturing business, after automobiles and electronics" (2001: 3).

The software industry grew at a slow but steady pace in the second half of the 20th century. In 1956 the US government-owned RAND Corporation created a company known as Systems Development Corporation (SDC) for the purpose of developing computer programs for the Semi-Automatic Ground Environment (SAGE) air defense project, "which provided an important market for early software contractors" (Campbell-Kelly 2003: 5). SDC became the most influential company in the history of the US software industry (ibid.: 5-6). This industry growth was also the result of the progress in electronic, microelectronic and storage technologies, mainly "advanced through military support" (Randell 2002: 48).

At the private level, the use of computers for business applications by small corporations and manufacturers created a need for software programs (Campbell-Kelly and Aspray 2004: 176). In the late 1950s several software-contracting companies were formed to meet the demands of this fledging market. The first independent software company to develop and market custom computer programs was probably Computer Usage Company (CUC), also known as Computer Usage Corporation, which was founded in New York in March 1955 by two former IBM programming employees (Campbell-Kelly 2003: 31-50, Ceruzzi 2003: 167).

By 1965 there were about 45 major software vendors in the US, with annual revenues of US$100 million. In the late 1960s the number of small software services companies in the US was estimated at 2,800 (Campbell-Kelly and Aspray 2004: 176). During this period several software companies were founded in Europe and Japan, specializing in developing systems for IBM mainframes and other compatible machines (Cusumano 2005: 90).

The 1970s was a decade of growth, creativity, and innovation among computer companies in the US. Digital Equipment Corporation (DEC) "built the foundation for interactive personal computing with its minicomputers and its software" for both scientific and engineering firms (Ceruzzi 2003: 243). Steve Wozniak and Steve Jobs, the founders of Apple Computer Company (now known as Apple Inc.), are credited with having created the first computer for home use in 1976: the Apple II (Campbell-Kelly 2003: 202, Ceruzzi 2003: 264). The Apple I was Apple's first computer sold from July 1976 through to October 1977, and it was basically an assembled circuit board "designed for kit-building hobbyists" (Campbell-Kelly 2003: 202, Campbell-Kelly and Aspray 2004: 219-220). However, Randell affirms that IBM created the first personal computer (PC) based on the Intel 8086 microprocessor (2002: 46).

Even though thousands of computer software firms have been founded around the world in the last three decades, only a few of them enjoy a strong international presence and most of them are headquartered in the United States. The sales of packaged software have risen steadily since the early 1980s with the birth of the personal computer. On the other hand, firms and business organizations invest heavily in software applications and information technology for various reasons: to improve business productivity, efficiency and information management, to gain a strategic advantage or to meet the needs of customers (Burian 1998: 3-6).

The rapid adoption of the desktop computer by US consumers generated a huge market for packaged software (Graham and Mowery 2003: 223). Packaged software is defined as a pre-written program designed for a specific industry, or for an application such as an inventory management. Software was not a saleable item plus it had "a life of 10, 15 or even 20 years, versus 5 years for hardware" (Campbell-Kelly 2003: 177). Until the 1960s, software programs were sold by computer manufacturers as a bundle, that is, they were included in the price of a computer or 'mainframe', as it was called back in the 1950s, or were written by the users themselves, since computers came with primitive programming tools (Campbell-Kelly 2003: 29, Johnson 2002: 101).

As Campbell Kelly points out, one of the legacies of the 1950s and 1960s was the perception that software was a 'free good' (2003: 96). When competition intensified, computer manufacturers would include free software programs and services every time they sold a computer. 'Bundling', the practice of joining together software packages "that were known to work harmoniously" with the hardware for the purpose of selling them as a single unit, provided IBM with a competitive advantage over its competitors (Campbell-Kelly 2003: 177, Johnson 2002: 101-102, Wilson, M. 2003: 10). IBM enjoyed a privileged position in the mainframe computer market from the mid-1950s through the mid-1970s (Campbell-Kelly and Aspray 2004: 135-136).

In June 1969 IBM announced its decision to 'unbundle' its software packages from the hardware. This was due to a civil antitrust action filed by several computer manufacturers, accusing IBM of limiting their entry into the computer industry (Wilson, M. 2003: 10). The Federal Government, by way of the Justice Department, also filed an antitrust lawsuit against IBM to keep the markets competitive. Consequently, many contracting companies started writing software programs for computer manufacturers to compete with IBM, and thus the packaged software industry was born (Campbell-Kelly

2003: 30-31). The unbundling of software products and services in 1969 paved the way for the creation of the software industry as a competitive market.

During the 1980s and 1990s computer companies went on growing at great speed and became well established. In the early 1980s several US computer and software firms, like Microsoft and Sun Microsystems, started their international expansion (Esselink 2003: 22). However, the computer software industry of the 1990s was very different from the software industry of the 1950s and 1960s, mainly due to the advent and marketing of packaged software (Graham and Mowery 2003: 219). As Vermaat notes, "--[f]ading fast are the days when software packages were sold in boxes with a one-time, perpetual software license fee" (2013: 91). By 2011 most software products and pre-installed software packages were available for download via the Internet and in the language of the customer's choice. A new range of subscription model offerings allowed consumers and businesses to buy only those software applications based on their needs, as opposed to software packages or suites (ibid.: 92).

According to data from the Bureau of Labor Statistics of the US Department of Labor, about 10,400 software-publishing establishments employed 1,018,000 wage and salary employees in 2012. These jobs were projected to grow 22 percent between 2012 and 2022, much faster than the average for all occupations, due to the demand for computer software (US DOL Career Guide 2012: 2). Consequently, the demand for highly-skilled workers such as computer programmers, software engineers, developers, systems analysts, support specialists, sales representatives, technical writers, and instructors as well as language translators or localizers, revisers, and terminologists has been on the rise. The US Bureau of Labor Statistics warns that "the growth will not be as rapid as it was during the technology boom of the 1990s, however, as the software industry continues to mature and as routine work continues to be off-shored" (US DOL Career Guide 2010-11: 9).

The clear dominance of US software firms over their European counterparts derives from the funding programs provided by government agencies to firms seeking to develop new software technology during the Cold War era. Since only the government could afford to fund million-dollar projects, in the end this benefited the civilian sector (Campbell-Kelly and Asprey 2004: 48). The US retained its global leadership in software from 1950s well into the 1990s mainly because European governments had limited funds to support the development of computer technology, while Japan had a late start in this industry (Ceruzzi 2003: 11).

### 2.3. US Software publishers

The US Bureau of Labor Statistics in its 2010-11 edition Career Guide to Industries, defines software publishers as:

Those organizations primarily engaged in all aspects of writing, modifying, designing, testing, producing and distributing computer software as well as providing documentation, assisting in the installation and providing technical support to meet the needs of their customers (Career Guide to Industries 2010-11: 19).

The development team in an organization creates a software product through a sequence of phases or activities. The terms "software publisher," "software developer" and "developer" are used synonymously.

What a publisher does is provide limited use of software applications or databases in return for a purchase price or fee (a subscription or license fee). "When a publisher sells a copy of an information asset, the customer receives certain limited rights to use the information, but the publisher usually retains the right to make additional copies and resell the information. Example: Microsoft" (Malone et al. 2006: 10).

As stated above, most software products are designed in the US. They are therefore written in American English and targeted at US audiences. "Once successful at home, software companies can quickly move to expand globally to gain market share and increase high profit margin revenues" (Freij 1998: 16). When software companies decide to sell their products globally, they need to translate their software products' user interfaces and technical documentation or online help into several languages, and adapt them to the cultural standards of the countries where they are planning to sell their products (ibid.: 16). The goal of the software companies is market penetration and to have the product accepted by the users from the countries where they do business (Van Vliet 2000: 64). And localization helps them achieve that goal. Unquestioningly, localization gives companies a competitive advantage and an international image "which is hard to ignore over their rivals who do not think globally" (Freij 1998: 17). Once an initial product design is accepted, the development team will create subsequent versions of the product through its lifecycle in both the source language and the target languages (Van Vliet 2000: 64):

Only weeks after the first prototype laboratory computers sprang to life, it became clear that programs had a life of their own - they would take weeks or months to shake down and they would forever need improvement and modification in response to the demands of a changing environment. (Campbell-Kelly 2003: 29)

Van Vliet depicts software establishments as 'software factories' whose capital is made up of the knowledge of their skilled team of software engineers, developers, programmers, testers, technical and project managers, language translators, terminologists and reviewers, and its 'family of products'. The reuse of elements from earlier products, such as code, design, software architectures and frameworks, as well as the reuse of translation memories by localizers or translators make this kind of organization a 'factory' (Van Vliet 2000: 64). According to Mahoney, the concept of the software factory is based on the Taylorist model of "the one best way" of programming or on the Ford model of the assembly line, whereby automation reduces the role of human judgment. In the software industry, this dates back to the 1970s. Today, even though some tasks are highly automated, programming still is "a form of craft production" (Mahoney 2002: 94), which does not fit in with the Taylorist model.

Some US software companies hire in-house translators who translate those various programs to operate computers and related devices, mainly from American English into their native tongue, while maintaining linguistic subtleties and nuances of the target culture (this process is known as 'product localization'). These establishments are also staffed with in-country reviewers who are in charge of revising translated segments, among other responsibilities.

The concept of translation as a form of craft or art has been much discussed by theorists and practitioners in Translation Studies. Translation is a profession that requires skilled artistry as well as the knowledge of two languages, cultures and writing skills. This is how Woolsey describes translation:

Since translation from one language to another, no matter how closely related they may be, is not a mechanical process, this situation of communication is a highly complicated thing as well as a highly important one. Translation is an art, or more correctly expressed, ought to be one. (1974: 166)

And Woolsey continues with this remark: "The translator should be an artist and a translation worth its salt should be a work of art" (ibid.: 166). Newmark similarly defines translation as "a craft consisting in the attempt to replace a written message and/or statement in one language by the same message and/or statement in another language" (1981:7).

To conclude, for the reasons stated above, we could say that translation and revision efforts are anti-Taylorist since they are not mechanical activities.

### 2.4. Defining the Graphic User Interface (GUI)

In Information Technology, "the Graphic user interface (GUI) is basically a communication system that allows a user to interact with his/her computer and others through networks" (Van Vliet 2000: 552). GUIs are mainly used in computers, mobile phones, music players, tablets, photo cameras, household appliances, office equipment, Global Positioning Systems (GPS) and other devices (ibid.: 552).

Translation and revision of the graphical user interface are separate stages of the software localization process. The localized user interface is the main object of our study, and in-house software translators or freelancers are the language professionals who translate, revise and test the translatable components of the English source graphic user interface into selected target languages. The graphic user interface is "the visible part of the software", that is, what the user sees (Dohler 1997: 5).

Many things can go wrong when localizing a software product. Terminology inconsistency, for instance, might impede an end-user from locating or opening a file or not even be able to perform a simple command. The use of a culturally offensive word in the target-language market may refrain users from buying the software. Consequently, the success or failure of a computerized system will depend on the graphic user interface design (Van Vliet 2000: 532) as well as on its translation and review quality.

The main elements of a GUI may include a button, check box, radio button, combo box, icon, text box, tooltip, scrollbar, status bar, tool bar, menu (command, context and pie), window (panel and dialog box) (Verna and Singh 2006: 37). These are also known as widgets, that is, object-oriented tools that facilitate writing a graphical user interface when creating applications (ibid.: 38). "With the increasing use of multimedia as part of the GUI, sound, voice, motion video, and virtual reality interfaces seem likely to become part of the GUI for many applications" (ibid.: 36-37).

Below is a list of all language specific features of user interface that are translated, revised and reviewed (these definitions have been taken from TechTerms 2013):

Error messages: display information alerting the user that there is a problem or error

Dialog boxes: are used to change options and settings

Icons: represent an object or a program on your hard drive

Menu entries: are used to select commands and options

Prompt: a symbol that appears on a monitor to indicate that the computer is ready to receive input

Install program (a setup program also know as an installer): software that prepares an application (software package) to run in the computer

Readme files: usually contain "late-breaking news that did not make it into the documentation, additional setup information, or corrections and additions to the manual" (Dohler 1997: 12)

Toolbar: a row of icons on a computer screen that activate commands or functions when clicked

Tooltip: explains what each tool icon represents and is displayed when you roll over an icon with the cursor

The online Linux Information Project, launched by Bellevue Linux Users Group, provides the following definition of 'software string':

> In computer science a string is any finite sequence of characters (i.e., letters, numerals, symbols and punctuation marks). An important characteristic of each string is its length, which is the number of characters in it. The length can be any natural number (i.e., zero or any positive integer). A particularly useful string for some programming applications is the empty string, which is a string containing no characters and thus having a length of zero. A substring is any contiguous sequence of characters in a string. (LIP February 2015)

According to Esselink, string sections are the most difficult to localize because they do not contain textual information, therefore, "translators have to guess if, how and where a particular string may be displayed in the software application" (2000: 59). Schäler posits that mark-up and formatting can be like "finding a needle in the haystack" (2008: 204). An example of this particular problem comes up when translating two separate strings containing the following words: 'Open' and 'Set'. Is 'open' used as a verb or as an adjective: is it like 'to open a dialog' or is it referring to 'an open dialog'? Is 'set' used as a verb or as a noun, as in 'set the value of' or 'a set of values'? Therefore, translators have to guess what part of the application a particular word like 'open' will be displayed (Esselink 2000: 59). The adjective or past particle 'open' can be translated into Spanish in four different forms (for example, masculine, feminine, and singular and plural) that must match the noun or nouns it modifies. Added to this complexity is the fact that Spanish is spoken in many countries around the world, so there are some lexical, and grammatical differences as well as regional varieties within the same country and in between countries.

### 2.5. The meaning of language localization

In The Moving Text (2004) Pym outlines all the intricate steps needed to convert knowledge into digital text. In other words, he explains the translation, localization, internationalization and globalization processes involved "in moving text" from its source language to its target language or languages and its distribution in two dimensions: time and space. As Leal explains, this is knowledge that did not exist at one point but has to be created: "Knowledge is, or has become, a commodity that travels swiftly and efficiently" (Leal and Shipley 2002: 139). Knowledge, or information capital, is as intangible and invisible as some of the people involved in its creation (Campbell-Kelly 2003, Ceruzzi 2003). And some of those people are our technical translators.

Any software product needs to be internationalized before it goes to the localization stage (Esselink 2000: 25, Savourel 2001: 12): "There are two reasons for internationalizing software and online information: to ensure that a product is functional and accepted in international markets, and to ensure that a product is localizable" (Esselink 2000: 25). Internationalization does not involve any translation and is a fundamental part of the development process. However, localization involves translation and the technical adaptation of a software product for use in different languages and locales. During the translation stage, a text is converted from the source language into its target language, and during the localization stage, the text is modified technically and culturally. Some theorists include translation within the localization process. Pym observes that "[t]hus, when the two fall together in a business model, translation is just a part of localization, since localization encompasses the broader range of processes" (2004: 4). We argue that translation is a standalone process. However, technological advances have gone beyond the translation process to absorb the latter into a larger process known as localization (l10n).

We agree with O'Hagan that translation is 'key' to localization, even though it is just another component in the GILT industry: "From the point of view of traditional translation, localization was initially considered an extension of software engineering. Now it is treated as a new form of translation" (O'Hagan 2006: 39). While translation can stand as an activity in its own right, software localization only exists through the combination provided by its relatives: translation, internationalization, and globalization.

## 2.6. Technical and linguistic challenges of UI translation and revision

Since localized software is different from the source-language software (which is generally in English) it goes through a different integration process and must be validated separately (Nikolaropoulos et al. 1997: 89). Localized user interface strings contain both translatable and non-translatable content. Translatable content is subject to requirements or constraints such as space and length restrictions. Translators need to focus on a number of technical and linguistic aspects during both the graphical user interface translation and review stages. When software content is to be localized, specific parts of the software text are subject to the following requirements:

1. Text string length
2. Stacked text
3. Variables
4. Control code
5. Non-translatable text.

We will now look at each of these requirements.

### *2.6.1. Text string length*

Translated text has to keep the same length as the original language string. In many languages, like Spanish for instance, translated strings can be up to 30% longer than the original English strings. Generally in a Windows environment a length restriction is limited to 255 characters, spaces included. On the other hand, menu names, commands and other text need to be kept as short as possible (Esselink 2000: 67). When translating UI strings, translators need to take into account the length of the original string due to limitations placed by some software engineers on certain segments due to architectural or code issues. If the localized string exceeds the number of characters provided, the displayed text in the application will be truncated. Quite frequently translators need to shorten their translations to accommodate the length required by the developer. And sometimes translators discover this issue during the review or the linguistic testing stage. We will present an example of a text segment extracted from a manufacturing software product:

English segment: Body Type (9 characters) – Space restriction: 10

Spanish translation: *Tipo de carrocería* (18 characters)

Adjusted Spanish translation: *Tipo carrocería* (15 characters) or even *Tp carrocería* (13 characters), which renders the Spanish text somewhat difficult to understand.

The translated string needs to match the length of the original string; otherwise it may cause inconsistencies or even malfunctions of the application commands or menus. English is a very compact language, and Spanish is not.

### *2.6.2. Stacked text*

These are phrases that are displayed as three separate UI strings, as opposed to only one string, as in Teamcenter Engineering Order.

Segment 1: Teamcenter

Segment 2: Engineering

Segment 3: Order

When translated into Spanish literally, the phrase ‘Teamcenter Engineering Order’ becomes Teamcenter *Ingeniería Orden*, as opposed to the correct form *Orden de ingeniería de* Teamcenter, since Spanish syntax requires a different grammatical structure. Side-by-side text is a variation of the stacked literals. An example of this would be as follows: when ‘Standard’, ‘Parts’, and ‘Library’ are displayed as three separate segments, the translation will render *Estándar Piezas Biblioteca*, which should be *Bibioteca de piezas estándar*, instead. This creates problems in the translation memory used by translators and reviewers, and it multiplies when vendors translate technical documentation containing these stacked literals (Greenwood 2010: 4).

### *2.6.3. Variables*

Variable parameters, also known as ‘placeholders’, “are characters preceded by a percentage (%) sign and replaced later on by another word, value or string during the application runtime” (Esselink 2000: 68). These variables need to be positioned properly within a string. Since they are inserted at runtime, "they may have effect on how the text around them should be translated" (Savourel 2001: 166). When a string contains more than one variable, the order of those variables must remain intact in the localized string. The text of the variable is gender and/or number specific in Spanish. Therefore, the translator needs to know what the variable will be replaced with in order to render the proper translation. Since variables also have space limitations, the translator needs to be aware of the maximum size of the text allowed in the variable. We will present the following examples:

(1) English segment: In the {2221}New Item{2222} dialog box, select {2223}CPCopyElement{2224}. {1546}CP_Has_Specification{1547}
Spanish translation: En el cuadro de diálogo {2221}Ítem nuevo{2222} seleccione {2223}CPCopyElement{2224}. {1546}CP_Has_Specification{1547}
(2) English segment: New -> %s
Spanish translation: Nuevo/Nueva/Nuevos/Nuevas -> %s

Since the % sign will be replaced later on by another word or expression, it is difficult to match the Spanish adjective *nuevo* (new) with the noun or expression that follows. The translator needs to know the text of the variable for the right gender and number agreement. The Spanish language has a grammatical gender marking on nouns and a gender-number agreement between nouns, determiners and adjectives (Sagarra and Herschensohn 2013: 169). In contrast, the English language is a more gender-neutral language with no gender-number agreement between nouns, determiners and adjectives. The gender is distinguished by inflection (man – woman; grandfather – grandmother; tiger – tigress). There is only one definite article in the English language (the) whereas in Spanish there are five (el, la, los, las, and lo).

During the Quality Assurance (QA) period, translators need to make sure that the variables display correctly in the test applications. A missing character or the wrong case type in a variable will display a garbled screen message (Esselink 2000: 68). Table 1 shows a list of the most common variables found in UI strings.

Table 1. Common variables and parameters. Source: Esselink (2000: 68)

| Variable | Parameter |
|---|---|
| %s | String |
| %d | Decimal integer |
| %ld | Decimal long integer |
| %x | Integer in hexadecimal form |
| %g | Floating point value |
| %u | Unicode character |
| %f | Fixed (added by researcher) |
| %p | Page number |

### *2.6.4. Control code*

Some localized strings contain formatting information such as line feeds, carriage returns, line breaks and tab characters. These codes can be moved but not deleted so that the localized data can be displayed properly (Esselink 2000: 69). The following are examples of a line break in three different operating systems:

Windows = \r\n

Unix = \n

Mac OS = \r

When the codes shown above are missing in the translated string, the line break will not be displayed. For example, we may have a long text segment such as:

English segment: Unsupported section for standard cross sections.¶ Section is not processed. First occurrence is %s %i type %s.

Spanish translation: Sección no admitida en las secciones transversales estándar.¶ La sección no está procesada. La primera incidencia es %s %i tipo %s.

If we do not keep the line break code in the translation (¶), the sentence will be displayed on one line and part of it will probably be truncated in the software user interface.

### *2.6.5. Non-translatable text*

Data content can be divided into translatable and non-translatable. Translatable content is isolated into resource files that are separate from the programming code. Sometimes the limits between what is translatable and what is not are blurred (LionBridge Translation Guidelines 2011). Translatable data contains text elements that should be translated. Translatable text is embedded in coding. These are UIs that contain translatable units. Each translatable unit includes data in the source language that needs to be translated into the target language (Esselink 2000: 70).

Some sections of the UI strings need to remain in the source language. Translating these could damage the software program functionality since some of the non-translatable strings are internal commands. Some bugs and errors are introduced into the software product during the translation stage when non-translatable data is translated (Esselink 2000: 69-70). Below are some examples of non-translatable data in the English-Spanish language combination:

Concatenated words (words that are linked together through underscores). Example: organization_chart.

Combined words such as DgtSignatureByUserRelation and propertyDescriptor (also known as Pascal casing and Camel casing conventions).

Preference names such as: cad_suffix

Utility names such as ipem_db_adjust.

Code names such as OP5 (a plant code)

Command names. Examples: Repeat; Update: Execute.

Command lines. A command line is defined as “the space to the right of the command prompt on an all-text display mode on a computer monitor (usually a CRT or LCD panel) in which a user enters commands and data” (The Linux Information Project).

Command-line switches such as (-F). Microsoft Office provides the following definition: “A command-line switch is the addition of a forward slash (/) followed by the switch name and any parameters the switch has” (http://msdn.microsoft.com). The format will change according to the operating system being used. Examples: -disable-remote-fonts; -process-per-site.

Parameters. Specific values: “A parameter may be a file name, a coordinate, a range of values, a money amount or a code of some kind” (PC Magazine Encyclopedia).

File names, directory names, binary names, variable names, entities and product names.

Some words in caps: AND, OR, SO.

Debugging messages. These are messages intended for developers and other technical staff. However, in some situations they are incorrectly marked for translation. Example: “hwangb move applyOccFilterAction to actions folder”.

Configuration keys: These control access to certain features. Once they are disabled, their features are no longer available (http://msdn.microsoft.com).

Symbols: The ampersand symbol (&) is used to indicate a hot key, and it is not to be translated since it does not mean "AND". Example: English segment: &Open - Spanish translation: &Abrir.

A common misconception among novice software translators is that they need to translate every single word in each text segment. Reality is different. The intervention of seasoned in-country revisers helps these translators avoid translating words or phrases that might endanger the software's functionality.

**2.7. Usability of the software user interface**

The international standard ISO 9241-11 defines 'usability' as follows: "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" (Guidance on Usability 1998). Bevan et al. (1991: 1) explain that the term 'usability' in the user-interface context was coined in the 1980s to replace the term 'user-friendly', which "had acquired a host of undesirably vague and subjective connotations".

Those Spanish-speaking users who completed our assessment surveys interact with their computers for handling tasks and information that allow them to accomplish their daily activities: the design, development and manufacturing of digital products. These end-users work for large- and mid-size companies from a wide range of industries (automotive, air- and space and shipbuilding, among others), headquartered in Europe and Latin America. The PLM software products evaluated in the next chapters provide companies with a fully integrated system for managing the entire lifecycle of a product.

PLM software products are supposed to meet the following quality requirements: usability (the customer's interaction with the software program), reliability (failure-free operation), functionality (works as programmed), performance (how it works), capability (implementation and execution) and maintainability (restoration to its operable state) (Pan 1999: 30). These attributes are derived from the five Juran quality parameters model, namely functionality, usability, reliability, performance and serviceability (Juran 1992). Of all these attributes, our research is concerned with the usability of the localized software user interfaces.

The usability approach places the customer at the center of the process. Can usability be measured, and if so, how can it be improved? Daniel Jackson holds that "almost all grave software problems can be traced to conceptual mistakes made before programming started" (2006: 10). Consequently, he continues, "if the design of a software user interface is flawed, then the software is flawed". We add that if the localized version of any software is flawed, then the user's acceptability and usability will be negatively impacted.

Usability determines whether our localized software products can be used and the impact they have on user performance and satisfaction; in other words, it is a measure of how the user interacts with the software application (Bevan et al. 1991: 19). The two main components of usability are "ease-of-use: how easy the product is to use, and acceptability: whether the product will be used in the real world" (ibid. 19). Acceptability determines whether the software application will be used. For clarification purposes, the usability criteria here will not include factors such as software cost, pre-training, availability and other global limitations.

### 2.8. Similarities between software design and the translation/revision process

We begin this section by taking a close look at the relationship between software design and the translation/revision process. Reeves points out that designing software "is an exercise in managing complexity" (2005: 5). So is the translation and translation revision process. In Reeves' opinion, "the complexity exists within the software design itself, within the software organization of the company, and within the industry as a whole" (2005: 5). Complexity also exists within the localized version, within the localization team and within the industry. We will show that translating and revising user-interface segments is like putting all the pieces of a very large puzzle together, such that translation discrepancies between in-house translators and in-country reviewers and even among the industry experts and customers arise frequently.

Many software applications contain source-code flaws. These are high-impact defects that might cause crashes, affecting system stability and software performance (Shankland 2010: 5). According to a 2011 study conducted by Coverity, a development testing company, the industry average is 1 flaw per 1000 lines of code (Shankland 2010: 3). Mistakes made during the translation and the translation revision process can break the code and impede the user from conducting a command. Additionally, an extra space in a placeholder may impede it from pointing to the right content holder. Typographical mistakes or word omissions in the programming language can go unnoticed while coding, but they will be exposed during the testing stage of the software application. If these mistakes are not detected and corrected by the translator and/or reviewer, the functionality of the program could be at risk. And, to make things more complicated, if the software program is translated into ten different languages, the workload originating from the debugging time will be increased ten fold.

Once the coding is completed, quality analysts conduct various test cases for different types of errors or bugs and make sure that the application runs as expected and with the least possible number of defects or bugs. In some situations, designers need to redesign or reengineer the base code against time constraints. Translators and reviewers also make sure that every single line is properly translated, and that the terminology is consistent and appropriate before the release of the software product within a certain timeframe. While software testing is the process of refining the design, translation revision is the process of improving the localized text segments.

Software design is a complex engineering activity. Reeves points out that "[t]ypical commercial software products have designs that consist of hundreds of thousands of lines. Many software designs run into the millions" (2005: 8). And even up to "[o]ver 55,000 hours of design, code, testing have been captured and recorded in a computer database" (Norcio and Chmura 1986: 99). How long does it take to translate 10,000 lines of code, for example? An in-house translator can record up to 2,080 hours in user interface-text translation per year, based on a 40-hour work schedule per week. If we subtract paid time off (sick time and vacation), the number of worked hours would be approximately 2,000. According to Gladwell's measuring system (2008), it would take roughly five years for each in-house translator to total 10,000 hours of translation and translation review activities.

Changes in any localized version may affect usability and acceptability and this can influence sales. For instance, a customer may be used to seeing the English term 'offset' in the main menu of a Spanish localized software application. A year later, in the new version, the translator and/or reviewer has decided to replace 'offset' with *desplazamiento*, which is probably one of the most common terms in one of the software applications analyzed in this research. Consequently, the user may not move around the menus as easily as before, and may eventually stop using the software.

Software design involves many sub-disciplines like computer programming, systems engineering, systems analysis, information systems, software management processes, modeling language, and computer architecture. Translation and translation review draw from other disciplines as well, such as linguistics, comparative grammar, intercultural communication, textual analysis, translation processes and theory, and specialized terminology.

According to Reeves, software specifications generally change very rapidly, even during the design stage (2005: 15). When translating and even during the revision stage, it might be difficult to find an exact technical equivalent that suits all Spanish-speaking users, especially when dealing with recently coined English terms. As a consequence, translators and reviewers make changes in later translations, and sometimes go back to the original translation. The goal is always the same: to make the translation better.

As Reeves (2005: 32) notes, "[n]o other modern industry would tolerate a rework rate of over 100% in its manufacturing process". Often translators and reviewers decide to modify one term or phrase in 1000 segments, or they may rewrite many translations. Perhaps we might not find the right translation the first time, but then we will, during the translation review process. Software design is a complex process. So are translation and translation review.

Reeves states that "[c]hanges in software design will ripple through some significant portion of the entire software design" (2005: 25). Changing one single translation might affect the whole string or sentence, as well as the terminology consistency within the application and across the applications of the software publisher. It might also affect the translation of other terms. And there will be times when translators cannot make all the changes, due to the high number of localizable files and the frozen testing policies. This will evidently produce an imbalance in the localized version of the software application.

To conclude, software design and translation/review process share some similarities, even though they belong to completely different disciplines.

## 2.9. Agents in the US software publishing industry

According to the US Bureau of Labor Statistics, the information sector comprises "establishments engaged in producing and distributing information and cultural products; providing the means to transmit or distribute these products as well as data; and processing data" (2011: 51). Software publishers are one of the main components of this sector.

The software industry is made up of a well-educated workforce performing in a range of jobs, such as computer software engineers, computer programmers, software developers, localization engineers, translators or localizers (in-house and/or translation language vendors), translation revisers/reviewers, terminologists, quality assurance (QA) experts and project managers (US Bureau of Statistics 2011).

In the following sections we will describe briefly the roles played and the activities performed by the different departments and members who are actively involved in requesting, authoring, translating, revising, reviewing and testing software products: in-house translators and in-country reviewers (ICRs). We will also address the role played by the end users of those products.

Schäffner notes that "[t]he main roles in a translation process are played by one or more persons or institutions. The roles include the initiator, the commissioner, the text producer, the translator, the target-text 'applicator' and the receptor, and each role is highly complex" (2008a: 4).

Byrne (2006: 12) differentiates between the 'document initiator' and the 'translation initiator'. The document initiator is the person responsible for producing the original source language document. In the case of a software publishing organization, the document initiator is the new product development department. This team handles all the processes related to the creation of new products, covering a wide range of activities from the initial concept and design, programming, writing and preparing the localization kit. As Schäffner points out, the translation initiator is also responsible for determining both the source-text language as well as the target-text language (2008a: 4). Besides developing new software products, they also support and update existing ones in order to constantly expand market share. It is not uncommon that some software publishers' customers commission the company to develop custom-made software applications that are specifically tailored to the needs of their organizations or business entities. Developed according to specific requirements of a company, this type of software is very expensive and is different from software targeted at the mass market. There are thus essentially two groups of initiators: the internal (publisher) and the external (customers).

The translation initiator is the person or entity that starts the translation process and provides the translation instructions (Byrne 2006: 13). In our case, the translation initiator is the product development department, whose director will instruct the localization department manager to translate the user interface text strings into a selected number of target languages. The localization manager's job is very complex and demanding, requiring "skills in people management, resource allocation and coordination, planning, scheduling, budgeting and finance, tools and technology, quality assurance, among others" (The Rubric Guide to Localization Management 2004: 11).

However, the development department does not provide the 'translation brief' or define the Skopos or function of the translation in the target languages, since their knowledge of the target languages, cultures and audiences is limited. As Byrne points out, "[i]t is not unheard of for a project manager to simply send a text out for translation by a translator without passing on any form of instruction, assuming instead that the translator will know what to do with this" (2006: 13). In daily situations, in-house translators receive translation requests containing only the name of the project, number of words, deadline and location of the files. Other data such as language audience, type of register and cultural characteristics are non-existent. The project manager simply assumes that the translators can handle any translation or translation revision project. Consequently, it is up to the in-house translators to fill in the blanks (Nord 1996: 142). Translators are the language professionals who know the source and the target languages, who ascertain the Skopos of the user interface text prior to the translation, and who decide how it can best serve the end-users' or readers' interests (Schäffner 2008b: 235). Based on this essential information, translators decide accordingly, in our particular case, what kind of Spanish and what kind of language register to use, among other decisions. Jiménez-Crespo observes that "[n]ormally, in those cases in which initiators or commissioners might fail to provide this information, professional translators are expected to deduce it based on their expert knowledge" (2009: 81).

The text producer or author (Byrne 2006: 11) is a team of computer software engineers and programmers who write the user interface text strings to be localized. More specifically, "computer software engineers design, develop, test, and evaluate software programs and systems" while "computer programmers write, test, and maintain the detailed instructions, called programs or software, that computers must follow to perform their functions" (US Bureau of Labor Statistics 2011). These professionals are located in several offices around the world and English is often their second language.

The 'receptor' in our particular case is the group of companies that purchase software licenses for their employees or end-users. Byrne describes two sets of users: those who use the user interface in the source language and those who use it in their own language (2006: 14). As mentioned above, we have learnt that a large number of PLM users in Mexico prefer the English user interface to the Spanish-localized version.

The translator is the person responsible for rendering the text from a written source language (American English) into a target language (in our case Spanish) and culturally adapting it to a certain locale (Europe or Latin America), thus bringing down barriers that separate cultures. Many software publishers are staffed with in-house translators who are salaried employees. Schäffner observes that "[t]ranslators are responsible for carrying out a commission in such a way that a functionally appropriate text is produced" (2008a: 5). Revisers are responsible for checking the accuracy of the translated text and concordance with the original text so that the localized software product looks and feels right to the native language end-users.

The localized files are then returned from the localization department to the development department for import processing. Once this department confirms the versions are complete, the translators review the product in their target language to verify that context is appropriate to each locale.

The relationship between the office members is shown in Table 2. As Salevsky and Ller point out, all these professionals are in a "translation-related relationship" because they are related through a common "translatorial action" (2010: 28). Table 2 shows all the steps in the translation and revision activities. To summarize: the new product development/client within the software publisher organization commissions the software engineers and programmers to write the English UI text segments. The same group then requests the localization department to translate those UI text segments into a certain number of locales. Translators and in-house reviewers work collaboratively to make sure that the localized software product transmit the same message as the original one.

Table 2. Language localization group (adapted from Schäffner 2008a: 4)

| TRANSLATION/REVISION AGENTS | ROLE |
|---|---|
| New product development/client (American English) | Document Initiator/Commissioner |
| Software engineers and programmers (multiple authors) | Text producer |
| New product development/client (American English) | Translation initiator |
| Localization department in-house translators | Translator |
| Expert in target country | In-country reviewer (ICR) |
| End-users | Target-text applicator |
| Companies (employees) | Receptor |

As Schäffner explains, the translatorial operations (translation revision included) "are based on analytical, synthetic, evaluative and creative actions" that consider the cultural aspects of the receptor's target language (2008a: 5).

## 2.10. Software translators or localizers

The average time used for translation activities in many localization departments in any given 40-hour-week is 28 hours. For proofreading: 3.125. For editing: 3.2; for Terminology: 1.66; for software testing: 2.66; for language guidelines: 1; for QA: 0.83 (less than one hour); for meetings: 0.5 (Mick 2008: 83). Unless you work for the United Nations (UN), the International Monetary Fund (IMF), or any of the European institutions such as the Directorate-General for Translation of the European Commission (DGT), there may be no other salaried positions where professional translators can devote almost 85% of their time to either translation and/or revising activities.

*2.10.1. In-house translators' responsibilities*

The duty of an in-house translator is to translate all user-interface strings as if done by the same person, that is, consistently and accurately. Even in large publishing establishments where there might be several translators working on the same language combination, a translator's responsibility is to make sure that the translated content sounds as if it had been done by only one person "or by one brain" (Hansen 2009b: 265). Translators need to use consistent and correct language and domain-specific terminology that can ensure that customers use the localized software for the intended purpose and operate it in a productive way. In-house translators provide the communication bridge between software developers and their customers.

From an ethical point of view, an in-house translators' duty is to satisfy the reader, providing a high-quality localized version that the user can interact with as does the user of the original language version. These responsibilities stress the accuracy and quality of the translated content. The end-user should be able to accomplish the same tasks no matter which localized version he or she is using.

*2.10.2. Translators' skills and competencies*

Localizers or technical translators are required to have many skills and talents. Biel mentions the following five competencies (2011: 63-64): translating competence, linguistic and textual competence, cultural competence, technical competence and research competence. We have added: revising and reviewing competence, communicative competence as well as social competence.

*2.10.2.1. Translation competence*

An in-house translator should ideally have a formal degree in translation, that is, a Bachelor's degree from a university (Biel 2011: 63). However, many US employers require either a formal degree or a certain number of years of translation experience, as we will see below. They also prefer translators who are target-language native speakers.

*2.10.2.2. Linguistic and textual competence in the SL and the TL*

An in-house translator is mainly a 'communicator'. Translators must be able to write in the target language the same message expressed in the source language. The Common European Council Framework of Reference for Languages (CERF) defines linguistic competence as "the knowledge of, and ability to use, the formal resources from which well-formed, meaningful messages may be assembled and formulated" (2001: 109). The message delivered in the target text must be effectively communicated and easily understood by the recipients. Vermeer states that "[t]ranslation is here understood as a professional activity which already presupposes a thorough knowledge and practical command of the respective working cultures and their languages" (1992: 45).

*2.10.2.3. Cultural competence*

An in-house translator is above all a powerful agent "mediating between languages and cultures" (Angelelli 2003: prologue). They must have a solid understanding of both the source and the target cultures. Translators help to avoid linguistic misunderstandings arising both from cultural differences and the linguistic gap between technology and end-users.

*2.10.2.4. Technical competence*

An in-house translator should have subject-matter expertise (specialized subject knowledge) and should translate unequivocally. Technical competence involves the set of skills and knowledge required to successfully accomplish their job.

*2.10.2.5. Research competence: Information acquisition and processing*

An in-house translator must make "optimum use of research tools and information sources" (Biel 2011: 4). They also need to have computer skills as well as testing skills (Hofmann and Mehnert 2005: 73). They need to be familiar with common conversion tools; translation tools (such as SDL Trados, Déjà Vu, or WordFast) and maintain translation memories; they need to participate in creating, updating, and maintaining in-house technical glossaries, terminology databases and style guidelines; they have to be able to perform linguistic quality assurance for localized versions of software applications.

*2.10.2.6. Revising and reviewing competence*

An in-house translator must also be a critic of his or her own work. Technical translators bear almost all the responsibility for translating and revising the user interface segments written by programmers. They must be able to step out of the translated content and judge it objectively. An in-house translator has the dual role of being both a translator and a reviser. Mossop clearly observes that "[t]he translator has a mixed translation/revision job to perform" (2010: 215).

#### *2.10.2.7. Communicative competence*

Hymes' theory of communicative competence is based on the interaction of these components: language, grammar, sociolinguistics and psycholinguistics (1972: 282-283). Based on Hymes' theory, Bell defines this competence as the knowledge and ability that a translator should have to create communicative acts that are grammatically as well as "socially appropriate" (1991: 42). He also adds that translators should have linguistic competence in both languages and communicative competence in both cultures, consisting of knowledge of the rules that govern usage and of the rules that constrain usage as well as knowledge of sociolinguistic and discourse rules (ibid.: 42). Hatim and Mason point out that "[t]he translator's communicative competence is attuned to what is communicatively appropriate in both SL and TL communities and individual acts of translation may be evaluated in terms of their appropriateness to the context of their use" (1997: 33). Therefore, a translated UI segment that is appropriate in the source and target languages becomes a successful communicative act (Bell 1991: 43).

#### *2.10.2.8. Social competence*

In-house translators should have social and peer skills since they form part of an organization. Localization is teamwork, as opposed to literary translation, which is generally more solitary. Consequently, translators need to get along well with their co-workers and be team players. Segrin defines appropriate social skills as "behavior conforming to social norms, values, or expectations and not viewed negatively by others" (in Tsang 2009: 6). In-house translators are generally foreigners living in a different society, so it is important that they use the same values as the company culture. Venuti considers translation as a collaborative effort "between divergent groups, motivated by an acknowledgement of the linguistic and cultural differences that translation necessarily rewrites and reorders" (1999: 4).

### *2.10.3. The translator's job profile*

Localization and technology have changed the professional skills required of translators and have widened their role (Biau Gil 2005: 17, Snell-Hornby 2006: 115). Localizers are not only translators but also glossary creators, translation-style guidelines authors, revisers/reviewers and technical testers of software applications. In short, they are 'multi-tasking translators', as Pym says (2000: 2).

Listed below are some prerequisites and essential functions required of a "technical translator/localization specialist" ad published by Kelly Services Inc. in the classified jobs section of the Cincinnati Enquirer newspaper on March 18, 2012. Kelly Services is a Fortune 500 company headquartered in Troy, Michigan, US, offering temporary staffing solutions as well as full-time placements:

> * Experience with the software development life cycle * Experience with CAT (computer assisted translation) tools, Localization Industry Standards and Best Practices * Experience localizing in the IT (Information Technology) workspace * Experience identifying globalization issues* Knowledge of HTML, XML, Java * Understanding of Product Lifecycle Management (PLM) products * Bachelor's or equivalent degree in the target language or translation, or minimum of 3 years of technical translation experience * Native speaker of the target language and excellent command of English language Skills and Abilities Required: * Team player with a thorough understanding of the localization process, localization tools and i18n and l10n aspects of software architecture. * Strong organizational, communication and interpersonal skills * Strong personal management skills * Excellent problem solving and debugging skills, attention to detail * Ability to work well with others in a multi-cultural environment.

As far as translators' education requirements are concerned, the US Department of Labor (DOL) Bureau of Labor Statistics states the following in its Occupational Outlook Handbook (2012):

Although interpreters and translators typically need at least a bachelor's degree, the most important requirement is to have native-level fluency in English and at least one other language. Many complete job-specific training programs. (US DOL Website)

It is interesting to notice that there is no mention of a specific university degree specifically related to translation in either the US employment agency ads or in the US DOL literature. Knowledge of translation software tools and localization standards seems to have more weight than a specific degree in translation.

To summarize, translators need to have an excellent command of two or more languages; subject-matter expertise; knowledge of translation memory systems and translation tools, cross-cultural communication knowledge, analytical and writing abilities, editing skills, communication skills, and social skills.

Perhaps it would be more appropriate to change the heading of the Cincinnati ad to 'language engineer', as O'Hagan and Ashworth predict that localizers will be known in the future, since they are required to be familiar with programming languages besides all the other language, cultural and communication skills required (in Mazur 2009: 152). Here is how Santi van der Kruk, General Manager of LionBridge, has described localizers' strengths:

The profile we look for in translators is an excellent knowledge of computer technology and superb linguistic ability in both the source and target languages. They must know how to use the leading CAT [computer assisted translation] tools and applications and be flexible. The information technology and localization industries are evolving very rapidly and translators need to move with them. (In Abaitua 1999: 8)

Software publishers look for translators who have technical expertise in automation technology, solid understanding of the software products, and a track record as a professional translator. Localizers also need to be flexible, be able to work under tremendous time pressure, and function socially in a corporate environment. Localizers have a longer list of tasks than that of traditional translators, who do are not usually involved in software product testing.

## 2.11. In-country reviewers (ICRs)

Translation revision is considered a mandatory step in both the translation workflow and the quality assurance practices and procedures implemented by localization departments in US software publishing companies. These organizations rely on in-country reviewers (ICRs) or local revisers to perform linguistic validation and testing of their localized software applications before the official release date to customers (Neill 2010: 10). Based on their product knowledge and subject expertise, in-country reviewers also provide feedback to translators about any linguistic issues that can help improve the builds. Wrong settings due to translation problems can cause software applications to fail. This results in lost revenue, loss of market share, delayed release dates and damage to a company's reputation. Consequently, efficient translation revision and review processes are a mandatory part of any localization department.

Revising and reviewing localized software is a challenging and time-consuming process. Esselink clearly points out that "[t]his review or validation is not the same as editing or proofreading: reviewers must focus on technical consistency, completeness, and adherence to agreed terminology and language standards" (2000: 15). Firstly, the input provided by these reviewers to the in-house translators assures compliance with higher-industry standards in the final product. Secondly, their feedback helps assess the translations done by the in-house translators and/or language vendors. When end-users detect a linguistic or translation and/or a technical problem in the released localized application, they are allowed to submit a problem report (PR) on the software publisher's Website. Software problem reports (SPRs) record information such as defects that are found, when and where they occurred, their cause, how they can be fixed, and when the fix has been verified. A systematic analysis of the reports submitted by end users provides in-house translators and ICRs with a different mechanism to correct problems not exposed during the translation, translation review and testing cycles. This is equivalent to readers finding typos or faulty translations once a book has been published. And it is also an indication that something went wrong or unnoticed during the translation and/or review workflow.

Quite frequently, in-country reviewers are engineers, software programmers, application specialists, sales professionals, software instructors, country managers, product distributors, consultants, or even technical support specialists. In short, they are product experts whose additional job is to check the localized user interface strings in their own native language against the English user interface strings. Work arrangements between the publisher and the reviewers in the target country will vary from company to company. While some reviewers are employed directly by the software publisher and even paid for their extra time, others are not (Neill 2010: 13).

Ideally, reviewers should have product knowledge, communication and language skills and review experience. According to Neill, "a good reviewer is a company employee, a native speaker of the target language, a product SME, and a stakeholder in the process of producing quality translated documentation" (2010: 10). For Hofmann and Mehnert, "[a] reviewer must be a native speaker of the target language" (2000: 74). To judge the quality of a translation, reviewers must be fully bilingual and have excellent writing and reading skills in their native tongue.

Reviewers should have a deep knowledge of the functionality of the software products. Their feedback might guarantee the success of each localized version since in-country reviewers are more frequent users than the translators of the software applications. Even though in many cases reviewers are neither translators nor linguists, they have a better understanding of the terminology that makes sense to the customer.

### *2.11.1. Translation reviewers versus translation revisers*

In this section we will explain briefly the differences between a translation reviser and a translation reviewer. For this purpose we will be referring to the terminology described in both the European translation standard EN 15038 and the American translation standard ASTM F 2575. However, it should be noted that the term ‘translation review’ is more frequently used within the US software industry to mean ‘translation revision’, that is, a comparative reading of both the source and the target texts.

EN-15038 is the European quality standard for translation services approved by the European Committee for Standardisation (CEN) in April 2006 and adopted by 29 European countries (Schopp 2007: 7). The standard encompasses the whole translation process, from commissioning, translation, proofreading, review, project management, and quality control to delivery (Biel 2011: 61). According to EN-15038 (2006) “quality is guaranteed not by the translation which is just one phase in the process, but by the fact of the translation being reviewed by a person other than the translator”. So the figure of the reviewer or reviser comes to the front page in this standard, which also “contributes to the professionalisation of the translator and, more importantly, the reviser” (Biel 2011: 61). The translator does the first revision and a reviewer performs the second revision. In other words, it takes two people to engage in the translation revision process, and they assume shared responsibility for the final deliverable. Not only does the standard establish terminology regarding revision but it also makes a clear distinction between the role played by translation reviewers and by revisers.

The EN-15038 (2.8) defines the review process (unilingual revision) as the examination of a target text ‘for its suitability for the agreed purpose and respect for the conventions of the domain to which it belongs’ (2006: 5). And the same standard defines revision (comparative revision) as the examination of ‘a translation for its suitability for the agreed purpose, compare the source and target texts, and recommend corrective measures’ (2006: 5). The European standard also states that self-revising or checking by the translator of his/her own work as well as translation revision (conducted later by a person other than the translator) are obligatory parts of the process, whereas review is not (2006: 11). Section 5.3.5. reads ‘[i]f the specifications of the service product include a review, the reviewer…shall carry out a monolingual review to assess the suitability of the final translation for the agreed purpose’ (2006: 12).

To sum up, the EN 15038 European standard joins other quality translation standards, like the German DIN 2345 Standard, the Canadian CGSB 131.10-2008, in assessing the quality of the translated text through a rigorous translation revision and review process.

*2.11.2. Skills and competencies of translation revisers and reviewers*

As per the EN 15038 standard, translation revisers must have the following five competencies:

1. Translation competence: Comprises the ability to translate texts to the required level. It includes the ability to assess the problems of text comprehension and text production a as well as the ability to render the target text in accordance with the agreement.
2. Linguistic and textual competence in the source language and the target language: Includes the ability to understand the source language and mastery of the target language. Textual competence requires knowledge of text type conventions for as wide a range of standard-language and specialized texts as possible, and includes the ability to apply this knowledge when producing texts.
3. Research competence, information acquisition and processing: Involves the skills required to conduct an objective and critical investigation of a language or translation issue. It also comprises the capability to separate out relevant information and to ignore data that is useless. The information processing is based on the assumption that translators' and revisers' minds can only process a limited amount of information at a time, without becoming overloaded.
4. Cultural competence: Includes the ability to make use of information on the locale, the behavioral standards and the value systems that characterize the source and target cultures.
5. Technical competence: Comprises the abilities and skills required for the professional preparation and production of translations (EN 15038, 2006: 7).

In section 3.2.3 the European standard states that reviewers shall also be domain specialists in the target language; should have a recognized degree in translation, and at least five years of professional experience in translating.

The Standard Guide for Quality Assurance in Translation ASTM F2575-06 was published in 2006, the same year its European counterpart was approved. EN 15038:2006 specifies the requirements for translation service providers (TSPs) with regard to human and technical resources, quality and project management, the contractual framework, service procedures, and term definitions (2006: 5). US standard 2575 sets up a series of guidelines to be followed by all stakeholders involved in the translation process, that is, translation agencies and translation buyers (2006: 1).

As far as definitions of terms related to translation revision process are concerned, the US Guide uses the term Editor, while the European Standard uses the term Reviser. An editor is a "bilingual member of the translation team who compares a completed translation to the source text for the purpose of validating the accuracy of the final target text, and gives detailed feedback" (2006: 2). The EN-15038 standard defines a reviser in these terms:

> The reviser shall be a person other than the translator and have the appropriate competence in the source and target languages. The reviser shall examine the translation for its suitability for purpose. This shall include, as required by the project, comparison of the source and target texts for terminology consistency, register and style. (2006: 11).

Another term defined in the European standard is that of the 'third party reviewer': "a person assigned by the requester or supplier to evaluate a completed translation for quality or end-user suitability" (2006: 11). And it adds "when the third-party reviewer is located in the target locale, this person is often known as an in-country reviewer" (2006: 4).

While the EN standard specifies that the reviser shall be a person other than the translator, the US standard introduces the role of a third-party reviewer (a "person assigned by the requester or supplier to evaluate a completed translation for quality or end-user suitability"), which specifies the double role translators can have (5.3.4, 2006: 11).

In-country reviewers play an important role in attaining and increasing consistency and improved translations to any software product before they are launched globally. And translation revision activities help translators improve their skills.

*2.11.3. In-country reviewers' responsibilities*

We will mention briefly the most common items that ICRs look for when reviewing software UIs: semantic issues (for instance, faulty or inappropriate translation); truncated, incomplete, un-translated, and blank strings; spelling mistakes; terminology (industry accuracy and consistency); missing or wrong placeholders and variables;

omissions; readability, grammar, style, cultural sensitivity, and errors that would prevent the end user from using the software product (Hansen 2009b: 278-279). Reviewers help ensure the quality of the localized products through terminology and stylistic consistency.

### 2.12. Software product end-users and customers

Byrne states that "[t]he user is the real reason the original document was produced in the first place and subsequently translated" (2006: 14). The goal of in-house translators and reviewers is to make sure that users will be able to perform the tasks for which the localized versions will be used. Byrne points out that some users treat the target text as if it were the source text, and when they find translation errors or other linguistic issues they no longer trust the localized version (2006: 15). Worst of all, when localized versions contain language errors, performance might be affected. Truncated text, strings that were not localized and corrupted characters are among the most common issues.

Below we outline some characteristics shared by the PLM software user groups based on our electronic surveys. For more information, please see Appendices D, E, F and G.

1. Language skills

Byrne mentions two types of users in technical texts: the source-language user, and the target-language user (2006: 15). Independently of the language version selected, all end-users share the same objective: to accomplish the job or task the software products are supposed to do. Some users have language proficiency in both English and Spanish (these are source and target language users). Some have language proficiency in Spanish only (these are target language users). And some others have a significant technical language proficiency in English but a good command of Spanish (these are the source language users).

2. Frequency of use

Our customers make use of the PLM software applications on a daily, weekly or monthly basis. In other words, they are primary or direct users (intermediate to high degree of usability). Many of them have been using the PLM software applications for several years. Since they learn routine operations, they use codes and abbreviations for data input.

3. Computer knowledge

Most of our text receptors have high-level computer skills. They are software designers, CAM and CAE users. The only connection between the translator and the end-user is the target text. The purchase of a software product is not like buying a TV set, where you choose a brand, a model, and plug it in when you get home. If you do not like the features, or the sound or the video images, you return it to the store. But you cannot return a software product back to its publisher. You have to live with it.

If the application user does not understand a command, for instance, they will have to consult the technical documentation or place a phone call to the global support center for assistance. When the user finds a mistake in the localized user interface – perhaps some words are truncated and the command cannot be understood –, he or she might fill in a Problem Report. In either situation, a translation error might cause delays in the customer's daily work activities.

As mentioned above, several teams of knowledgeable professionals are involved in the design, development, translation, translation revision, reviewing and testing of the software products. They all play key roles in providing the end-user with a reliable localized version that aspires to be a mirror of the source version.

## 2.13. About Siemens PLM Software Inc.

In 2007, German-based Siemens AG acquired the product lifecycle management (PLM) American vendor UGS Corporation. Neil concluded that "[t]he news of the $3.5 billion deal caught many by surprise, as it was the first major move by an automation company to add PLM (Product Lifecycle Management) technology to its stable" (2007: 2). The resulting company describes itself as follows:

Siemens PLM Software, a business unit of the Siemens Industry Automation Division, is a leading global provider of product lifecycle management (PLM) software and services with 7 million licensed seats and more than 71,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with companies to deliver open solutions that help them turn more ideas into successful products. (Siemens Website, February 2012)

### *2.13.1. A brief description of the Siemens PLM software products*

In this section we will briefly describe three of the industrial applications developed by Siemens PLM Software: NX™, Solid Edge™, and Teamcenter™.

Siemens software products include, among others, a commercial software suite (NX), an integrated set of collaboration tools (Teamcenter), and an application bundle for solving calculation problems (Solid Edge). The company's portfolio contains other software products designed for large- and medium-size companies. The English software user interface, technical documentation and courseware of the three applications are translated into 10 languages: Brazilian Portuguese, Chinese (Simplified and Traditional), French, German, Italian, Japanese, Korean, Russian, and Spanish.

NX is the oldest software product. Sayen notes that it was originally brought to market under the Unigraphics (McDonnell Douglas/EDS/UGS) and I-DEAS (SDRC) brands. Indeed, some customers still refer to it as UG (UNIGRAPHICS) (2011: 1). That technology originated in the 1960s and evolved into what we think of as a CAx (Computer-aided Technologies) system in the 1970/1980's. The NX brand was introduced when UGS and SDRC were merged in 2001 (Sayen 2011: 2). NX 10 is one of the most important software applications in the machining world, which includes "bulletproof simulation and analysis tools". It includes design, engineering analysis and manufacturing capabilities" (Siemens Website). This product is used across industry sectors and is available on multiple platforms, such as Microsoft Windows, Mac OS X and Linux. The new JT file format for sharing data has become very popular and widely used in the automotive industry. Displaying models in a "lightweight format makes it easier to load up large models" (Dean 2010: 3). The introduction of Synchronous Technology delivers "faster and more flexible part and assembly modeling, improved multi-CAD capability, streamlined digital simulation and more efficient manufacturing" (Siemens brochures). NX includes the "industry's broadest suite of integrated, fully associative CAD/CAM/CAE applications enhancing the development processes in product design, manufacturing and simulation". NX's integrated process automation tools enable companies to capture and reuse product and process knowledge (Siemens brochures).

Teamcenter is the "middle child" (Sayen 2011: 1). It was originally brought to market with the i-MAN (EDS/UGS) and Metaphase (SDRC) brands. That technology was started in the late 1980s and evolved to what we think of as a cPDM system in the late 1990s and early 2000s. It also includes technology that was originally released as separate products/brands (Slate, VisProducts, E-Vis, etc.). The Teamcenter brand "was introduced originally by a company called Inovie in the late 1990's and included just project management and document sharing capabilities" (Sayen 2011: 1). SDRC acquired Inovie in 2001 and soon afterwards it started to reposition the Teamcenter brand as being more than project management. It became the umbrella brand for all of our cPDM products when UGS and SDRC were merged in 2001" (ibid.: 2). Teamcenter is known as "the company's flagship digital lifecycle management portfolio". It provides a comprehensive suite of solutions that include "best practices and standards-based processes" (Siemens Website). It allows program teams to "better coordinate resources to meet the strategic needs of their company and drive product and program performance". It also facilitates "instant collaboration among team members across the globe by allowing them to connect, communicate and share information on-demand". Boasting the broadest suite of solutions, Teamcenter enables companies to fully "understand the impact of change and automate processes throughout the lifecycle". One of the Teamcenter solutions includes a "robust knowledge management framework for configuration, record keeping and audit tracking across multiple industries" (Siemens brochure).

Of the three, Solid Edge is the youngest product and the only one to maintain its brand identity since its initial introduction. The technology and brand were originally developed in the mid 1990s by Intergraph. The Solid Edge product/brand was acquired by UGS in 1998 (Sayen 2011: 2). Solid Edge is an "industry-leading mechanical design" software product comprising a "family of modular and integrated solutions for creating and managing 3D digital prototypes" (CIMdata 2010: 28). Its modeling and assembly tools enable engineers "to easily develop a full range of products, from single parts to assemblies containing thousands of components - greater than 200,000 parts" (ibid.: 2010: 30). Solid Edge provides companies around the world with a "fully integrated design management" system allowing them to benefit from its "functional innovations", "complete and accurate designs" and error-free solutions. It also helps manufacturing organizations manage "product and process complexity", which is a cause for concern in the market today (Siemens website).

The three software products are highly technical in nature and clearly pose numerous challenges for in-house translators, in-country reviewers and vendors, who are translating, revising and reviewing their content in any language combination.

In the next chapter we will present the literature review and provide a synthesis of the general principles related to translation revision activities, types of revision processes, such as checking, proofreading, unilingual and bilingual revision as well as revision parameters. We will complete this chapter by focusing on the concept of linguistic error in translation revision, different types of translation errors, and the effects of errors in localized software versions.

# Chapter 3: Literature review

## 3.1. Introduction

The aim of this chapter is to review literature published on translation revision/review procedures since 1980 so as to provide a broader and more comprehensive perspective. The 'translation/proof-reading/editing' routine (as it is generally known in American English) is not a new field within Translation Studies, but revision in a localization environment is more recent (Robert 2008: 2). Nonetheless, the use of translation memory programs, revision software tools and terminology management systems has changed the nature of traditional translation revision procedures. Moreover, García points out that "[t]ranslating and revising for localisation requires special skills that are distinct from those required for translating and revising for publishing or other purposes" (2008: 49).

Comprehensive translation applications and centralized terminology databases have become the norm among software translators or localizers as well as freelancers in the last decade. Though translation memory tools can be traced back to the 1970s, it is only since the turn of the century that they have been fully accepted and integrated. These cutting-edge technologies have allowed translators and local revisers to work in an increasingly interactive and collaborative way, besides coping with diverse linguistic and technical challenges. According to Beninatto and DePalma, this "'collaborative translation' model is better suited to our instant communication era" due to the nature of the so-called 'simship standard' - or simultaneously shipping of software versions in multiple languages - applied by digital publishers (in García 2009: 211). The main point made by Beninatto and DePalma and reinforced by García is that both translation and translation revision stages should be replaced with a 'better model', where revision takes place in sync with translation:

> Thus, translations would be undertaken in parallel rather than consecutively, with as many translators and subject matter experts as possible, while doing away with editing/proofreading roles, with the idea being to avoid mistakes from the outset rather than detect them at the end. (Beninatto and DePalma, in García 2009: 211)

The literature on translation revision within Translation Studies is, to a certain degree, limited to just a few studies, notably Brunette 2000, Hernández Guerrero 2005, Hosington and Horguelin 1980, Künzli 2007a, Mossop 2010, Nord 2005, O'Brien 2012, Parra Galiano 2005, Robert 2008, and Williams 2004. As Künzli points out, studies on translation revision have concentrated on "conceptual and/or didactic aspects" and are mainly addressed to translation students and practitioners, whereas, "empirical studies in revision are still relatively rare" (2007a: 44). García (2008: 53) echoes this, maintaining that studies on translation revision "have been scarce in the past", with some exceptions: Sedon-Strut 1990, Vasconcellos 1987, and Shih 2006. Byrne asserts that "this industrial type of translation has been largely neglected in the literature on translation theory", perhaps because it has been considered the "poor cousin" of translation in academic circles (2006: 1).

On the other hand, many books and articles on translation revision have been authored mainly for training purposes, outlining extensive models or guidelines for evaluating and grading translation output. Rasmussen and Schjoldager point out that "[m]ost studies that deal with the revision of professional translation focus on conceptual and/or didactic aspects, aiming to help translator trainers and practitioners to improve their work (e.g. House 1981, House 1997, Hönig 1997, Lauscher 2000, Mossop 2007, Hansen 2009a)" (2011: 87).

Research on translation revision using the *English-Spanish* language combination, especially in industrial and/or enterprise software applications as described in Chapter 1, is practically non-existent. Most of the literature focuses on the revision and reviewing procedures of literary and technical texts for publishing (García 2008: 54).

Our literature review is organized around the key WH- questions: 1. What does translation revision work on? 2. Who is the reviser? 3. When does the translation revision take place? 4. How is translation revision done? 5. Why is translation revision done? Based on these concepts we will compare the opinions of the various theorists and researchers on each of the questions.

### 3.2. *What* does translation revision work on?

The first distinction made by Horguelin and Brunette (1998: 3) is this: either the text under examination is a translation, or it is not a translation. The document to be revised is any target language translated document, or, in Hermans' words, "an imitation" of the original source document, but it is not the original. The term 'translation' differentiates the text from other forms (2002: 10).

Hosington and Horguelin (1980: 1), on the other hand, opine that revision "does not apply only to translated texts". They base their argument on the definition of the word 'revise' itself: "to look over again in order to correct or improve a manuscript". According to these authors, revising is a main step in any writing process, since corrections or improvements can always be made during the revision cycle prior to proofreading. This last step allows writers and translators/revisers the opportunity to remove any misspellings, misused or extra words, and so on. A translation draft can be changed several times during this stage, sentences can be reordered, verb tenses changed, vagueness removed, and so on. In order to differentiate the revision of a draft translation from a revision of an original document, Hosington and Horguelin (1980: 1-2) resort to the terms 'unilingual revision' for revising original texts and 'bilingual revision' for revising translations. They also use the term 'comparative revision' when referring to a bilingual revision, since revision entails a comparison of an original piece of writing and its translation.

To conclude, these authors agree that the object of the revision needs to be a translation.

### 3.3. *Who* is the reviser?

Folaron (2010: 430) interestingly observes that back in the 1990s localizers or technical translators and revisers were the first professional teams who had to learn how to use very primitive translation software tools and adapt digitized content primarily written for the American public to other locales.

Section 2.11 of EN 15038:2006 describes 'proofreading' as the printer's job, as opposed to revision of a translated text. In this context it seems that proofreading is not conducted by the reviser, but by someone hired by the printer. Interestingly enough, section 3.1.7.1 of F2575-06 describes proofreading as a monolingual activity, that is, a unilingual revision of the translated text.

The reviser can be either the translator or a person other than the translator (Mossop 2007: 6). Robert uses the term 'revision' to refer to either the process of "revising one's own translation, or to the process of revising somebody else's translation" (2008: 5). Generally speaking, translators have a linguistic background (translation capital) whereas local revisers have knowledge about the software products (subject-matter domain).

In 2005 Brunette et al. conducted a study to determine whether monolingual revision was as effective as bilingual revision, since it could be carried out by unilingual revisers for a lesser cost and would be less time-consuming. The language pairs involved were English into French, and French into English. The results of this study showed that bilingual revision rendered better results than monolingual revision (2005: 41-42). The revision criteria used were accuracy, readability, appropriateness and linguistic coding. Brunette et al. also factored in the number and type of correction, omissions and the errors introduced by the revisers, who were professional translators and university instructors. Mossop explains that monolingual revision is not recommended when higher quality is expected in a translated text (2007: 7).

### 3.4. *When* does translation revision take place?

Generally, professional translators revise their own work during the translation stage, which is known as 'checking' or 'self-revision'. Mossop (2010: 197) also uses the term 'checking' as a form of revising and identifying errors "without necessarily correcting them". He calls this "mental stylistic editing and mental structure/content editing while they translate" (ibid.: 33). Mossop points out that some translations are much easier to read than their originals because experienced translators revise their work and produce translations that are of better quality than the source texts (ibid.: 33).

Robert (2008: 5) remarks that if the translator is doing the revision, this will take place during the translation process and this procedure is called "checking", as per the EN 15038 translation standard. However, if a second translator or reviser is conducting the revision, this will take place on a draft text after the translation is done but prior to delivery to the client (2008: 4). She also indicates that if the revision is done after submittal to the client, it will not be a revision but a sort of translation quality assessment (TQA), since this procedure is conducted on a final text. Delisle (1980) and Bell (1998) also consider translation revision as a final phase of the translation process where the translator verifies the translated text for accuracy: they call this activity 'justified analysis' and 'revision' respectively (in Hurtado Albir and Alves 2009: 63).

Saridakis and Kostopoulou view translation revision and evaluation as the last stage of the translation process (2003: 5). The first phase is the reading and interpretation of the source language text; the second stage refers to the translation itself, or "the decoding of the text's notions and meanings"; and the last one is the translation revision and evaluation of the product necessary for the "adjustment of the TT [target text] in terms of register and style" (ibid.: 5). For them, translation and revision are not two different or separate activities. However, Christine Durieux considers translation revision a "complementary task of the translation process" (in Saridakis and Kostopoulou 2003: 6).

To summarize, self-revision and translation revision are essential steps in the translation process. Translation revision conducted by a professional other than the translator seems to be considered a separate activity from translation, while self-revising seems to be part of the translation process itself. Additionally, translation revision is done on a semi-finished text, whereas quality assessment is performed on a final text (Hernández Guerrero 2005: 685), as we shall see in section 3.12.

### 3.5. *How* is translation revision done?

According to Mossop (2010: 34), source documents should be edited before sending them out to translators. Not everyone has the necessary experience and skills to write a quality text (or a UI segment for that matter), and in some organizations English texts are even authored by non-native language writers.

Robert (2008) discusses the results of an explorative study on the impact of seven translation revision procedures (A through G) used by professional revisers while trying to determine which is the method that renders the highest revision quality. The seven methods are based on unilingual and bilingual revision and a combination of these in different order, as well as the number of times that both source and target texts were read and reread. In 2006 Robert requested Belgian translation agencies to complete a survey that dealt mainly with the way translation revisers perform their job. Out of a total of 117 emails sent out, she received 48 complete surveys back that were analyzed (2008: 9).

Based on the number of times the target text (TT) and/or the source text (ST) are read or not read, and whether these texts are read in full or partially, Robert (2008: 9) contends that there are seven translation revision procedures (A through G), as explained in Table 3.

Table 3. Different translation revision procedures (Robert 2008: 9)

| The TT is read once, the ST is not read at all (or partly): | The TT is read once, the ST is read once: | The TT is read twice, the source text is read once: | The TT is read twice, the ST is read twice: |
|---|---|---|---|
| A - the reviser reads the TT alone without the ST, and makes changes. | C - the reviser compares ST with TT and makes changes. | D - the reviser reads the TT, makes changes, then compares ST with TT, and makes additional changes, if necessary. | F - the reviser reads the ST, then compares ST with TT and makes changes, he finally reads the TT again and makes additional changes, if necessary. |
| B - the reviser reads the TT alone, refers to ST when he thinks there may be a problem, and makes changes. | | E - the reviser compares ST with TT, makes changes, then reads the TT and makes additional changes, if necessary. | G - the reviser reads the ST, then reads the TT and makes changes, and then compares ST with TT and makes additional changes, if necessary. |

Based on the conclusions of the experiment conducted by Robert, four out of the seven methods described above are most frequently used by revisers:

1. The reviser reads the TT, refers to ST if there is an issue and makes corrections (B).
2. The reviser compares ST with TT and makes changes (C).
3. The reviser reads the TT, makes changes, then compares ST with TT, and makes more changes (D).
4. The reviser compares ST with TT, makes changes, then reads the TT and makes additional changes if necessary (E). (Robert 2008: 20)

The study concluded that professional translation revisers preferred procedure “E”, that is, where “the reviser compares ST with TT, makes changes, then reads the TT and makes additional changes if necessary” (Robert 2008: 9). In other words, bilingual revision is preferred to unilingual or monolingual revision. Robert explains that the choice of one kind of revision over the other is personal, and that it also depends on the type of text being revised.

In 2007 Robert conducted a second study: this time she sent out 101 emails, obtaining 21 completed surveys that were analyzed (2008: 11). This time Robert included only four revision procedures (B, C, D and E). Thirty-six percent of translators indicated that they preferred the same revision procedure named “E”, described above: “the reviser compares ST with TT, makes changes, then reads the TT and makes additional changes if necessary” (2008: 9). In November and December 2007 Robert conducted a small-scale survey where she asked respondents to indicate their revising preference: on screen or on paper. A total of 101 emails were sent out and she received

21 completed surveys (2008: 16). An overwhelming majority indicated that they preferred to revise translated text on screen.

As far as time allotted is concerned, bilingual or comparative revisions generally take longer than unilingual revision since "there is twice as much text to read, and it takes time to consider whether the translation adequately reflects the meaning of the source text" (Rasmussen and Schjoldager 2007: 8).

### 3.6. *Why* is translation revision done?

Mossop points out that revision by another translator has two functions: business and training. The business function refers to the revision done for a customer, whereas the training or didactic function refers to the revision conducted for training other translators or less experienced ones (2010: 174-177).

Parra Galiano observes that translation revision is one of the systems used to evaluate the quality of a translated text (2007: 198). According to Hosington and Horguelin, translation revision means examining a manuscript for correction and improvement (1980: 1). The Revision Manual developed by the European Commission Directorate-General for Translation states that translation revision has a three-fold purpose:

1. To improve the draft translation
2. To determine the quality of a translated text, and
3. To provide training for translators, revisers and students. (2010: 6)

Hosington and Horguelin also maintain that the purpose of revision is to achieve "clarity of thought", "clarity of expression", and to improve the quality of the translated text (1980: 1). In other words, the translated version should be trusted and accepted by the native language readers as if it had been written in their language.

Sadirakis and Kostopoulou (2003: 3-5) explain that the purpose of revision is to identify defects, inadequacies or errors in the translated text "after having acquired a complete picture of the text, at all its levels, morphological, syntactic, lexical, etc." Hosington and Horguelin (1980), Mossop (2010), Newmark (1988), and Williams (2004), as well as others, also share this viewpoint. There is a clear consensus among authors that translation revision allows the translator or reviser to improve the draft translation. What these authors differ on is the terminology and methods used and in the extent of the translation revision activity.

Gouadec adds that translation revision aims at harmonizing different translating styles (2007: 18). A translator's style is usually defined as the specific and unique way a translator conveys the meaning of a particular text, that is, his or her linguistic preferences. Localized software products should read as if the same professional had translated the whole source text, since "chunking" or the distribution of UI segments, technical documentation and courseware content among several translators located across the world is a very common practice within the present globalized translation industry (Mossop 2006: 789-790). The fact that translators work in teams located in different countries heightens the risk of inconsistencies in terminology (Hartley 2009: 113). Qualified revisers can help produce smoother localized versions.

Furthermore, Mossop mentions that revision is necessary to enforce rules (2010: 20). One of the responsibilities of local revisers is to make sure that translation style guidelines have been complied with. In-house translators and local revisers working for digital software publishers generally design their own translation standards and conventions that determine the style, register and grammar rules to translate UI content, technical documentation, courseware and video scripts. For example, there may be a rule about when to use the pronoun 'we' or 'you' in video scripts. Another rule may determine the tenor of the text, that is, how to address the end-user in UI segments, either by using the Spanish formal *usted* (you) or the informal *tú* (you). Or there can be rules governing English abbreviations, acronyms and initialisms, for instance: should these be translated or left in English? Should we use the passive or the active voice to mimic the English text? And so on.

### 3.7. ***What*** **are the reviser's duties and responsibilities?**

Parra Galiano asserts that translation revision has become an important component within the translation profession and also acknowledges it has become "a specialty" or a distinctive field of work in the last decades (2007: 198). One important reason for this "new field" within the translation industry is the high number of "translators with limited experience" that are hired to work for government agencies as well as for private corporations. Consequently, translation revision has become an integral part of any translation environment, such as software localization, to control quality (Parra Galiano 2007: 198).

In the context of translated published materials, Gouadec asserts that the proofreader is one of the stakeholders for controlling what the translation should look like in terms of length, content and style (2007: 46). Additionally, Gouadec observes that the proofreader complements the translator's job, in the sense that they are both responsible for the quality of the final text (ibid.: 127).

## 3.8. Types of translation revision

Revision is defined in EN 15038 as "to examine a translation for its suitability for the agreed purpose, compare the source and target texts, and recommend corrective measures." The reviewing task is defined in the same standard as "to examine a target text for its suitability for the agreed purpose and respect for the conventions of the domain to which it belongs and recommend corrective measures" (sections 2.10 and 2.8, respectively, under Terms and Definitions). The revising task involves a bilingual reading of both the source and the target text, while the reviewing task is simply a unilingual reading of the translated product without contrasting both texts. However, recommending corrective measures is a feature of both tasks.

In the context of the English translation industry, translation practitioners and project managers use the following English terms almost in an equivalent manner: checking, cross-reading, editing, proofing or proofreading, reviewing, revision, comparative revision, re-reading (Allman 2007: 36, Martin 2012: 5).

It should also be noted that one of the aims of the EN 15038 standard is to unify the terminology used in the translation industry. The ASTM F-2575 standard is a guideline designed to provide a framework for translation buyers and customers on specific requirements for translation projects (2006: 1). The ASTM F-2575 calls the activity performed by a second translator 'editing', while it is called 'revision' in EN 15038. Therefore, there has been no effective standardization.

### *3.8.1. Checking and self-revision*

Section 5.4.3 of EN 15038:2006 describes 'checking' as a way "to make sure that the meaning has been conveyed, that there are no omissions or errors and that the defined service specifications have been met". The translator shall then make any necessary amendments. One of the translator's duties is to correct all typos, resolve any ambiguities and see that the whole text has been translated.

Mossop also discusses 'self-revision', describing it is the act of revising or 'cross-checking' the translated document against the source text by the original translator (2010: 8). Hosington and Horguelin use the phrase 'unilingual revision' for what Mossop calls 'self-revision' (1980: 1). Tim Martin argues that self-revision, which is a clearly understood phrase, is not revision at all, and adds that the EN 15038 section 5.4.3 defines self-revision as simply 'checking' a translation, since revision is done by a person other than the translator: "This process shall include checking that the meaning has been conveyed, that there are no omissions or errors and that the defined service specifications have been met" (2007: 61).

Mossop distinguishes between the persons who perform the revising: the 'translator' and the 'reviser' (2010: 17). Therefore, 'self-revision' or 'checking' is an activity carried out by the translator, while 'other-revision' means a revision performed "by a person other than the translator" (section 5.4.3 of EN 15038:2006). Self-revision is an "integral part of the translation production process in which one revises one's own translation" (Mossop 2010: 202). This corresponds to Horguelin and Brunette's (1998: 4) '*relecture* or *autorévision*' (in Rasmussen and Schjoldager 2011: 89).

### *3.8.2. Revision, reviewing and editing*

Mossop makes a clear distinction between 'revision', 'reviewing' and 'editing' within the translation field (2010: 1). 'Revision' is "the process of checking a draft translation for errors and making appropriate amendments" (ibid.: 201). 'Reviewing' is an evaluation performed by a subject-matter expert of a translated manuscript mainly "to identify conceptual or terminological errors" (Mossop 2010: 201). 'Editing' is "the process of checking a non-translational text for error and making appropriate amendments, with special attention to making the text suitable for its readers and intended use" (Mossop 2010: 198). As far as the text itself is concerned and based on Mossop's definitions, we could conclude that 'revising' and 'reviewing' are activities conducted on translated texts, while editing, although sharing the same purpose as the other two, is performed on non-translated content.

Additionally, Mossop argues that the tasks of both the 'reviser' and the 'editor' are closely related: "Revisers and editors amend texts in two ways: they correct and they improve". They act as 'gatekeepers' making sure that the wording of a translated text "conforms to society's linguistic and textual rules and achieves the publisher's goals" (2010: 17). Mossop also compares the translation reviser or editor to a language therapist, that is, a person with special knowledge or skills who improves the text and determines whether it can be understood and/or used by readers or end-users. Therefore, revision is a kind of therapy and a constant improvement of any translated text for the readers or customers' sake (Mossop 2010: 17). As far as the person is concerned, or as to who does what, reviewers, revisers and editors examine the translations or writings made or authored by another professional.

### *3.8.3. Proofreading and copy-editing*

Proofreading and copy-editing are editorial skills associated mainly with original texts, as opposed to translations. Proofreading refers to "the reading and checking of proofs", hence its name, and it is done on the copy of a final written text (dictionary.com). Copy-editors also work on finished copies, usually as a final step before the written text goes to printing. Copy-editors are not proofreaders, although some of their tasks might overlap. Walsh asserts that copy-editors "are charged with simply looking for typographical and mechanical errors on copy that has already been typeset" (1995: 1). In magazine and book publishing, copy-editors are also supposed to verify facts extensively, and have the liberty to rewrite bad writing (ibid.: 1).

In the translation field, Mossop defines 'copy-editing' as "checking a text to bring it into conformance with pre-set rules, including the publisher's house style, rules of correct usage, and the grammar, punctuation and spelling rules of the language" (2010: 198). According to Mossop, proofreading has two meanings: 1) in editing - "comparison of the printer's proof with the manuscript", and 2) in revision - unilingual re/reading, which implies a reading of the translation without checking the source text, mainly if this is limited to making corrections but no improvements (2010: 200).

On the other hand, Gouadec proposes that 'proofreading' and 'revision' should be kept as two separate activities. The proofreader makes sure that the whole content has been translated and that the translation has also complied with language use, the client's specifications and the function of the text (2007: 18). Gouadec further explains that the proofreader's job is to find any defects or mistranslations in the draft text without interfering with it, since the reviser is the one who will then correct and improve the translation (2007: 35). If the translation has not achieved a "revisable quality" status, continues Gouadec (ibid.: 76), the reviser may ask the translator to make the necessary changes. Additionally, if the quality is sub-standard, the translation buyer can hire a different translator and "question any payments to the first translator" (ibid.:

76). Based on Gouadec's views, proofreading is similar to Mossop's concept of checking or self-revising, a form of revising and identifying errors "without necessarily correcting them" (2010: 97), as indicated above.

### *3.8.4. Thorough revision and cross-reading*

In the 2010 European Revision Manual (ERM) two types of revision are described: 'thorough revision' and 'cross-reading'. 'Thorough revision' refers to the revision sentence by sentence of the whole translated text "with no reference to the original" (ERM - 2010: 6-7). This step allows translators the possibility of seeing their work with fresh eyes and improving the draft, especially if there has been some kind of temporal distance between the translation and the thorough revision, and even "between the main revision and the final delivery of the translated document" to the client (Newmark 1988: 223).

Some translators would call this 'unilingual revision' or 're-reading' (Mossop 2010: 30). However, if the translation is a new version of an old document, the reviser will conduct only a partial revision, that is, they will revise the portions of the text that are new.

In a cross-reading type of revision, the reviser reads the target language text and, if finding something awkward, they will resort to reading the original text and see where the problem lays (Mossop 2010: 6-7).

### *3.8.5. Bilingual and unilingual revision*

We would like to point out some differences between bilingual and unilingual revision. In a unilingual revision a reviewer identifies linguistic errors, makes corrections and improvements without consulting the source text. This is what Mossop calls "a read translation only" (2007: 8). A comparative or bilingual revision implies a reading of both source and target text. The reviser's competence and the time allotted to each task are the main differences between these two types of revision. Bilingual revisers are supposed to be translators themselves since they are dealing with the original and the translated texts. On the other hand, unilingual revisers "shall be domain specialists in the target language" (DS/EN 15038: 2006: 3.2.4)." Rasmussen and Schjoldager claim that revision "is rarely fully comparative" because translators tend to do a unilingual revision followed by a bilingual rereading (2011: 87).

### *3.8.6. Pragmatic, formative and didactic revision*

Hosington and Horguelin mention three types of bilingual or comparative revision: pragmatic, formative and didactic, as far as the function is concerned (1980: 1-2).

The purpose of a pragmatic revision is to “correct errors both in language and meaning” while improving the end product of translation (Hosington and Horguelin 1980: 2).

‘Formative revision’ refers to a “revision carried out in a translation bureau or service”, where the reviser’s role is to train the translator (Hosington and Horguelin 1980: 2). And didactic revision takes place in a classroom for the purpose of preparing student translators as revisers. Therefore, the aim in the formative and didactic revision is identical, in other words, it is training, but what changes is the venue: one takes place in an office while the other at a school (ibid.: 2). For these authors, proofreading is part of revision.

Saridakis and Kostopoulou state that quality in the didactic approach “is aimed at an ideal optimum but no *single* achievement of a translation task” (2003: 7). However, in a production translation environment type (such as localization), the quality will largely depend on “the systematization and quantification of the translation process phases”, the interaction of all team members, deadline and other specifications set by the development company (ibid.: 7-8). Formative (didactic revision) is “the training of younger translators by senior translators” and summative revision takes place at the end of the translation process and its objective is to correct the translation (Durieux in Saridakis and Kostopoulou 2003: 6). This type of revision is important if the translator is novice or a student, if they are using a new technology such as a new software translation program, and if performance is critical.

As far as who does the revision, Brunette uses the terms ‘pragmatic’ and ‘didactic’ reviser (2000: 170). The main difference between these two types of revisers is that there is no communication or contact between the translator and the pragmatic reviser. They probably work for different agencies and do not have “to justify the changes they make to a text by citing authoritative sources and providing irrefutable examples” (Brunette 2000: 170). Unlike pragmatic revisers, a didactic reviser’s role is to improve a less experienced translator’s skills; for this reason, there is a communications channel between these two and the changes made by the reviser are documented.

Christine Durieux describes two types of revision: formative (for translator trainees and beginners) and summative, also called 'didactic revision' (in Saridakis and Kostopoulou 2003: 6-9). Her concepts seem to match the tutor-student relationship for evaluation purposes and mark assignment, and are similar to the formative and didactic revision concepts defined by Hosington and Horguelin above. As reported by Durieux, the purpose of summative revision is to correct the translation once it is completed, and to decide whether it meets the required standard or effectiveness (in Saridakis and Kostopoulou 2003: 6).

### *3.8.7. Translation revision and critique*

Compared to other activities, translation revision and review are different from a critique or an evaluation of a translated text in that the reviser or reviewer works on a draft text, which will become the final version after the proper examination and correction (Hernández Guerrero 2005: 685; Robert 2008: 4).

A translation critique involves a deep analysis of both source and target texts for the purpose of finding differences and similarities in accuracy, register, grammar, syntax and vocabulary items. Ammann's functional model of translation critique starts from the translated text and involves a five-step analysis: (1) the function of the translated text in the target culture; (2) the intratextual coherence of the translated content; (3) the function of the source text in the source culture; (4) the intratextual coherence of the source text; and (5) the intertextual coherence between both the source and the target texts (in Snell-Hornby 2006: 110-111).

A translation revision aims at finding and correcting mistakes in the draft translation for improving purposes. A translation critique is an analysis of the final product where there are not corrections.

Table 4 describes the five questions in the translation revision process in human translation and compares them with pre- and post-editing in a machine translation system.

Table 4. The five questions in the translation revision process

| HUMAN TRANSLATION AND REVISION | | | | | |
|---|---|---|---|---|---|
| **ACTIVITY** | **WHAT** | **WHO** | **WHEN** | **HOW** | **WHY** |
| CHECKING OR SELF-REVISION | First translated draft | Translator | During and after first translated draft | As per organization's guidelines | Checking omissions, terminology, lexis, style, grammar, and formatting. Translator shall make the necessary amendments. |
| TRANSLATION REVISION | Translated text | By a person other than the translator (bilingual reviser) | After translation has been checked | As per organization's guidelines | Comparison of the source and target texts for terminology consistency, register and style |
| TRANSLATION REVIEW | Translation revision (bilingual comparison of ST and TT) | By a person other than the reviser (can be a monolingual professional) and this step might be optional | After translation has been revised | As per organization's guidelines | Evaluation of completed translation for quality or suitability |
| FINAL VERIFICATION | Final text | TSP or in-house translator | After submittal of final text | As per organization's guidelines | Linguistic and functionality testing |
| **MACHINE TRANSLATION** | | | | | |
| **ACTIVITY** | **WHAT** | **WHO** | **WHEN** | **HOW** | **WHY** |
| PRE-EDITING | Raw translated output | Translator or Pre-editor | Before translation | As per organization's guidelines | Preparation of text for translation |
| POST-EDITING | First draft translation | Translator or post-editor | After translation | As per organization's guidelines | Examination and correction of text |

## 3.9. The American translation standard versus the EN translation standard

Below is a list with the different definitions regarding translation revision activities extracted from both the European and the American translation standards. Included are the specific translation revision related terms and their definitions in both standards.

### Checking

EN 15038: "The translator shall check the translation for omissions and confirm that the defined parameters (terminology, lexis, style grammar, and formatting) have been met. The translator shall make the necessary amendments" (2006: 11).

F2575: No formal definition.

**Editing**

En-15038: No formal definition.

F2575: Editing is conducted by a "bilingual member of the translation team, who compares a completed translation to the source text for the purpose of validating the accuracy of the final target text, and gives detailed feedback" (2006: 2).

**Pre-editing**

EN 15038: "Preparation of the text for translation by an automatic or semi-automatic machine system (machine translation, translation memory)" (2006: 6).

F2575: Machine translation (also called *automated translation*) generally requires human participation before the computer processes the source text (2006: 3).

**Post-editing**

EN 15038: "Examination and correction of the text resulting from an automatic or semi-automatic machine system (machine translation, translation memory) to ensure that it complies with the natural laws of grammar, punctuation, spelling, and meaning, etc." (2006: 5).

F2575: Machine translation (also called automated translation (generally requires human participation after the translation is produced by the machine (2006: 3).

**Proof-reading**

EN 15038: A term used to refer to "the printer's proof-reading as opposed to revision of a translated text. If the specifications of the service product include monolingual proof-reading, the Translation Service Provider (TSP) shall ensure that the service product is proof-read" (2006: 6-12).

F2575: Proof-reading is conducted by "a reader of printed or electronic target text whose task is to find typographical and formatting errors and verify whether the text is understandable and reads well in the target language without reference to the source text" (2006: 3).

**Reviewing/reviewer**

EN 15038: "If the specifications of the service product include a review, the reviewer, who shall have domain competence, shall carry out a monolingual review to assess the suitability of the final translation for the agreed purpose (e.g. by assessing it for register and to ensure that it respects the conventions of the domain in question)" (2006: 12).

F2575: This standard defines reviewing as an activity performed by a third-party reviewer "who is assigned by the requester or supplier to evaluate a completed translation for quality or end-user suitability" (2006: 4).

**Revising/reviser**

EN 15038: "The reviser shall be a person other than the translator. The reviser shall examine the translation for its suitability for purpose. This shall include, as required by the project, comparison of the source and target texts for terminology consistency, register and style" (2006: 11).

F2575: This standard uses the terms 'reviser' and 'reviewer' as synonyms of 'editor' "to designate persons who perform various aspects of the editing activity" (2006: 2).

**Final verification**

EN 15038: "The Translation Service Provider (TSP) shall verify that the translation service product and its delivery meet the client's specifications" (2006: 12).

F2575: "In addition to proofreading for linguistic and formatting issues, functionality is also tested (for example, verifying that all hyperlinks work in a localized website)" (2006: 10-11).

**In-country reviewer**

EN 15038: No formal definition.

F2575: Term used to refer to a third-party reviewer who is located in the target locale (2006: 4).

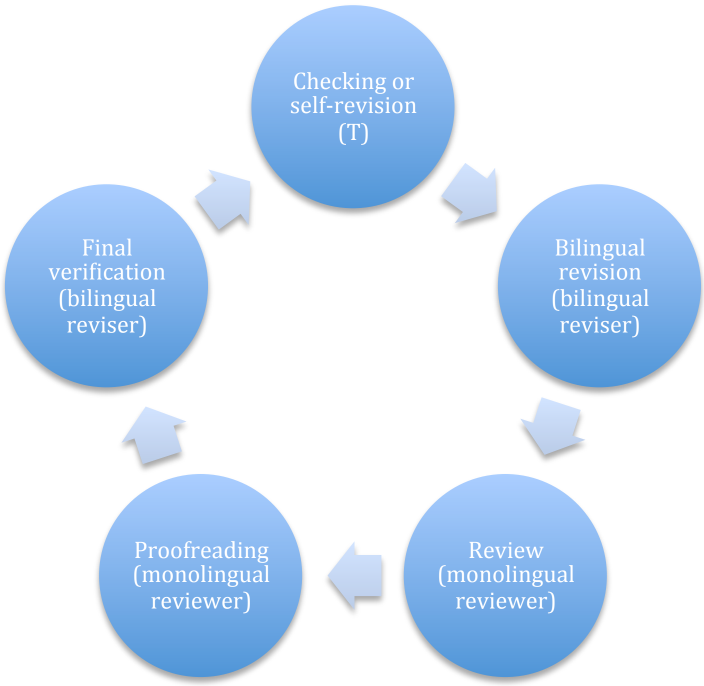
Judging from the definitions specified in the two translation standards, the main differences regarding translation revision terminology are as follows:

1. The American standard (F2575) uses the term 'editor', whereas the European standard (EN-15038) uses the terms 'reviser' and 'reviewer' to refer to the same activity.
2. Review is conducted on target texts only, while revision is a comparison review of both the source and the target texts.
3. Included also in the American standard is a short description of the term in-country reviewer (ICR), which the European standard does not mention.

On the other hand, it should be noted that only the EN-15038 indicates that the translator should make the necessary amendments during the self-revision or checking stage (5.3.3). This standard also states that the "TPS shall take the corrective measures necessary to amend the translation or to retranslate, when applicable, in accordance with the TSP's procedures" (5.3.4).

The following figure shows the steps followed by the translator and reviser as per the model detailed in the European Standard.

Figure 3. Translation revision process according to EN 15038




### 3.10. Ambiguity between English and Spanish key terms and concepts

In the above section we have seen that there is not a lot of consensus among theorists and translation practitioners as far as English translation revision terminology is concerned (as remarked by Martin 2007: 58, Brunette 2000: 169, Robert 2008: 4).

Parra Galiano reminds us that the same confusion is found among Spanish-speaking translation professionals, since the Spanish noun *revisión* seems to be used as an umbrella term outside the Translation Studies community (2005: 13). However, even language professionals use the term *revisión* to denote multiple activities, making matters worse (ibid.: 13).

Added to this ambiguity is the difficulty of translating concepts related to the translation revision phase and at the same time trying to find some consensus among authors. For instance, the English terms 'review' and 'revision' are generally both rendered into Spanish as *revisión*. Parra Galiano points out that the terms *revisión* (review or revision) and *autoedición* (self-revision) are used as synonyms, mainly within the publishing industry (2005: 14-15). On the other hand, the Spanish terms *crítica*, *evaluación* and *revisión* of translations are also used interchangeably (Tardáguila 2009: 368). For clarification purposes, these interventions apply only to a finished product, whereas *revisión* or *corrección de pruebas* apply to a semi-finished text. Even Graham admits that "[t]he duties of the checker and those of the reviser will overlap and both functions may very well be exercised at the same time by the same person" (in Tardáguila 2009: 370). Parra Galiano prefers to translate 'unilingual revision' or 'monolingual revision' as *corrección* (which is the preferred Spanish translation for the English 'checking') because it refers to the changes and improvements introduced by the author, the translator or even the reviser (2005: 17). Parra Galiano also favors using the Spanish term *revisión de la traducción* to *revisión bilingüe* or *revisión comparativa* (bilingual revision) since "it does not mean to verify and revise a text in two languages but to revise and improve the translation by comparing both the source and the target texts" (2005: 17; our translation). Additionally, *autorrevisión* or *relectura* (re-reading) are activities conducted by the translator (Parra Galiano 2005: 17).

In the Spanish literature we have found the following terms related to translation revision: *revisión recíproca, revisión de concordancia, revisión colectiva* and *revisión pericial*. Tardáguila defines *revisión recíproca* as the revision conducted by two translators of each other's work (2009: 371). *Revisión de concordancia* means that one reviser reads the translated text out loud while the reviser verifies whether it matches the original text. *Revisión colectiva* is the revision carried out by a group of revisers, such as terminologists, subject-experts, customers and translators. And finally, *revisión pericial* is implemented when there are contradictory opinions between the translator and the customer (Tardáguila 2009: 131).

Parra Galiano notes that if you just read a translation (*simple lectura de la traducción*) without reading the original text, it does not necessarily presuppose that you are revising it (*Manual de revisión* 2010: 7). To revise a translation means to read both the source text and the target text. And a partial or selective revising of a translation to check its quality does not imply a translation revision (ibid.: 7). Spot-checking or *cala* in Spanish, which is the partial control of a translation to check its quality, is not revision (*Manual de revisión* 2010: 7).

Finally, Parra Galiano (2005: 18) points out that the Spanish term *revisión* applies to a semi-finished product; it is performed by either the translator or the reviser who compares both source and target texts and verifies whether the specifications set forth in the translation brief have been met.

### 3.11. Human translation revision versus machine translation post-editing

Advances in Machine Translation (MT) technology have been impressive in the past decade. Its adoption by several types of organizations, especially by software publishers, is on the rise since it saves time and reduces effort and operating costs (McElhaney and Vasconcellos 1988: 142, O'Brien 2002: 99, Ulitkin 2013: 2). Global companies needing to generate large volumes of documents want quality translations at a faster speed. One post-editor of MT output can process up to 10,000 or 12,000 words per day, compared to the generally approved 5,000 to 6,000 words per day required of a seasoned reviser (McElhaney and Vanconcellos 1988: 147).

Machine translation is a process by which a computer program translates "a wide variety of texts from one natural language into another", with or without human assistance (Hutchins and Somers 1992: 1-3). From a functional standpoint, machine translation adjusts "the machine output so that it reflects as accurately as possible the meaning of the original text" (McElhaney and Vasconcellos 1988: 140). However, without human intervention or post-editing, the full meaning of the source text might not be restored in the translation.

Ryan affirms that some MT systems can "translate up to 1,000,000 words in an hour" (in O'Brien 2002: 100). Following the localization industry translation output requirement of 3,000 words/day, it would take 334 days for a human in-house translator to process this massive volume. Since the raw MT output is far from perfect, it needs to be post-edited or "repaired" (Hutchins and Somers 1992: 1, Krings 2001: 7). Post-editors are responsible for turning automated translated text into a correct translation acceptable to a human reader at an affordable rate (Hutchins and Somers 1992: 1, Laurian 1984: 238).

Laurian posits that post-editing is one of the new specializations within the different translation related fields since "[i]t is not revision, nor correction, nor rewriting" but "a new way of considering a text, a new way of working on it, for a new aim" (1984: 236-238). In a similar vein, Parra Galiano notes that translation revision is *"una especialización en la profesión de traductor*" (a specialization within professional translation) (2007: 198).

In a traditional translation revision setting the text to be revised is a draft translation produced by a human translator. Both translators and revisers will try to "disguise the fact" that the document is a translation (Senez 1998: 4). In an MT environment, a post-editor interprets the automated translation instead of correcting "the interpretation of a colleague" (McElhaney and Vasconcellos 1988: 141). Additionally, a post-edited text shows "the linguistic patterns and stylistic features peculiar to the original language, but this does not necessarily mean the meaning is obscured" (Senez 1998: 4).

Although there might be some overlapping activities between human translation revision and MT post-editing, such as editing operations (cut, copy, paste, delete, etc.), O'Brien outlines four specific distinctions:

Types of errors
Time available
Level of final quality of content
Skills required (O'Brien 2010: 4; 2002: 101).

Other authors also claim that the errors that need to be corrected during both processes are dissimilar, thus requiring particular correction methods (Doherty and Gaspari 2013: 9; McElhaney and Vasconcellos 1988: 141; Senez 1998: 1-3). A human translator is the one who makes the errors in a draft translation, but in a text processed by MT the software itself produces the errors. Laurian has classified the nature of the errors found in machine-translated texts as "errors on isolated words, errors on the expression of relations, errors on the structure and errors on the information display" (1984: 237). O'Brien adds the following problems: loss of capitalization, incorrect punctuation, and extremely high or low fluency (2010: 9).

There are two major types of post-editing: 1) 'conventional or full post-editing', which aims at recreating a similar text in the target language or equal to a human translation; and 2) 'quick or rapid post-editing', which aims at producing a correct text without "taking care of the style", especially for texts that will be read only once (Laurian 1984: 237; O'Brien 2010: 3).

Laurian's observations are based on several studies she conducted on the SYSTRAN translation output produced in Luxembourg within the Commission of the European Communities (1984: 236). The results of her experiments served as a model that would enable a supervisor to select which texts would be translated by a human translator and which ones would be processed by machine-translation (ibid.: 237).

Pursuant to Laurian's experiment with post-editing, the only factor that differentiates one type of post-editing from the other (conventional versus quick post-editing) is "time limitation".

Materials to be post-edited can be divided into three groups:

1. Post-editing is necessary to make the text clear
2. Post-editing is possible in order to adapt the text for communication purposes; and
3. Post-editing is superfluous because the text does not need to be polished (1984: 237).

Just as traditional translation revisers need to be trained in revision, so post-editors need to be trained in post-editing (O'Brien 2002: 99). However, the groups require different sets of skills. According to Vasconcellos, "post-editing skills are developed gradually" and after the first 100,000 words or one month of full-time post-editing, a post-editor's "level of comfort" will be increased (1986: 145). Greater exposure to this activity and a better understanding of the nature of errors in machine-generated translations will improve the post-editor's performance.

Although post-editing skills are different from translation and revision skills, some are transferrable. O'Brien points out that "[w]e cannot assume that a qualified translator will be a successful post-editor" (2002: 100). Nonetheless, O'Brien recognizes that post-editing skills can bring translators more employment opportunities (ibid.: 100).

In Table 5 we have summarized some additional differences between traditional translation revision and machine translation post-editing. They highlight the mode of operation, the time spent on these activities, number of words revised or post-edited on a daily basis, as well as mechanical, structural and conceptual corrections.

Table 5. Differences between translation revision and post-editing
(McElhaney and Vanconcellos 1988: 142-144, Vasconcellos 1987: 411)

| Traditional translation revision | Machine translation post-editing |
|---|---|
| Reviser might or might not work directly onscreen, except when working in a localization environment. | Post-editor works directly onscreen. |
| Reviser has to make sure that the whole text has been translated. | Post-editor "has the assurance (at the mechanical level) that nothing has been skipped or repeated". |
| Changes made by the reviser might not be final. | Changes made by the post-editor are final but the output might be edited by the client. |
| Errors in numerals and spelling are more likely. | Errors in numerals and spelling are unlikely. |
| Required number of words revised in a localization environment in eight hours: up to 6,000. | Number of words post-edited in eight hours: 6000 and up to 12,000 words. |
| Reviser might or might not be able to replace terms globally or selectively. | Post-editor is able to replace terms globally or selectively. |
| Might miss the point of a sentence. | Misunderstandings might happen with one lexical item. |
| Time spent on revising might not be that important. | Time is of the essence: the less time used the better. |

How does translation revision compare with translation post-editing, understood as the correction of any text translated by a machine? According to O'Brien, revisers working on machine translation output should have knowledge of MT systems, text linguistics, controlled language writing skills and terminology management (2002: 102). Translation revision in a localization environment shares some characteristics with this newer form of tool since they both use translation memory output. A second similarity between these two processes is their requirement for an extensive "cognitive knowledge to 'polish' a text" (Guerra Martínez 2003: 13). The difference lies in the type of text that is to be revised: while translation revisers rely on "well-translated texts", post-editors work on translated-machine output (ibid.: 17).

Brunette (2000: 181) considers the post-editing of machine translation texts to be a type of revision, as we will see later in this chapter. On the other hand, Laurian posits that "[p]ost-editing is not revision, nor correction, nor rewriting. It is a new way of considering a text, a new way of working on it, for a new aim" (1984: 238).

We conclude with the following statement by Vasconcellos: "revision is a discovery process, while post-editing is an ongoing exercise in adjustment" (1987: 409). In the same way a reviser is trained to find errors in order to improve the translation output, a post-editor is trained to act as an inspector, judging each segment for accuracy.

### 3.12. Translation revision and quality control mechanisms

Software development companies aim at providing their customers with accurate national language versions of their products or, "zero-defect translations" (Gouadec 2007: 18). Larose states that this zero-defect goal is "probably unrealistic" (in Williams 2004: 10). One way to determine the accuracy of the final product is to perform Translation Quality Assurance or TQA. The purpose of this process is to test the linguistic performance of any software product before it reaches the market.

In a broader context, Quality Assurance (QA) and Quality Control (QC) are two different processes. Yet they are used interchangeably across some industries to refer to ways of ensuring the quality of a service or product (Tian 1990: 7). Firstly, QA is process-oriented while QC is product-oriented. The American Society for Quality (ASQ) defines both terms on its Webpage titled "Quality Assurance and Quality Control". Quality assurance is "the planned and systematic activities implemented in a quality system so that quality requirements for a product or service will be fulfilled". And quality control is defined as "[t]he observation techniques and activities used to fulfill requirements for quality". A second difference between these two methods is chronological: quality assurance procedures are applied *during* the development of a product or service, quality control procedures are applied *after* the product has been manufactured or the service is ready to be delivered (IT Standards and Organizations glossary 2011: 2).

Quality control aims at detecting and eliminating errors and their consequences as well as doing away with "rework and wasted resources" (Hinckley 1997: 873). In this sense, translation revision and quality control seem to pursue the same objective – to reduce error or mistake rates. However, Hinckley claims that what we still do in QA and QC is "judgment inspection", that is, to spot defects in a product or language issues in a translated text (1997: 875).

Since translation revision is a significant cost-driver in any localization project due to the time involved and the investment in bilingual personnel, some software publishers resort to TQA, that is, a quality evaluation performed on some portions of text or sampling, as opposed to revising thousands and thousands of words in a limited period of time (Williams 2009: 6). Brunette states that quality control "is always performed on only part of a (final) text", or a sample, which "may consist of a specified number of words in one section, or of several sections, depending on the length of the text" to determine its quality (2000: 171). She also describes quality control as a reading or a "'formal language check' of the translated text" (ibid.: 171). Mossop agrees that quality control is "synonymous" with translation revision, but adds that TQC can be performed on the whole text or just a sample to check whether some or all the translation parameters have been met (2010: 201). TQA is also important for end-users "because they want to know whether they can trust the translators and rely on the quality of their products" (Hönig 2010: 15).

Although these terms are closely related, Mossop makes a clear distinction between 'quality control', 'quality assurance' and 'quality assessment' within the context of the language industry (2010: 109). Quality control "always occurs before the translation is delivered to the client" whereas "quality assessment may take place after delivery" (ibid.: 117). Moreover, Mossop defines 'quality assurance' as "a set of processes applied before, during and after the translation process" by all members of an organization (ibid.: 201). This method is intended to evaluate the performance of the system in relation to deadlines, interaction among all members and quality of the text for the purpose of improving quality.

As far as Translation Quality Assurance (TQA) is concerned, Brunette explains that "[q]uality assurance, in the form of a *fresh look* at a translation, falls somewhere between didactic revision and quality control" for the following reasons:
"The reviser regards the text from the reader/end-user's perspective"
"The reviser does not refer to the original text, unless there is an issue", and
"The translation is considered a separate text and is assessed as if it were a monolingual text" (2000: 172).

Brunette also points to a sharp distinction between translation revision and quality assessment: "To begin with, they belong to different areas: didactic revision is part of translation, whereas translation quality assessment comes under management" (2000: 171). Assessments and validations are tools used by the receptors or translation buyers to determine the quality of the translated text.

Williams describes TQA as either a quantitative or a qualitative method: quantitative TQA measures the number and type of errors (major and minor) that are found in a text of "fixed length" "as in the case of most academic instruments" (2009: 4-6), whereas qualitative TQA identifies how the reader or user feels about the translation through "interviews and questionnaires" (ibid.: 4). As far as function is concerned, TQA can be 'diagnostic' (finding "areas for improvement"), 'formative' (“measuring progress and giving feedback”) or ‘summative’ (“measuring the results of learning”) (Williams 2009: 4).

Mossop’s concept of TQA in translation is similar to the one used by the American Society for Quality. He states that it refers to “the whole set of procedures applied before, during and after the translation production process, by all members of a translating organization” (2010: 201). Its purpose is to warranty the compliance with translation standards: “The goal of every operation or production system is to generate a useful product” whether it is to manufacture a car, provide a personal service or translate a document (Hinckley 1997: 873).

Another quality control mechanism is ‘translation assessment’ generally performed on the whole text for the purpose of judging or evaluating it (Brunette 2000: 170). Mossop states that quality assessment is performed “on selected parts of a translation and after delivery to the customer” by a third party, and is basically used for “employee performance assessment” and selection of new hires or contractors (2010: 201). On the other hand, Brunette explains that quality assessment is ‘comparative’ in nature: “the TT can undergo a second check (in the form of an assessment), at the translator’s request” and that this generally occurs when “payment is contested”. Therefore, those corrections, if any, are “more strategic than didactic” (Brunette 2000: 172). Mossop explains that the main difference with other control methods is that no corrections are made in an assessment (2010: 201).

### 3.13. Time and cost of revision activities

As we have indicated earlier, the EN-15038 standard establishes that a translated text shall be revised by a person “other than the translator” to ensure quality (5.4.3). Many translation buyers see translation revision by a second translator or reviser as a “cost increase in time and efficiency” (Saridakis and Kostopoulou 2003: 6). Tim Martin also argues that translation revision is a “valuable and costly resource”; therefore, it should be applied selectively or intelligently (2007: 57). One way to do this is to assess translations done by vendors based on a pre-established QA model. The resulting metrics will determine the type of revision, whether full or partial, or correction or improvement, to be applied on that particular translation project (Rasmussen and Schjoldager 2011: 91). Martin proposes that translators indicate in writing the main problems found during the translation stage so that revisers can concentrate on the main issues, thus spending less time on revision efforts (2007: 61). Additionally, Martin suggests that translation providers need to match a job with a translator who has the expertise and subject matter knowledge. Translations done by professionals will lower translation revision costs (2007: 60).

Although some translation agencies might skip the translation stage for financial reasons "since it makes the process even more cumbersome, slows translation delivery" and there is "no guarantee that the improvements will be worth it", others realize that revision helps to improve the quality of the translated product (Charles Martin 2012: 6). Scholars and language professionals, on the contrary, emphasize the special role translation revision plays in improving the quality of the translation output (Martin 2012: 3, Tim Martin 2007: 58, Saridakis and Kostopoulou 2003: 9). Software publishers particularly see revision as an added benefit in translation quality assurance, provided that the costs are kept to the minimum (Tim Martin 2007: 1).

Translation and revision errors cost money and result in customer dissatisfaction and an increase in Problem Reports (or corrigenda requests) as well as a loss of reputation (DGT 2012: 8). One of the basic principles of Total Quality Management (TQM) is to do something right the first time, since "it is usually more expensive to correct errors than to 'get it right the first time'" (DGT 2012: 5). Revision changes and corrections imply an investment in staff, money and time. According to DeFeo, costs related to defects or deficiencies in products within the manufacturing industry generally range from 15 to 30% of the total operating cost (2001: 32). Additionally, DeFeo states that when a company removes deficiencies in products and processes, it will also lower its total cost (2001: 30). The European Commission's Directorate-General for Translation has indicated that for some companies, part of the deficiency-related costs are hidden since they are not easily identified due to the so called 'iceberg effect' (2012: 2-4). The DGT establishes the following items in order to calculate the cost resulting from translation and the changes made in draft translations:

Estimate of the time spent on a certain activity

The average yearly cost (salary, IT, office, space, etc.) per staff member

The number of days worked per year (daily availability rate) 5 (average for the service, not individual staff)" (2012: 2).

Translation costs at the European Commission amount to some EUR 300 million per year (2010: 2). Below is a table with the cost breakdown of corrigenda requests or problem reports "for translation services dealing with legislative texts" extracted from a study by the European Commission conducted in January 2012. According to this study each corrigenda request takes 4 hours, "100,000 euro per translator per year and the 100,000 euro per translator per year and the 200 working days per year". This cost also includes the time cost of two administrators and four assistants to help handling these requests. The total yearly cost for these corrigenda requests was 547,000 EUR (approximately US$733,000) in 2012.

Table 6. Yearly costs for handling corrigenda requests
by the European Commission (2012: 31)

| Cost area | Cost calculation | Totals per year |
|---|---|---|
| Corrigenda-related effort in the language departments | – 4 hours on average per request => 590 requests x 4 hours = 2360 hours<br>– 2360 hours equals 295 translator days = 1.475 FTE<br>– 1.475 x 100 000 EUR = 147 500 EUR | 147,000 EUR (approximately US$197,000) |
| Team for handling corrigenda requests | – 2 AD x 100 000 EUR = 200 000 EUR<br>– 4 AST x 50 000 EUR = 200 000 EUR | 400,000 EUR (approximately U$S 536,000) |
| Total | | 547,000 EUR (approximately US$733,000) |

Information on time spent by translators on correcting translation mistakes is not well tracked by private companies, as explained by the DGT:

> The replies from the language departments to the question of how much time they spend on average on corrigenda requests varied greatly, from half an hour for a very simple request to several working days for highly complex cases. To obtain a more precise figure, language departments would have to keep track of the time spent on corrigenda requests for a period of 6 months to a year. (DGT 2012: 31)

Based on the numbers provided by the DGT, our calculations show that the cost of corrigenda requests or "poor-quality costs" at the European Commission is about 0.19% of the yearly operating costs. Following the 'iceberg effect', the hidden costs could make up for up to 15% of the translation revision costs, as suggested by DeFeo above, although they are very difficult to quantify. Once again, customer dissatisfaction and loss of reputation are the main consequences of translation and revision issues (DGT 2010: 8).

There might also be invisible costs in translation revision activities that are unaccounted for, such as "small corrections and improvements" made by translators or revisers when changes have occurred in the source text that can affect not only those segments, but other segments already revised (Koskinen 2008: 141). Some translators go an extra mile to improve localized segments during the translation revision stage without counting in the "production figures". In other words, for some in-house translators revision could be a constant activity. Koskinen calls this "the category of extra effort" since she "finds slips and errors a normal part of translation work" (2008: 141). For instance, she mentions that all documentation translated by the Finnish Unit at the European Commission goes through a strict peer revision system before its release (2008: 141).

### 3.14. Dealing with translation revision errors

The European Commission reminds us that both "translation and revision are human activities" (unless we use machine translation programs) and, consequently, prone to error (2012: 15). Mossop also asserts that "indeed, even the best writers and translators make mistakes – sometimes serious ones" (2010: 18). Hinckley stresses that the key issue in any process is to determine the source of the mistakes and to avoid them because this will definitely "result in increase productivity, more customer loyalty and less costly litigation" (1997: 879).

Software localization is very different from translating and revising a "standard linear text" (Foltz 1993). User Interface (UI) segments resemble a maze of elaborate design and multiple pieces that only can be partially seen when opening an application and navigating through its paths and directions. Pym explains that we no longer read texts in a linear way, starting at one end "in a certain direction, and reading through to the end at an equally pre-determined point" (2011: 2). When reading printed text, "the content is displayed in a straight line of paragraphs and pages from beginning to end" (Stewart 2009: 1). However, when opening a user interface (not linear or flowing text), users face a different reading and writing experience: "The key differences between hypertext and traditional print relate to textual boundaries, mobility and navigation. What hypertext changes is the presumption of linearity" (McDonell 2003: 8). Hypertext has incorporated several features that are not found in linear texts, such as linking, videos, 2D and 3D images, and interactive maps. More flexibility and control allow users to choose the functions they need and when they need them (Foltz 1996: 19-21). Text is "broken into units" or, for example, into UI strings, thus "texts become short segments, without narrative progression, and are presented and treated in isolation" (Pym 2011a: 6).

What has also changed is the way professionals translate and revise this new text genre, where there is no starting or ending segment but a continuous text. Software products are open-ended systems that allow authors to add further modules or nodes (Storrer 2002: 165).

Foltz (1993: 8) agrees with Pym when he observes that this type of text breaks cohesion and negatively affects the reader's comprehension. Following Pym, Dorchies states that "[w]ithout cohesion, a written work can seem choppy and may not flow well; a lack of coherence challenges the reader and can hurt comprehension, thus rendering your attempt at communication ineffective at best" (2012: 3).

By detecting and correcting manifest errors in the target text before the publication or distribution date, and by checking whether or not technical terms have been used consistently and that translation guideline styles have been followed to the letter, translators and revisers are reducing the risk of issues and controlling the quality of the text (Mossop 2010: 201, Parra Galiano 2007: 198, Williams 2004: xiii).

Byrne states that to find a translator or reviser liable for an error, the end-user needs to prove that the translation is "faulty" and that it "has caused harm" to the customer (2007: 11):

> Translation errors are, of course, potentially embarrassing for the client; the translations represent the company and any flaws, mistakes or imperfections reflect badly upon the company much as dirty fingernails reflect badly upon a surgeon. (Byrne 2007: 9)

This "ripple effect", as Byrnes describes it, not only has a negative impact on the company, its employees, such as translators, ICRs, but also on its end users and other stakeholders (2007: 10).

### *3.14.1. Defining an error*

Mossop defines an error as "any feature of a text that requires correction or improvement", the text being either an original text or a translation (2010: 198). For Hansen, error in translation "arises from the existence of a relationship between two texts": the source and the target texts (2010: 385). On the other hand, Williams (2004) makes a distinction between a language error and a translation error. He uses Delisle's definition of 'language error': "an error that occurs in the target text and can be ascribed to a lack of knowledge of the target language or of its use" (in Williams 2004: 162). As per this definition, the error found in the translated text arises out of the translator's lack of competence and knowledge of grammar of the target language. A 'translation error' is then the result of "the misinterpretation of a source text segment or methodological error" (Williams 2004: 165). The error found in the translated text arises out of lack of knowledge or ignorance of translation principles.

This interpretation is similar to Nord's, who also defines an 'error' as "an offence against a norm in a linguistic contact situation" which might be "the result of deficient linguistic competence or a lack of comprehension due to deficient factual knowledge (2005: 186). In other words, errors result in failures to recreate an equivalent message or portions of a message in the target language.

The term 'defect' is also used by Williams to refer to a failure to meet a usability requirement or reasonable expectation (2004: 160). Imperfections or defects found in translated text might cause a malfunction in the interaction with a software product.

Hansen explains that translation errors can be caused by "misunderstandings of the translation brief or of the contents of the ST" or "by factual mistakes, terminological or stylistic flaws and all kinds of interferences between ST and TT" (2010: 385). Written language interference is a real issue in translation and translation revision, especially in software localization. It refers to the transfer of an element in the ST that does not exist in the TT or that is different. This shift happens at different levels - lexical, cultural, syntactic, grammatical or structural (Franco Aixelá 2004: 50-51).

### *3.14.2. Error analysis*

What are the most common types of errors in software localization? Linguistic errors can imperil the communication act, as pointed out by Brunette (2000: 179), Hansen (2009a: 278) and Manzoor (2011: 17).

Below we show the main errors found in Web localization based on the typology presented by Jiménez-Crespo (2011: 321). The main types of error are lexical, syntactic, linguistic, typographic, pragmatic, localization and translation.

**Lexical**

(1) Loanwords (2) Barbarisms (3) Calques (4) False friends (5.1) Lexical coherence/ superstructural (5.2) Lexical coherence/ microtextual (6) Wrong lexical item

(7) Acronyms (7.1) Punctuation or spaces in acronyms (7.1) Capitalization in acronyms (7.2) Anglicisms in acronyms

**Syntactic**

**(**1) Syntactic calque (2) Formal/informal (3) Subject/verb agreement (4) Dialectal syntax (5) Prepositions (6) Gender or number agreement (7) Pluralization of acronyms (5) Ambiguity

**Stylistic**

1) Phrasing/ wording (2) Short sentence (3) Appellative function (4) Register (5) Ambiguity (6) Omission/ incomplete

**Typographic**

(1) Cacography (2) Diacritical marks (3) Inconsistent capitalization (3.1) Borrowings/ capitalizations (3.2) Capitalized sentences (3.3) Capitalization/ months, languages, etc. (3.4) Decades (3.5) @ sign (3.6) Punctuation/numbers (3.7) Format currencies (3.8) Quotation marks (3.9) Capitalization/ abbreviations (3.10) Ampersand (&)

**Pragmatic**

(1) Appellative function (2) Sociocultural norms (3) Explicitation (4) Genre conventions (5) Cloned structure 6) Other pragmatic

**Localization**

1) Untranslated segments (2) Segments in other languages (3) Encoding (4) Incorrect syntax (5) Incongruent text/ image (6) Visual metaphor

**Translation**

1) Opposite sense (2) Wrong sense (3) Nonsense (4) Addition (5) Omission

Jiménez-Crespo based the above error typology on the analysis of a “40 million word comparable corpus of original and localized web texts” using the English-Spanish language combination (2011: 316). It should be noted that this typology does not include errors related to the source text (ibid). Jiménez-Crespo also states that he has added certain error categories, such as pragmatic and functional errors (Nord, 1991, 1996, 1997, Martínez and Hurtado, 2001), that are not included in present localization industry quality assessments (2011: 325-326).

The typology presented above applies to our study in these categories: Lexical, Syntactic, Stylistic (Phrasing/wording, Register, Ambiguity, Omission/ incomplete), Typographic, Pragmatic (sociocultural norms and genre conventions), Localization (placeholders should be added), and Translation.

### 3.15. Parameters in translation revision

In Table 7 we show Darbelnet's model of revision parameters that can be applied to a lexical unit or to the whole text (in Hosington and Horguelin 1980: 18-19). The first column shows the seven parameters in which "the translation and revision process function", while the second column details the questions that the reviewers needs to ask about the translation draft (ibid.: 18-19). Darbelnet proposes these revision parameters based on the seven levels of translation: semantics (meaning), naturalness and fluency (usage), tone (style), cultural adequacy (cultural context), equivalences (allusion), author´s underlying intentions (explication), and readership´s needs (audience).

Table 7. Darbelnet's model of revision parameters

| Parameters | Questions |
|---|---|
| 1. Meaning | Has the translator conveyed the overall meaning of the ST and the basis message accurately? |
| 2. Usage | Is the target language idiomatic and appropriate to the subject? |
| 3. Style | Have the stylistic features of the original been successfully rendered in the translation? |
| 4. Cultural context | Have any cultural differences been taken into consideration? |
| 5. Allusion | Have acceptable equivalents been found for the different allusions in the original? |
| 6. Explication | Have the author's underlying intentions been respected? |
| 7. Audience | Has the translation been adapted to suit its audience? |

Hosington and Horguelin set up five criteria for revising translations: accuracy, correct usage, transparency, tone, and audience appropriateness, which would equate to clarity of thought, clarity of expression and quality of the translation. These measurable factors emphasize translation revision from a didactic and a professional perspective (1980: 24). Hosington and Horguelin also observe that while these parameters show revisers what problems should be looked for in a translation, they do not offer a solution. Additionally, Hosington and Horguelin argue that there are other external factors that influence a reviser's job, for instance "work habits, professional status (freelance versus salaried), work environment, client's demands", as well as "time and profitability" (ibid.: 26).

Table 8. Hosington and Horguelin's model of revision parameters (1980: 24-25)

| Parameters | Details |
|---|---|
| Accuracy | The translation should convey the message of the ST accurately and in its entirety. |
| Correct usage | The translation should comply with syntax, grammar, barbarisms, and mechanical aspects: spelling, punctuation and style. |
| Transparency | The translation should be idiomatically correct. It must be clear, concise and cohesive. |
| Tone | The translation keeps the same register as the source, formal, conversational, etc. |
| Audience appropriateness | The translated text should be adapted to the locale. |

The European Standard EN-15038 recommends translators who are engaged in self-revision to take into account the following seven parameters: terminology, grammar, lexis, style, locale, formatting, target group and purpose of the translation (2006: 10-11).

Table 9. Translation revision parameters as per EN-15038

| Parameters | Details |
|---|---|
| Terminology | Compliance with specific domain and client terminology, as well as terminology consistency throughout the translation |
| Grammar | Syntax, punctuation, orthotypography, diacritical marks, spelling |
| Lexis | Lexical cohesion and phraseology |
| Style | Compliance with style guidelines, register and language variances |
| Locale | Local conventions and regional standards |
| Formatting | Compliance with the SL text formatting |
| Target group and purpose of the translation | Compliance with the purpose of the translation and the audience |

Mossop's twelve parameters are divided into four groups: Transfer, Content, Language and Presentation (2010: 125). In Table 10 the four groups are shown in the first column; the middle column explains the questions that the reviser should ask about the translation output; the third column refers to the sub-parameters.

Table 10. Mossop's model of revision parameters (2010: 125)

| Parameters | Questions | Sub-parameters |
|---|---|---|
| Group A (Transfer) | 1. Does the translation reflect the message of the source text?<br>2. Have any elements of the message been left out? | 1. Accuracy<br>2. Completeness |
| Group B (Content) | 1. Does the sequence of ideas make sense? Is there any nonsense or contradiction?<br>2. Are there any factual, conceptual or mathematical errors? | 1. Logic<br>2. Facts |
| Group C (Language) | 1. Does the text flow?<br>2. Is the language suited to the users of the translation?<br>3. Is the style suited to the genre? Have correct terminology and phraseology been used?<br>4. Are all the word combinations idiomatic?<br>5. Have the rules of grammar, spelling, punctuation, house style and correct usage been observed? | 1. Smoothness<br>2. Tailoring<br>3. Sub-languages<br>4. Idiom<br>5. Mechanics |
| Group D (Presentation) | 1. Are there any problems in the way the text is arranged on the page: space, indentation, margins, etc.?<br>2. Are there any problems of text formatting: bolding, underlining, font type, font size, etc.?<br>3. Are there any problems in the way the document is organized: page numbering, headers, footnotes, table of contents, etc.? | 1. Layout<br>2. Typography<br>3. Organization |

Mossop recommends a revision procedure listing the errors or problem areas that revisers need to look for (Mossop 2010: 125). Or, as Horguelin and Brunette (1998: 39) explain, revision parameters are the replies to the question 'What needs to be checked?' (in Tardáguila 2009: 372, our translation).

The parameters described by Darbelnet, Hosington and Horguelin, Mossop and the European Standard seem to point to the following four as their common denominator: Accuracy, Fluency, Correctness and Style (or Presentation). One of the revision parameters set up by the European Standard highlights the purpose of the translation and the intended target group (locale) category but it also emphasizes the compliance with the style guidelines provided by the client. This standard also mentions consistency with the terminology. Darbelnet's model similarly includes the audience category ("Does the translation suit the audience?") as well as the locale parameter ("Have any cultural differences been taken into consideration?"). Hosington and Horguelin echo this parameter as 'audience appropriateness'. Mossop's model asks a similar question: "Is the language suited to the users of the translation?" He calls the genre issue a sublanguage or a particular domain "(Is the style suited to the genre?)"

### 3.16. Error categorization

We have seen in section 3.15 that translation revision parameters are used to identify translation errors (actual problems) requiring intervention. It is essential to determine the severity and the quantity of errors (undesirable effect) in order to have a reasonable judgment about the translated text. In-country revisers need to ask themselves: What do we need to measure in the translation output and how many problem reports are we receiving from our end-users?

Williams classifies translation errors into three levels: critical, major and minor, based on industrial quality control systems (2004: 67). Critical is a "defect that is likely to prevent performance of the product and should be fixed immediately to avoid dissatisfied customers". A major defect will decrease the utility of a product and the end result is unreliability. And a minor defect is "not likely to reduce the utility of a product" (ibid.: 67). Williams concludes that both critical and major defects have very negative consequences for the final user since this type of defect might render the text or parts of the text unusable (ibid.: 68).

Ishikawa observes that "one can never allow a critical defect, but a small number of minor defects is acceptable" (1998: 51). However, the propagation or "snowball effect" of a minor error in translation memory systems can endanger the quality of the final translation. Austermühl highly recommends controlling the quality of UI segments before storing them in databases (2006: 77). Unfortunately, some translation memory software applications do not "provide the easy manipulation and updating of new or modified terminology" (Enriquez-Raído and Austermühl 2003: 239). Therefore, the propagation of errors or defects is sometimes unavoidable in a localization setting. And when readers find repeated minor errors, either typographical or grammatical or even an inconsistency, they might even doubt the validity of the translation (Byrne 2006: 222).

Nord classifies translation errors into four categories: pragmatic translation errors, cultural translation errors, linguistic translation errors and text-specific translation errors (2001: 73-74). According to Nord, although pragmatic errors are easily solved, their consequences are very serious since receivers "are getting wrong information" (2001: 76). This type of error can only be detected through a bilingual comparison (revision) of both source and target texts (ibid.: 76).

Nord recognizes that the severity of both cultural translation and linguistic translation errors depends on the influence they exert on the function of the target text, whether referential, appellative, expressive or phatic (2001: 76-138). Based on a particular function, a linguistic translation error might or might not be more critical than a cultural translation error or even than a pragmatic translation error (ibid.: 76). Nord also points out that linguistic errors result from deficiencies in the translator's source or target language competence (ibid.: 77).

Newmark also opines that "referential errors are both more important and potentially more dangerous than linguistic errors… though they are often ignored or excused" (1988: 189-190). Referential errors are errors about the facts or the information provided in the source text, for instance, a date, a chemical formula, or an inventor's name (Nord 2001: 41).

We conclude with this statement by Sigrid Kupsch-Losereit: "an error is an offence against "the function of the translation, the coherence of the text, the text type or text form, linguistic conventions, culture- and situation-specific conventions and conditions, and the language system" (in Nord 2005: 73).

## 3.17. Translation quality metrics

We are going to briefly mention the human error categorization measures found in four translation performance metrics with a quantitative dimension, since we will be using one of them in our translation and revision practical session.

Both government and private organizations use different evaluation metrics to inspect and assess translation deliverables. Some methods are based on frequency of errors, others on severity of errors, and still others on both. The purpose of creating evaluation metrics was "to reduce time, money, human effort and subjectivity and to introduce a more systematic type of analysis" (Secară 2005: 39) as well as to improve assessment processes for all parties involved.

### *3.17.1. The SAE J2450 model*

This model is mainly used in the automotive industry and allows companies to compare the quality of translation deliverables, regardless of how the translation is performed, whether human translation, computer assisted translation or machine translation. Focusing mainly on terminology assessment, the model does not evaluate style errors.

Therefore, it is not suitable to evaluate marketing literature, for instance. However, it categorizes defects into serious (s) and minor (m), and each error is assigned a weight between one (1) and five (5). Five indicates a very serious error and 1 corresponds to an error with a minimum consequence (Schütz 1999: 5).

### *3.17.2. The Canadian Language Quality Measurement System (Sical)*

Sical is a Translation Quality Management (TQM) model developed by the Translation Bureau, a federal organization created to provide services for Canadians in the language of their choice: English or French (Translation Bureau website). The model was created to save time and money and to provide translations with zero defects, given the millions of words translated by the said agency on a yearly basis. Consequently, instead of revising each project containing thousands of words, evaluators select and assess a sample of 400 words in a certain language combination. The Canadian model distinguishes between translation transfer errors and language errors, and classifies them as major and minor. The acceptability of any translated text will depend on the number of errors made. A rating of A means "superior (0 major errors/maximum of 6 minor); B = fully acceptable (0/12); C = revisable (1/18); and D = unacceptable" (Williams 2004: 3).

### *3.17.3. The ATA TQM model*

Instead of using a minor and major error quality metrics, the American Translators Association (ATA) has modified its model for assessing translations. The new evaluation model assigns a number of error points (from 1 to 18), from Passed to Failed to a translated sample containing in between 225 and 275 words. The ATA TQM model includes a weighting system to define the severity of an error. Each error carries a certain weight and it is marked with a letter or a combination of letters to determine the severity of each error (Secară 2005: 40).

### *3.17.4. The LISA QA Model*

LISA was the now defunct Localization Industry Standards Association. Though first published in 1995, the LISA model is still used to assess the quality of localization projects and uses a weighting system. In this model, errors are categorized as Minor, Major or Critical. A weight or numerical multiplier multiplies the number entered in any of the error categories. At the end, all the scores are added and the total score determines whether the evaluation has passed or failed (LISA QA metric).

As we have seen, these four models classify errors in human translation basically as major and minor. Some error-based models include weighting, that is, a numeric weight added to each error in the evaluation metric. The main function of these models is to highlight and count defects in the target text and classify error types, as well as to set a standard against which the translation quality of any deliverable can be objectively evaluated (Koo and Kinds 2000: 149).

The following list of critical, major and minor errors is based on the LISA Quality Assurance Model and has been adapted to meet the digital publisher's requirements.

Table 11. LISA Error types and categories (Koo and Hinds 2000: 150-152)

| Error Type | Category |
|---|---|
| **Translation Errors** | Critical and Major |
| Missing/broken &xxx; entity | Critical |
| Incorrect command translation | Mistranslation Critical |
| Incorrect source change | Others Critical, when source is not protected |
| Meaning reverse | Mistranslation Critical |
| Missing/incorrect number | Major |
| Translation not matching English | Mistranslation Major - Critical |
| Tag/variable position incorrect | Mistranslation Major - Critical |
| Variable missing | Mistranslation Major - Critical |
| Whole sentence missing | Mistranslation Critical |
| **Content Errors** | Major and Minor |
| Grammar error | Major |
| Improper logic | Accuracy Major |
| Incorrect logical operator name | Style Minor - Major |
| Omission | Accuracy Minor - Major |
| Incorrect product, module and component name | Terminology Major |
| Misspelling | Minor |
| Term inconsistency | Consistency Minor - Major |
| Term mistranslation | Terminology Major |
| Translatable string not translated | Style Minor – Major |
| Typo | Accuracy Minor – Major |
| **Formatting Errors** | Major and Minor |
| Incorrect case | Minor |
| Glossary and mnemonic | Style Minor – Major |
| Punctuation | Style Minor – Major |

The LISA QA model distinguishes between quality assurance and quality control. Quality assurance is done on a sampling of a translated text while quality control is a review of the whole project. Additionally, this model is based on repeatability (the same reviser working twice on the same translated text should obtain the same result) and reproducibility (two different revisers working on the same translated text should obtain the same results) (Koo and Kinds 2000: 148).

### 3.18. How much translation revision is necessary?

Mossop raises the question about the time devoted to translation revision: "How much translation revision is enough?" (2010: 140). First of all, the purpose and the function of the text will determine if the translated text will be read by a second translator or reviser (Mackenzie 2004: 35; Williams 1989: 20). The answers to how, where and why the user or reader will use the text will determine the type and amount of editing:

Will the document be read aloud or silently?
Will the readers read the document from start to finish?
Will the readers read the document for enjoyment or to get instructions? (Mossop 2010: 63)

Mackenzie asks similar questions: "Does the situation require a highly polished translation, a rough or gist translation, or even just a summary of the source text?" (2004: 32). The amount of time spent on revision will also depend on the shelf life of the translation and the number of readers (Mossop 2010: 140). The distribution or perishability of the translation will influence the time devoted to the revision and the quality requirements: "How many people will read the translation? What level of language is required?" (Williams 1989: 21). For example, a translation that "will be read by only a few people within the organization for information purposes, and then discarded" does not need to be an accurate translation, and typos, grammar or style issues will not be taken into account if the general sense of the text has been transferred (Mossop 2010: 140).

If urgency is the main criterion for deciding whether to have a text revised or not revised by a second translator, then a less perfect translation is accepted (Mackenzie 2004: 35, Mossop 2010: 140). As Williams puts it: "A large number of minor errors in language and meaning scattered throughout the text will probably have no adverse impact at all, whereas delays in producing the document may render it useless" (1989: 20).

Mossop argues that the decision to revise or not to revise a draft translation is a financial one, since "revision is expensive" (2010: 140). Some in-house translators might not have revisers, unless they are inexperienced. Therefore, some organizations rely on their translators' work only, without using a "second pair of eyes" (Mossop 2010: 140). Revising does not seem to be a mandatory step: Shih reports that while researching revision practices among translators he found that checking UI segments "was simply not part of the job" (in García 2008: 54). A large number of digital establishments are nevertheless staffed with in-country reviewers in charge of revising UI segments translated by in-house translators for two reasons: 1) to evaluate salaried revisers, and 2) to determine "how much revisers are contributing to their products" (Mossop 2007: 10).

On the other hand, the extensive adoption of quality standards and processes within the language industry has prompted translation agencies to hire revisers, since "in the minds of many translation companies there is certainly no question that such revision or editing is necessary" (Martin 2012: 5). Rasmussen and Schjoldager conducted a study on translation revision policies used by translation companies in Denmark; they concluded that the main factors affecting whether a translation will be submitted for revision are the translator's competence, difficulty of the source text, type of genre, intended purpose and customer's importance (2011: 102-103).

As we stated above, the main task of revision is to find and correct errors. If revisers determine that they have to use "more than 30% of the overall time" required for the translation, then the revision has no purpose since it can result in more errors (Saridakis and Kostopoulou 2003: 9). DePalma also emphasizes that revision costs will escalate if the source text contains many deficiencies (in García 2008: 53).

Charles Martin argues that some improvements that translation revision might bring "are not always worth the extra time, effort and cost," and what is more, "when not executed properly, [revision] can destroy quality" (2012: 4). In this regard, Mossop indicates that changes must be minimized, and knowing when to stop reviewing is essential (2010: 5). He advises revisers to have a procedure in place, for example, a list of errors that need to be checked, as the following:

- Typographical errors
- Unidiomatic word combinations
- Words not easily understood by the readers
- Text not appropriate for the type of genre
- Sentences that contradict each other (2010: 5).

Mossop also asks whether the reviser should correct minor errors or just major ones (2007: 8). Williams considers that major errors affecting the usability of the translation should not be allowed: "For no matter how many strong points a translation may have, the mere fact that it contains a significant error of meaning could cost the customer considerable financial loss and damage her organization's image" (1989: 19).

Hansen mentions that one of the most salient problems in translation revision or the revision conducted by another translator is over-revision or "unnecessary changes":

> A typical situation is that the reviser wants the TT to appear as if it had been translated by himself or herself, or that the reviser does not demonstrate much tolerance for the translator´s original suggestions, even in cases where they are not obviously incorrect. (Hansen 2009b: 261)

In his study, Künzli (2007b: 124) observes a similar problem with a large number of unjustified changes and with revisers who "impose their own linguistic preference at the expense of the translator's decision".

As we have seen translation revision is a research enrichment activity for language professionals. It gives translators and local revisers a second opportunity to confirm, reject or look for new translation equivalents and review technical terms that were selected under time constraints during the translation stage.

It should also be pointed out that, in the localization industry, especially in the US, local revisers are called 'in-country reviewers' (ICRs). Therefore, if we accept that revising refers to the bilingual review of a translated text, in-country reviewers should be called in-country revisers.

### 3.19. Some clarifications on automated translation

SYSTRAN was one of the first developers of machine translation software founded in 1968 by Peter Toma, a scientist and researcher who worked on the original U.S. government MT projects at Georgetown University for Russian-English translation. From a historical perspective, SYSTRAN used a 'rule-based machine translation' system, which relied on countless built-in linguistic rules and bilingual dictionaries "to analyze the source content in order to generate text in the target language" (Systran Website). The second main machine translation software type to consider is statistical machine translation (SMT), which "utilizes statistical translation models whose parameters stem from the analysis of monolingual and bilingual corpora" (Karami 2009: 1). Statistical machine translation is not new, as a matter of fact, it was introduced in 1949 by Weaver. However, this approach was abandoned by researches mainly for two reasons: the scarcity of "machine-readable text from which to gather the statistics vital to such an attack", and the slow speed and small storage capacity of computers at that time (Brown et al. 1990: 79). In 2010 SYSTRAN software started using a hybrid machine translation engine that combines the strengths of rule-based and statistical machine translation to deliver high translation quality for any domain (SYSTRAN Website). Google Translate, for instance, combines SMT and translation memory to increase the quality of their translations (Hernández-Lasa 2011: 1).

To conclude, machine translation quality is much better now than in the 1980s (where they were using algorithms for each language pair), therefore, the reports and studies from the 1980s should thus be taken with a grain of salt.

## 3.20. Clarification on specific terms used in this thesis

We want to clarify that the terminology on translation revision and review used in this thesis is based on the EN-15038 European Quality Standard for Translation Services. Basically, this norm states that any translation work should include translation and revision or review as well. This implies, consequently, that there should be at least two language professionals involved in this type of work: one translator and one reviser (EN Standard 2006: 11).

As explained earlier, in the US software localization scenario, the term In-Country Reviewer (ICR) is more frequently used than In-Country Reviser. Additionally, ICRs are also known as local revisers.

The term localizer is also used to refer to in-house translators working in software localization companies. Below is the description used by the Microsoft Globalization Step by Step to define a localizer's job (2012):

> Localizers translate strings and make other localization changes such as changing the layout of the UI, localizing graphics and multimedia, adapting the build process, and redesigning packaging.

In the next chapter we will restate our research questions, propose our hypotheses, and present our step-by-step methodology. We will disclose all aspects related to the developing, layout and pre-testing of our electronic survey questionnaires as well as our two other instruments, analysis of UI segments and problem report data elements.

# Chapter 4: Methodology

## 4.1. Introduction

Now that we have laid out our foundation, we will restate our main research questions, we will present our hypotheses as well as a detailed plan on how we have conducted our research methodology.

As stated in our first chapter, the main research questions are as follows:

1. What language version (English or Spanish) of the user interface do the Spanish-speaking customers prefer to use? And why? (Level of acceptability of translation)
2. Is the technical terminology used consistently throughout the Spanish-localized user interface? (Level of consistency of terminology)
3. Does the Spanish-localized user interface sound fluent and natural? (Level of adequacy and fluency of the translation)
4. Are there any functional errors in the Spanish-localized user interface that might be caused by the language and/or terminology used? (Level of usability)
5. Does the Spanish-localized user interface take into account the customers' cultural sensitivity? (Level of cultural sensitivity of translated text)
6. Is the Spanish language used in the user interface similar to the language used in the customer's country of origin? (Level of appropriateness of translation)
7. Are the Spanish-speaking customers satisfied with the Spanish-localized user interface of the PLM software products? (Level of satisfaction with translated text)
8. Do the UI segments reflect the meaning of each segment of the source text? Is the wording of the Spanish-localized user interface of the PLM software products easy to read? (Level of completeness and readability of translation)

By answering these questions, we will try to determine if our PLM customers can understand and use the Spanish-localized applications as well as the readers of the English source text. We will also determine whether revision has helped improve accuracy and consistency of the UI content. And finally, we will identify the reason or reasons why a group of Mexican customers prefer to use the English-language version of the Siemens PLM software products.

## 4.2. Hypotheses

A software program can be considered communicatively successful if it appears to have been developed in the target language as opposed to being a translation. Revision of translated output is a necessary process for software text to sound as natural and fluent as possible. Or as Keniston puts it, "a culturally localized program should be indistinguishable from a program written by members of that culture" (1997: 7).

Since a large number of Mexican application users have shown a preference for the English interfaces over the Spanish-language translations, we could think that the Spanish translations are perceived as being significantly inferior to the English-language interfaces.

Therefore, we have broken down this statement into these two hypotheses:

1. The translated interface is unclear since it contains linguistic or stylistic errors.
2. Mexican users perceive the translated interface to be defective.

The first hypothesis is tested by our analysis of the translated and revised segments (method 1). The second hypothesis is tested by our analysis of the user survey (method 2) and the software problem reports (method 3).

## 4.3. Method 1 – Operationalization

In order to operationalize the value "unclear" in hypothesis 1, we have selected the variables that have shown to be relevant in the previous literature chapter. The selected criteria are important because they will tell us whether the intended audience can understand the revised UI segments (clarity) and whether they can use the software products properly (usability).

As far as the error typology presented in section 3.14.2 (Error analysis), these are the categories that apply to our localization situation in Jiménez-Crespo's typology of errors (2011: 321):

**Lexical**

(1) Loanwords (2) Barbarisms (3) Calques (4) False friends (5.1) Lexical coherence/ superstructural (5.2) Lexical coherence/ microtextual (6) Wrong lexical item (7) Acronyms (7.1) Punctuation or spaces in acronyms (7.1) Capitalization in acronyms (7.2) Anglicisms in acronyms

**Syntactic**

**(**1) Syntactic calque (2) Formal/informal (3) Subject/verb agreement (4) Dialectal syntax (5) Prepositions (6) Gender or number agreement (7) Pluralization of acronyms (8) Ambiguity (9) Inadequate verb tense (added by researcher)

**Stylistic**

1) Phrasing/ wording (2) Short sentence (3) Appellative function (4) Register (5) Ambiguity (6) Omission/ incomplete

**Typographic**

(1) Cacography (2) Diacritical marks (3) Inconsistent capitalization (3.1) Borrowings/ capitalizations (3.2) Capitalized sentences (3.3) Capitalization/ months, languages, etc. (3.4) Decades (3.5) @ sign (3.6) Punctuation/numbers (3.7) Format currencies (3.8) Quotation marks (3.9) Capitalization/ abbreviations (3.10) Ampersand (&)

**Pragmatic**

(1) Appellative function (2) Sociocultural norms (3) Explicitation (4) Genre conventions (5) Cloned structure 6) Other pragmatic

**Localization**

(1) Untranslated segments (2) Segments in other languages (3) Encoding (4) Incorrect syntax (5) Incongruent text/ image (6) Visual metaphor (7) Missing placeholder (added by researcher (8) Untranslatable lexical items* (7 and 8 added by researcher)

**Translation**

(1) Opposite sense (2) Wrong sense (3) Nonsense (4) Addition (5) Omission

**Terminology** (added by researcher)

(1) Wrong lexical item (2) Inconsistent lexical item

**Spelling** (added by researcher)

(1) Omission (2) Addition (3) Wrong product name

* Some source-code segments are not supposed to be localized since this can result in many hours of debugging and recompiling, or worst yet, can cause operation crashes which will require costly updates.

The analysis of the ICRs' interventions will help us answer these questions:

1. Does the revised Spanish text communicate the same message as the English does? (Correctness or appropriateness)
2. Have any elements of the message been left out or added? (Completeness)

3. Can the end-user understand the revised content? (Clarity)

4. Does the sequence of ideas make sense? Is there any nonsense or contradiction? (Logic)

5. Are there any factual, conceptual or mathematical errors? (Facts)

6. Is the language suited to the users of the translation? (Style)

7. Have the technical terms been translated consistently? (Terminology)

8. Are there any grammatical errors, spelling mistakes, false cognates, punctuation, missing accents, incorrect capitalization? (Mossop 2010: 125; Muzzi 2005: 21)

### 4.4. Method 2 - Operationalization

In the previous chapter we presented our literature review to explore, among other aspects, the different translation revision parameters that are relevant to improve UI segments. The selected criteria are important because they will tell us whether the intended audience can understand the revised UI segments (clarity) and whether they can use the software products properly (usability).

In order to operationalize the value "defective" in hypothesis 2, we have selected the variables that have shown to be relevant in our literature review chapter: Consistency, Naturalness and fluency, Cultural sensitivity, Appropriate variety of Spanish and familiarity with the language, Accuracy, and Acceptability.

1. Consistency: This is one of the criteria to determine whether the translation is good. Keeping consistent terminology can be difficult when translating thousands of words and sometimes out of context. We want to know whether the terminology has been used consistently throughout the three Spanish-localized software products. If it has not, then the translation is defective.

2. Naturalness and fluency: This criterion determines whether the message has been communicated properly to its intended audience, and whether it has been understood. We want to know if the Spanish text sounds natural and fluent. If it does not, it means that the translation is defective.

3. Cultural sensitivity: Since translation also involves the translation of cultures, there are many cultural issues that must be taken into consideration, such as, pragmatic, lexical, and syntactic and semantic differences between the two cultures. We want to know if the social and cultural contexts of the target culture have been taken into account. If they have not, we the translation will be defective.

4. Appropriate variety of Spanish and familiarity with the language: This criterion determines whether the language used in the translated text is socially and culturally adapted to the intended audience. We want to know if the Spanish used in the software products has respected the language rules of the end-users who live within a particular culture. If it has not, we will consider the translation as defective.
5. Accuracy: One of the concerns when translating and revising UI segments is to ensure the accuracy and entirety of technical information (whether the language and style used allow the end-users to follow and perform the tasks). We want to know if the translation conveys the message of the ST accurately and in its entirety. If it does not convey the message, then the translation will be defective.
6. Satisfaction or acceptability: This criterion determines whether the translated text follows the norms of the target language and culture. We want to know how the audience feels about the revised UI segments. How positive has the customer experience been when using the software products? A negative experience on the customer’s side will mean that the translation is defective.

### 4.5. Method 3 – Operationalization

Linguistic problem reports, also known as modification requests, come from end-users who have identified a linguistic issue in our software products. For obvious reasons, we will be discussing only those reports related to our Spanish-localized applications.

In order to operationalize the value “defective” in hypothesis 2, we have analyzed a series of linguistic problem reports filed by our Spanish-speaking customers against the localized applications during a six-month period. Linguistic problem reports contain descriptions of incorrect in-context linguistic usage. Once filed, these reports are sent over via email to the in-house translator to make the necessary corrections in the UI files.

In this situation we used a deductive reasoning or top-down approach. Therefore, we revised and analyzed the PRs filed against the Spanish-localized applications and identified the variables: mistranslation, inconsistent terminology, old file and directory names, truncated segments, syntactic issues, text field issues and untranslated content.

The analysis of these PRs will help us answer this question: What are the main language problems found by our end-users regarding the Spanish-localized software products? This is an evaluation of the results.

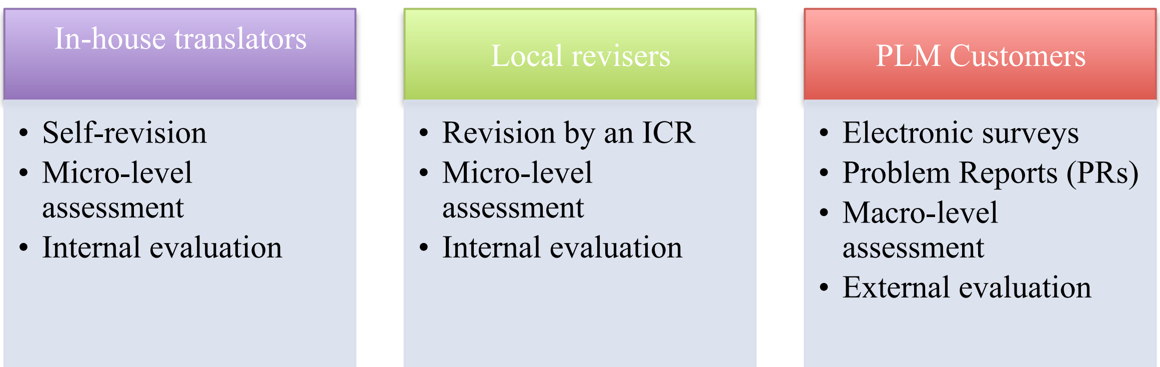
### 4.6. Overview of data-collection methods

In our organization we can only analyze and study translation revision effort as a 'final product', that is, the text in our Spanish-localized software applications (Hatim and Munday 2004: 3). We have no access to data on the detailed process of translation.

We have employed a quantitative and qualitative descriptive research design that is comprised of three main components: 1) a comparison of pre-revised with revised text, 2) an electronic survey evaluation of both the English-language and the Spanish-localized PLM software products by a select group of end-users, and 3) an analysis of a number of Problem Reports submitted by some Spanish-speaking customers. The quantitative and qualitative data collected from the three components will help us determine whether the translated text is clear, natural and fluent, consistent, familiar to the end-customer and representative of the user community's culture.

These three tools function like a three-tier quality control mechanism to test whether a localized software user interface "enables a reader who does not know the source language to think and act as the reader of the source language by having all the information of the source text" (Ponzano 2008: 5). In-house translators, in-country reviewers and application users manage this control mechanism. These three groups comprise the 'quality gatekeeper community' (Figure 4).

Figure 4. The quality gatekeeper community



The results from these three evaluations will help us determine whether the intended audience (end-user group) can understand the text of the Spanish-localized products.

### *4.6.1. Comparison of revised UI segments*

We have first used a textual approach, that is, a comparison of pre-revised UI segments and revised segments because it is based on the evaluation of translation and revision at a word and sentence level, or micro-textual model, which is more appropriate for assessing UI text. Additionally, in our literature review we indicated that when opening a user interface, customers are faced with a different reading and writing experience given the non-linearity feature of hypertexts. UI text is a new genre, where there is no starting or ending segment, but a continuous text.

The unit of analysis has been set to the segment level since it is the largest unit that can be handled. In localization translation, two sentences in the English language cannot be combined into one target text sentence since this will affect segmentation in the TMs.

This comparison will enable us to describe the changes made as well as the corrections that *should or should not* have been made in the Spanish-localized UI segments by the ICRs. We will also indicate whether these interventions were necessary or unnecessary (under-revisions, hyper-revisions and over-revisions). Unquestioningly, this technique is subjective, since it relies on human judgment about the quality of the translation.

### *4.6.2. End-user evaluation*

The purpose of this assessment is to find out how our end-users perceive the PLM software applications in two languages: English and Spanish. This evaluation technique is made up of two elements: electronic questionnaire surveys and Problem Reports (PRs). We have developed four electronic surveys in both languages to measure our intended audience satisfaction with the final localized products. The blank survey forms can be found in the following appendices: D (English survey to evaluate the English User Interface), E (English survey to evaluate the Spanish User Interface), F (Spanish survey to evaluate the English User Interface, and G (Spanish survey to evaluate the Spanish User Interface).

These questionnaires are useful tools for soliciting feedback on the quality of the English-language and the Spanish-localized user interface of the PLM software applications.

Our electronic survey questionnaires procedure will be fully explained below. The second element in the end-user evaluation is the description of Problem Reports submitted by our PLM customers against the Spanish-localized software applications.

*4.6.3. Problem Reports (PRs)*

A Problem Report (PR) or a Software Problem Report (SPR) is simply an online template filled out and submitted by a software user or customer to communicate that he/she has experienced a problem or an incident, or found an error in a given software application. In the localization industry there are other variants of a problem report, such as the Software Bug Report (SBR), which is a similar form to submit bug reports detected during the contract or licensing of a software product (Esselink 2000: 160). A bug (slang word for root of the fault) is a software failure impacting the operation of the product and requiring a corrective action (ibid.: 2000: 161). Problem reports are ranked as critical (show-stopper), major or minor and can track both technical and linguistic issues. Software developers, software engineers, testing engineers, project coordinators or managers, and/or in-country reviewers, depending on the digital publisher's internal organization, generally initiate software bug reports. On the other hand, in-house translators, revisers and reviewers are authorized to submit linguistic reports. Problem reports filled out and submitted by end-users are an essential means for communicating and tracking software bugs and language issues during the implementation and maintenance phases of a software product.

Siemens PLM end-users or customers are allowed to file software problem reports (also known as SPRs or simply PRs) on the software publisher's Web site. Clapp et al. explain that software problem reports (SPRs) "record information such as defects that are found, when and where they occurred, their cause, how they can be fixed, and when the fix has been verified" (1995: 215).

In-house translators, reviewers, and testers can also initiate a problem report against the source text and a localized language version when the issues do merit generating it. As Esselink mentions: functionality problems in the source text, for example: a variable that was translated when it should not have; internationalization problems, for example: incorrect display of characters; and localization problems, for instance: resizing of dialog boxes, English language text in localized versions, screenshots and/or graphics not displayed (2000: 151-160). However, we will be discussing only those problem reports that are related to language issues.

Problem Reports are classified per topic, that is, whether they are functional or linguistic. Information on how many PRs are received by the company on a yearly basis is confidential. Linguistic PRs are classified into minor, major and substantial errors. Minor errors are those that do not affect the integrity of the text, for example, a typographical or orthographical error. A major error is one that will have an impact on the usability of the text, for instance, an omission or a word left unstranslated in an error message or a dialog box. And finally, a substantial error will not only affect the translation but the utility of the software product, such as s wrong variable or file name or a mistranslation that might result in the failure to execute an operation. The difference between these two is the severity of the error and its location, that is, how negatively it affects the text.

Translation revision involves a good deal of negotiation and compromise between in-house translators and ICRs to render a final product that is acceptable to its intended audience based on the six criteria mentioned earlier: consistency, naturalness and fluency, cultural sensitivity, familiarity with Spanish, accuracy and satisfaction. The same communication is necessary, at a different level, among translators, ICRs and the user community. And one way to achieve this is through the submittal of problem reports. Problem report filing is an important effort on the part of our customers to make sure that every linguistic issue is corrected, thus avoiding extra cost and time to the digital publisher.

The language and cultural issues detected in the survey instruments and those notified through the Problem Reports mechanism provide valuable feedback on the level of acceptance and adoption of localized software products by end-users. Additionally, they might point out to other concerns that need to be addressed because they play an important role in the dissatisfaction of the software publisher’s customers. If localization is inadequate or unsuccessful, there will be more user complaints and some might even involve litigation.

A PR form typically contains the following information: a PR number and date, initiator’s name, email address and company, software product name, version and build number, language, a detailed description of the problem, severity, how to reproduce the problem, if possible, attachments (for example, a screen capture of the window where the error is exposed), status of the PR, and deadline. A generic Problem Report form is included in Appendix I.

### 4.7. Comparison of translated segments

The translatable text that has been revised and analyzed belongs to three industry software applications with a progressive level of difficulty. The graphic user interfaces of the PLM software programs that are at the core of this case study contain in between 400,000 and 1,7000,000 English words each. Again, we are evaluating in this section the translation revision *output* as opposed to the translation revision process.

#### *4.7.1. Sample text selection*

The Translation Bureau of the Canadian Government has determined through its SICAL system that a minimum of 400 words of source text is the quantified standard for quantification of errors in any translation output (Williams 1989: 21). However, given the fact that we are comparing three PLM software applications, we have extracted a total of 1,885 English words in length out of 150 user interface segments that we consider to be "representative of the form and content" of the PLM software applications (Williams 1989: 22). Due to the repetitive and structure of the localization genre, this higher word count is "long enough to present a significant, cohesive part of the document under assessment, and short enough to facilitate processing of texts on an industrial scale" (Williams 1989: 22).

Computer-Assisted Translation Tools (CAT) have been used to translate these UI segments from English into Spanish. This is also known as machine-assisted translation and should not be confused with machine translation, which is an application for translating text from one natural language into another. In-house translators had self-checked their own translations before submitting them for revision by the ICRs.

We randomly selected 150 UI segments from three different review-formatted files belonging to the three PLM software products. The smallest English segment contained 2 words and the largest 69 words. We then sent those files to three different ICRs (50 segments per file, respectively) for carrying out a linguistic comparative analysis or bilingual revision between the source and the target text. An internally developed review tool was used for this purpose. The localized file for this analysis was revised in November 2012.

Our ICRs modified 60 segments out of the original 150. Please see Appendix H (Revision practice) for a full detail of the revised UI segments. Table 12 lists the number of segments and the word count in both languages pertaining to the review file submitted for revision by our ICRs.

Table 12. Description of revised segments

| **Description** | **Segment Count** | **English Word Count** |
|---|---|---|
| English (SL) | 150 segments | 1,885 words |
| Revised | 150 segments | 1,885 words |
| Modified | 60 segments | 680 words |
| Spanish (TL) | 150 segments | 2,199 words |
| Revised | 150 segments | 2,199 words |
| Modified | 60 segments | 781 words |
| Total | 150 segments | 781 words |
| Revised Percentage | 100% | 100% |

This is the order we followed to analyze and present the modified segments: Example number, English UI segment, its corresponding Spanish translation, Local reviser's correction, Type of error, and Researcher's explanation why the correction was either accepted or rejected. The nature of the interventions will be explained in the following chapter. Once the analysis was completed, we created a table with the results as far as the number of interventions made by the local revisers and the type of intervention. Finally, we will conclude this section with some observations.

### *4.7.2. Analysis of revision practice*

In Appendix H we described the corrections or lack of corrections – "interventions or failures to intervene" as mentioned by Arthern (1987: 17-18) – made by the ICRs and determined whether those changes were unnecessary or not. Additionally, we pointed out the problems found in the source text that could create semantic and/or translation issues in the revision phase. We later reduced the classification of those interventions to the following categories: Necessary correction, Unnecessary change, Correction missed but not real error or Error introduced by the reviser, and No decision.

Arthern notes that "it is not enough to judge a linguist's revision on the basis of a given number of pages of revised translations, because the number of interventions which a reviser has to make depends very much on the quality of the translation" (1987:

17). Our goal in this section is not to test the quality of the ICRs' corrections but to simply highlight some issues that could help improve the translation revision process.

Both in-house translators and revisers are native speakers of Spanish. Our audience comprises users from Spain, Mexico, and other Latin American countries. We will point out some regional differences of the Spanish language that ought to be taken into account, whenever possible.

## 4.8. End-user survey instruments

The purpose of the self-administered questionnaires was three-fold:
1) To collect data on the attitudes and opinions of users of the Spanish-localized user interface of the three Siemens PLM software applications. However, the questionnaire is not designed to test the technical documentation accompanying those applications.
2) To collect data on the attitudes and opinions of the customers of the English-language user interface, or source text, in order to find out to what extent the target text quality is dependent on the source text.
3) To identify the areas in which there might be language proficiency issues, basically the appropriateness of the grammar, the consistency of the specific technical terminology and the fluency or comprehensiveness of the Spanish text.

### *4.8.1. Importance of surveys*

Our survey questionnaires are an important and critical tool to solicit feedback on the quality of the Spanish-localized user interface of the PLM software applications. The self-administered instruments also offer customers and other stakeholders, such as PLM software distributors and instructors, an opportunity to express their views anonymously. Participants were assured that their privacy is protected.

The findings of this survey provide us with an opportunity to identify what language areas and translation revision and review methods need to be revisited and improved. For enterprise and/or industrial software publishers, knowledge about the attitudes and opinions of their customers might bring about changes in both the development and localization departments to better serve the specific needs and goals of their customers. It should be mentioned that this is the first survey ever conducted by the Siemens PLM Software localization department.

At the moment there are four types of Internet survey methods: email and Web-based surveys, focus groups and online interviewing (Ellis 2002: 10). The tool used for our quantitative data collection is a Web-based survey questionnaire. This is a research strategy focusing on a contemporary event (Yin 1994: 6).

A survey questionnaire is a very frequently data collection method in evaluation research (Radhakrishna 2007: 6). Online surveys or electronic surveys are very popular data collection methods in the social sciences. They are appealing and less costly than traditional paper-and-pencil questionnaires (List 2007: 21). Additionally, they are also extremely fast: data can be collected in a few days, even hours from subjects worldwide. Though easy to handle and very helpful in "time-sensitive studies", this type of Internet research method has its pitfalls as well (Bauman and Airey 2001 in Ellis 2002: 3). One of them is the response rate. Many researchers have concluded that this type of survey generates a lower response rate than paper questionnaires (Shaefer and Dillman 1998 in Ellis 2002: 7). Additionally, some respondents can exit the Web page at any time without completing the survey, and even some uninvited guests might also use the survey. Another drawback to online surveys involves technical issues regarding computer skills on the respondent's part, but this is not the case with our population. All members of our target group have computing skills and are Internet users.

Using incentives is one way to attract participants to fill out questionnaires (Iarossi 2006). Most respondents like to be compensated for their time. However, we can only offer a non-monetary incentive, that is, the promise to offer the results of the survey on request.

#### *4.8.2. Survey layout*

Each of our survey questionnaires starts with a title, followed by a brief introduction/ welcome message that explains the purpose of the survey, why we need the information, the anonymity and confidentiality handling of the responses, as well as who is conducting the survey, how the data will be used and the expiration date. It is also indicated that no personal questions are included in the survey instrument. The Internet questionnaire is completely anonymous: we cannot individually identify who the respondents are, except that they claim to be Siemens PLM software applications users.

A time frame for completing the online survey was also provided. This is a courteous way of informing potential participants of the estimated amount of time they would need to fill out the survey (Ellis 2002, Iarossi 2006). According to Iarossi, there is no empirical evidence that correlates the length of the survey instrument with participation rate (2006: 151).

General instructions were included on how to advance through the online surveys. As an incentive to our respondents we stated at the end of the survey and prior to the 'Thank-you page' that the results will be provided to all those who request it. List (2007: 211) advices use of two types of incentives: a psychological incentive (the promise to share the results with the participants), and a financial incentive (such as a prize) in order to obtain a more balanced sample. However, we were not able to offer any financial incentives.

The following navigation instructions were included in the general overview of the survey questionnaires to make it easier for the respondents to advance through the instrument:

> In order to progress through this survey, please use the following navigation links:
> - Click the "Next" button to continue to the next page.
> - Click the "Previous" button to return to the previous page.
> - Click the "Submit" button to submit your survey.

The first questions were easy to answer, in order to stimulate the respondent's participation (Iarossi 2006: 75-76). In the online survey we used the skip logic technique to control the respondent's route through the survey, since some respondents ostensibly speak Mexican Spanish while others speak continental Spanish. The survey questionnaire flows from more general questions to more specific ones.

*4.8.3. Survey contents*

Four self-administered questionnaires have been designed for this specific research. Two of them are in English and two in Spanish. The full survey versions can be found in Appendices D, E, F and G, respectively. Table 13 depicts the number of questions and the type of question in each section of the surveys.

Table 13. Structure of the online survey questionnaires

| Appendix | Survey Language | User Interface Language | General Questions (mandatory) | Specific Questions (mandatory) | Optional Questions/Total |
|---|---|---|---|---|---|
| A | English | English | 7 | 5-7 (12) | 2 (21) |
| B | Spanish | English | 7 | 5/7 (12) | 2 (21) |
| C | Spanish | Spanish | 7 | 5/9 (14) | 2 (23) |
| D | English | Spanish | 7 | 5/9 (14) | 2 (23) |

Each survey questionnaire is composed of two sections: General Questions and Specific Questions. The General Questions section collects demographic information about the participants. The Specific Questions section contains a series of questions for collecting information on the English and Spanish texts used in the user interface of the PLM software applications.

First I developed the English source instrument for evaluating the English source user interface application. This questionnaire was then translated into Spanish. However, when a questionnaire is translated into a second language, it can pose some cultural issues for the researcher as well. One of them is the choice of words, especially when the target respondents speak different varieties of Spanish. For instance, in the Spanish email invitation the marketing manager based in Madrid, Spain, changed the expression 'Estimado cliente' (Dear Customer) to 'Apreciado cliente' (Valued Customer). The marketing manager working out of the Distrito Federal in Mexico City preferred to use 'Estimado cliente' as a way of addressing her PLM customers. The difference between both Spanish adjectives 'Estimado' and 'Apreciado' is very subtle. We think that the Spanish adjective 'Apreciado' seems to sound more formal and adequate for the Spaniards. It should also be noticed that the Spanish invitations and the survey questionnaires use the second person pronoun 'usted' (you), which is the formal way of addressing a customer, as opposed to using 'tú' (you), which seems to sound less conservative.

Below is a summary of the main topics developed in each survey instrument.

*4.8.3.1. English-language survey for users of the English-language applications*

General Information (7 questions): Covers some demographic and background data of respondents such as occupation, country of origin, Siemens PLM software applications used most frequently, time length as users, and strongest language.

Specific Information (13 questions): Covers the respondent's satisfaction and attitude towards the English user interface; the fluency of the English text; the accuracy and consistency of the English technical terminology, the relationship between the English text used and any functional errors, as well as the respondent's overall satisfaction with the text of the user interface. It also asks the respondent why they do not use the Spanish-localized user interface.

Optional Information (2 questions): Includes an option for the respondent to leave a general comment or suggestion about the software applications as well as an option to receive the results of the survey questionnaire.

*4.8.3.2. Spanish-language survey for users of the English-language applications*

General Information (7 questions): Covers demographic and background data of respondents such as occupation, country of origin, Siemens PLM software applications used most frequently, time length as users, and strongest language.

Specific Information (13 questions): Covers the respondent's satisfaction and attitude towards the English user interface, the fluency of the English text, the accuracy and consistency of the English terminology, the relationship between the language used and the functional errors as well as the respondent's overall satisfaction with the text of the user interface. It also asks the respondent why they do not use the Spanish-localized user interface.

Optional Information (2 questions): Includes an option for the respondent to leave a general comment or suggestion about the software applications as well as an option to receive the results of the survey questionnaire.

*4.8.3.3. English-language survey for users of the Spanish-localized applications*

General Information (7 questions): Covers demographic and background data of respondents such as occupation, country of origin, Siemens PLM software applications used most frequently, time length as users, and strongest language.

Specific Information (15 questions): Covers the respondent's satisfaction and attitude towards the accuracy and consistency of the Spanish technical terminology, the relationship between the Spanish text and any functional errors, the fluency and naturalness as well as the cultural sensitivity of the Spanish-localized user interface, the kind of Spanish used, and the respondent's overall satisfaction with the user interface.

Optional Information (2 questions): Includes an option for the respondent to leave a general comment or suggestion about the software applications as well as an option to receive the results of the survey questionnaire.

*4.8.3.4. Spanish-language survey for users of the Spanish-localized applications*

General Information (7 questions): Covers demographic and background data of respondents such as occupation, country of origin, Siemens PLM software applications used most frequently, time length as users, and strongest language.

Specific Information (15 questions): Covers the respondent's satisfaction and attitude towards the accuracy and consistency of the Spanish technical terminology, the relationship between the Spanish text and any functional errors, the fluency and naturalness as well as the cultural sensitivity of the Spanish-localized user interface, the kind of Spanish used, and the respondent's overall satisfaction with the user interface.

Optional Information (2 questions): Includes an option for the respondent to leave a general comment or suggestion about the software applications as well as an option to receive the results of the survey questionnaire.

*4.8.4. Question wording and types*

The items in the questionnaire are grouped into two sections: General Questions and Specific Questions, each covering a different topic arranged in logical sets. The total number of mandatory questions ranges between 19 and 21, besides two additional optional questions. The number of questions was limited to four per screen, whenever possible.

The length of the survey instrument was kept to a minimum of 10-12 minutes, since longer questionnaires tend to jeopardize the response accuracy and quality (Iarossi 2006: 79).

A combination of open- and closed-ended questions, single responses, as well as rated responses comprised our research instrument.

Open-ended or infinite-response questions require a more specific response from the participant, who is supposed to use their own words. Respondents are asked to key in an answer into a box provided. The maximum number of characters was indicated. This type of question also takes more time to fill out and has a higher refusal rate (Iarossi 2003: 71). We included only one optional question, presented as follows: "If you want to leave a comment or suggestion, please use the space below".

Closed-ended questions, on the other hand, are not time-consuming since they limit the participant's response to a set of predefined answers or multiple choices. Closed-ended or dichotomous type questions solicit a 'yes' or a 'no' response or just a few words. Example: "What language version of the PLM software applications do you use most frequently?” The respondent is given a set of five options to choose from: (1) Always Spanish – (2) More Spanish than English – (3) Spanish and English equally – (4) More English than Spanish – (5) Always English.

Since the survey is mainly an evaluation instrument, there are some questions that are considered to be ‘subjective’, that is, questions that measure the respondent’s ideas about the Siemens PLM software products. A very common way of asking a subjective question is to use rating scales (Iarossi 2006: 59). The rated type question allows the respondent to assign a value to each response. Example: How would you rate the cultural sensitivity of the Spanish-localized user interface? Please select your response by using the scale from 0 to 7: (7) Extremely satisfied – (6) Very satisfied – (5) Moderately Satisfied – (4) Neither Satisfied nor Dissatisfied – (3) Moderately Dissatisfied – 2) Moderately Dissatisfied – (1) Very Dissatisfied - (0) Not Applicable.

*4.8.5. Rating scales*

As explained above, rating scales are mainly used to elicit subjective answers (Iarossi 2006: 60). We have used a five-point rating scale to measure the respondents’ opinion regarding the consistency in the Spanish terminology used in the user interface of the three Siemens PLM software products: NX, Solid Edge and Teamcenter. In this ordinal scale the codes selected are arbitrary since the difference between a rating of five (very good) and a four (good) might not be the same difference as between a rating of 3 (average) and a rating of 2 (very poor) (List 2007: 138).

The Non-Applicable (N/A) category has also been included in the response choices. By allowing the respondent to choose this category when the question does not apply, we improve the quality of the data (Iarossi 2006: 61). Below are the rating scale descriptors used in the survey questionnaires:

1. (5) Too many (4) Many (3) Some (2) A few (1) None

2. (7) Extremely Satisfied (6) Very Satisfied (5) Moderately Satisfied (4) Neither Satisfied nor Dissatisfied (3) Moderately Dissatisfied (2) Very Dissatisfied (1) Extremely Dissatisfied (0) Not Applicable

3. (5) Very good (4) Good (3) Average (2) Poor (1) Very poor

4. (5) Highly fluent and natural (4) Moderately fluent and natural (3) A little difficult but understandable (2) Sometimes hard to understand (1) Not at all fluent or natural; hard to understand

*4.8.6. Sampling method*

Sampling is basically the selection of individuals within a certain population of interest. One of the issues raised with Internet questionnaires is the fact that they might affect sampling (Iarossi 2006: 95-98).

Our *theoretical population* is each and every customer, instructor, sales person, customer service representative, engineer, software distributor and user of the Siemens PLM software applications. Our *accessible population* is the Siemens PLM Spanish-speaking customers. The *sampling frame* is the list of Spanish-speaking customers provided to us by our Siemens contact persons. Some might no longer be customers, some might have moved to other companies, some might have changed their email addresses, etc. In our particular situation, the sampling frame is also the sample. The respondents who completed our assessment questionnaires are the subsample of the sample. We did not have access to all of our population of interest.

A 'conditioned' stratified random sampling method has been used to select our research subjects. This is a non-probability statistical method in which strata or groups are identified among the total population. The first step was to divide the population into subgroups (first stratum) based on language preference: Spanish-speaking customers. A subset of the population was identified on the basis of some common characteristics: language preference and location. Our target population is composed of the Siemens PLM customers who speak Spanish and who work in Europe and Latin America.

We will be sampling only a portion of the total population. Firstly, we need to determine our sample size. Siemens PLM Software has about 63,000 customers worldwide, according to a company press release dated August 23, 2010. Our target population is made up of the number of Siemens PLM customers who speak Spanish and who are located in Spain and Latin America. However, not all those customers could participate in our study. Our estimate is 352 customers (total number) divided as follows: 303 customers in Latin American and 49 customers in Spain.

In late July 2010, after several meetings with the Siemens PLM Software Localization department manager, we received official approval that the surveys could be sent out to a select group of their Spanish-speaking customers. The company also provided its own survey online tool for me to design and post the questionnaires. The Siemens PLM survey manager accepted to contact only those Spanish-speaking customers who had expressed an interest in participating in other assessment questionnaires. (Siemens PLM Software Inc. conducts an annual survey called 'The Voice of the Customer' for the purpose of obtaining feedback on the functionality of their software applications). A total of 352 Spanish-speaking customers, who had responded to the VOC 2010, agreed to being contacted again.

The respondents were directed to the Siemens PLM website survey (http://www.plm.automation.siemens.com/voc/Localisation2010/Portal.html) by an email invitation, as explained above. They thus form a validated sample (Ellis 2002: 7). Undoubtedly, there may be some respondents who might find their way to our online surveys 'through self-discovery', as it were, which constitutes a non-validated sample (Ellis 2002: 7-8).

The sample drawn is made up of 346 customers who had checked a box in the VOC survey (explained above) to indicate an interest in participating in future surveys. However, not all the end-users who we invited to be involved in our study accepted to do so. Consequently, the respondents who filled in our surveys (47) were the subsample of the sample (346), the whole group of people we selected to be in our study.

Table 14. PLM software customers

| | |
|---|---|
| Total worldwide population | Around 200,000 contacts - raw contact list |
| Customers in Spain | (Information not provided by company) |
| Respondents contacted in Spain | 49 – filtered list |
| Customers in Latin America | (Information not provided by company) |
| Respondents contacted in Latin America | 303 – filtered list |
| Sample drawn | 352 contacts (346 with complete email addresses) |
| Survey sample | 47 participants |

Below is a table showing the geographical place of residence of the Spanish-speaking customers based on the Siemens list:

Table 15. Number of customers contacted by country

| Country | Number of customers |
|---|---|
| Argentina | 3 |
| Chile | 2 |
| Colombia | 2 |
| Costa Rica | 4 |
| Dominican Republic | 2 |
| Ecuador | 2 |
| El Salvador | 2 |
| Mexico | 283 |
| Spain | 49 |
| **Total** | **349** |

Our respondents thus share the same general cultural-linguistic background: most of them speak Spanish as their first language. They also share a language, English, that might or might not be their first language. Respondents who live in Spain share different standard varieties of the Spanish language if compared with the participants who live in Mexico and Latin American countries such as Argentina, Chile, Colombia, Costa Rica, Ecuador, and the Dominican Republic. And respondents who live in Spain, Mexico and Latin American countries share the same lingua franca, American English.

*4.8.7. Pre-testing of the survey instruments*

The four online survey questionnaires were used as the basis for the empirical and statistical data collection on customer satisfaction issues regarding the evaluation of the English language and the Spanish-localized versions of the Siemens PLM software applications. The first drafting of the survey questionnaires was completed on April 30, 2010. The surveys were posted online and launched on the Zoomerang.com website on May 2, 2010. During the following four weeks they were reviewed by the researcher as well as by two in-country reviewers, two PLM software applications instructors who work in Mexico and in Spain, and by three PLM technical writers who work in the United States. The survey instruments were pre-tested in English and Spanish.

As mentioned above, a total of seven pre-testers were selected for the pretest. One of the testers was monolingual (Spanish), three of them were bilingual (English/Spanish) and three monolingual (English). All of them work for Siemens PLM. They emailed their feedback and suggestions back to the researcher who then incorporated them into the final version of the survey questionnaires. The main objections submitted by the pre-testers referred to the wording and intent of some questions in the English language as well as the overall design of the surveys. It took approximately half a day to make the improvements suggested by the pre-testers. A more detailed explanation of the modifications is provided in the following section.

The newly modified versions of the survey questionnaires were officially posted on Zoomerang.com on June 1, 2010. Zoomerang.com is a Web-hosted survey software tool that allows its users to create survey questionnaires and provide them with online forms for data collection, analytical results and reporting. Since each survey questionnaire used in this study contains more than 12 questions, I chose the Zoomerang professional subscription, which has a monthly cost of almost US$20.00. The basic subscription allows for only twelve questions.

Before launching the surveys officially, I contacted the survey manager's superior at Siemens PLM Software in mid June 2010. Several issues related to vacation time in the US during July and August as well as the administrative and legal requirements that the company sought also added to the delay in the launching date of the survey questionnaires. The first condition imposed by Siemens PLM was that the survey instruments were to be designed and posted on the Siemens Factory website, which is an online survey tool developed by Siemens employees for data collection and statistical analysis. Since I would be collecting sensitive data about the Siemens software products, the survey manager wanted to make sure that the data would not be shared with Zoomerang.com, or any other company for that matter.

After learning how to use the new survey software tool, I posted the newly modified survey instruments on the Siemens Factory website. The URL address for the surveys was emailed to three in-country reviewers as well as to three other technical writers in the company for a pilot test. Draft versions were tested again for functionality purposes only. As a result of the pilot test, a few minor changes were made. These had to do with a missing word in one of the questions and a typo. Once everybody was satisfied with the results, the surveys were officially launched on the Siemens website on November 19, 2010. For purposes of our study, our survey questionnaire cutoff day was to be December 24, 2010.

*4.8.7.1. Problems with questions*

Testing the language, type of question, design, functionality and overall structure of the survey instruments is a critical step in the development stage. This involves a live test of the surveys themselves that allows the researcher to find flaws and identify response difficulties early on in the process, and to improve the questionnaires (Iarossi 2006: 87).

The clarity of the questions and the instructions is essential for obtaining a high number of complete survey instruments. According to Dillman and Christian, instructions should be provided exactly where necessary (2002: 3).

I reviewed and pre-tested the survey instruments several times for language and functionality accuracy. The team of experts consulted provided the following objections and suggestions for improving the instruments:

*4.8.7.1.1. Sensibility of the questions:* Two English pre-testers were not satisfied with the question regarding the use of computer jargon and neologisms found in the English text. They suggested that one or the other should be deleted. They argued that the questions were rather similar, and that many PLM software users might not be familiar with the terms 'jargon' and 'neologisms' (although an explanation for each one of the terms was provided in the questions). They also claimed that the answer to the question about the frequency of jargon was rather obvious.

1. Are there any jargon terms in the English text? (Jargon words: Terminology related to a specific field of study, industry, profession. Examples: Malware, On the fly, Reboot, Tag, 404 Error)

Please select your response by using the scale from 1 to 5: (5) Too many (4) Many (3) Some (2) A few (1) None

2. How satisfied are you about the frequency of jargons terms used in the English text?

Please select your response by using the scale from 0 to 5: (5) Very Satisfied (4) Moderately Satisfied (3) Indifferent (2) Moderately Unsatisfied (1) Very Unsatisfied (0) Not Applicable

3. Are there any neologisms in the English text? (Neologisms: Newly invented or coined words, examples: Antialiased, Bitmap, Pixmap, Voxel)

Please select your response by using the scale from 1 to 5: (5) Too many (4) Many (3) Some (2) A few (1) None

4. How satisfied are you about the frequency of neologisms used in the English text?

Please select your response by using the scale from 0 to 5: (5) Very Satisfied (4) Moderately Satisfied (3) Indifferent (2) Moderately Unsatisfied (1) Very Unsatisfied (0) Not Applicable

Five out of the seven pre-testers concluded that the four questions indicated above should be deleted from the questionnaires since they considered that some end-users might not be able to distinguish between a jargon term and a neologism, and that this would only add confusion. Therefore, I decided to remove them from the survey questionnaires. All the other questions were considered valid.

*4.8.7.1.2. Design suggestions:* One of the English pre-testers suggested adding a progress bar to each survey instrument. A progress bar shows the percentage of answers loaded on the survey. It makes it easier for respondents to see how many questions are still left to answer. Since the Siemens Factory survey software does offer a progress bar, this issue has was solved.

*4.8.7.1.3. Language changes:* One of the technical writers suggested reiterating the software product name in some of the questions since respondents sometimes are interrupted as they are completing the questions and may have forgotten what the previous question said. Consequently, some of the questions were rewritten to include the product name of the software applications.

*4.8.7.1.4. Choice of answers:* One English pre-tester whose first language is British English claimed that the answer 'I am offended by the Spanish text' sounded a bit 'funny' (quoting from her email message). This is one of the multiple answers to the following question: Why do you not always use the Spanish-language version of NX, Solid Edge and/or Teamcenter?

This pretesting stage revealed that some questions were not clearly stated, or that some responses were not appropriate, or that there were some issues with the general layout or design of the self-administered questionnaires. The results from the pretesting stage were not included in the final survey results.

#### *4.8.8. Email invitation and distribution channels*

On November 19, 2010, a bilingual email invitation (English/Spanish) was sent out to 352 customers identified on the Siemens list by the marketing managers of the Spain and Mexico offices. These Siemens PLM customers had previously agreed to receive email messages from the company. The total number of customers who received the invitation was 346. Six email invitations were reportedly returned as having either a wrong or an invalid email address.

A copy of the English and Spanish email invitations can be found in Appendices B and C, respectively. The email invitation explains the purpose of the survey, how the customers' participation would benefit from it, the name of the company and the name of the researcher as well as the URL address to the Siemens Factory website, and a deadline for the survey completion. The email invitation was also sent to the researcher's company email address as well as to the in-country reviewers and technical writers who had provided their feedback.

#### *4.8.9. Validity and reliability*

Social research methods are different from natural science methods because we are trying to measure intangible variables such as attitudes, opinions, emotions, which are not stable concepts, and therefore, need to be interpreted.

Validity and reliability play a very valuable role in any type of research, but especially so in measuring phenomena in social science research. Validity answers the question: Is this survey measuring the constructs it is supposed to be measuring? (Yin 1994: 18-33). Reliability responds to the question: Is this survey measuring variables consistently? A survey questionnaire is said to be reliable if a different researcher who follows the same procedure obtains almost the same results every time the survey instrument is repeated. A survey is said to be valid if the conclusions are strong (Yin 1994: 100).

Validity refers to the strength of our conclusions. Cook and Campbell (1979: 43) provide a useful definition of validity as the "best available approximation to the truth or falsity of a given inference, proposition or conclusion." The method used could be reliable but it does not mean that it is valid.

Although the literature describes several criteria on how to measure validity, we will mention content, predictive validity, construct, conclusion, and external validity.

*Content validity:* do the variables cover everything we want to measure? (Yin 1994: 33). If the content of our surveys reflects an actual event that is being studied, and if it is relevant to the quality evaluation of the user interfaces, such as grammar, terminology, etc., then the content is valid. However, if the variables used in the survey focus on the speed of the electronic purchase of the software applications or exclusively on the customer's satisfaction with the courseware as opposed to the user interface, then the content has no validity.

*Predictive validity* refers to the ability of the survey instrument to measure a future event or predict a future outcome (Trochim 2006). In this case, we are evaluating the English and the Spanish text of the Siemens PLM software user interfaces. The results of the survey should tell us whether or not the PLM customers are satisfied with the software applications. If they are completely satisfied, it means that both language versions (English and Spanish) are well written and/or translated properly. If the respondents are not satisfied, it means that some changes need to be made in the way the user interfaces are written and translated.

*Construct validity* measures how well our variables have been conceptualized and operationalized (Yin 1994: 34). For instance, in a qualitative survey, it is important that we represent the intangible variables so that they can be measured properly. Since most of our questions attempt to collect opinions, and attitudes towards the user interface, our questions are worded so as to measure quantitatively those variables as objectively as possible.

*Conclusion validity* occurs when there is a relationship between the variables (Trochim 2006). For instance, we can conclude that the Spanish-speaking users do like or do not like the Spanish-localized version depending on how the variables relate to one another.

*External validity:* can we use the results of our study in other scenarios? (Yin 1994: 35). For instance, can we use the results obtained in other Spanish-localized applications or with other Spanish-speaking users?

We believe that our questionnaires have met all the validity and reliability criteria indicated above.

### 4.9. Data elements in a Problem Report

A PR form typically contains the following information: a PR number and date; initiator's name, email address and company; software product name, version and build number; language; a detailed description of the problem, severity; how to reproduce the problem, if possible; attachments (for example, a screen capture of the window where the error is exposed); status of the PR; and deadline. A generic Problem Report form is included in Appendix I.

Given the confidentiality issue of PRs, we can only indicate a list of linguistic PRs submitted by some end-users against the PLM Spanish-localized software products collected over a six-month period.

In the next chapter we will present the results obtained from the three instruments described in this chapter.

# Chapter 5: Results

## 5.1. Introduction

In this chapter we will describe the data obtained from our three data-gathering instruments: the analysis of revised UI content, the electronic questionnaires filled in and submitted by a group of PLM end-users, and a description of the Problem Reports also filed by a reduced number of knowledgeable end-users who react to inadequately translated text.

## 5.2. Revision of UI content

In our organization, Spanish ICRs are in charge of revising localized UI segments for language and technical accuracy. As explained in the literature review chapter, translation revision includes a comparison of the source and target texts. The UI localized segments for revision combine manually translated segments with translation-memory segments, 100% matches and ICE (In Context Exact) matches. Given the extremely technical and complex nature of our software products, the ICRs make sure that the localized versions meet the language and functionality requirements of our end-users. Additionally, they reinforce consistency between the software interface and other components.

Upon completion of their revision, in-house translators carefully read the modified UI segments to see what changes were introduced: a) Global changes, that is, changes that need to be applied to the whole file, (b) Sentence/Paragraph changes, that is, changes that affect a particular segment, and (c) Terminology changes. These are later incorporated into the bilingual glossary for that specific software product that is kept by each individual translator. In-house translators may approve or reject a change or changes for linguistic reasons, for instance wrong register, conflicting term, or stylistic issues.

Below we list the main language problems or complexities detected during the revision cycle of 150 Spanish UI segments conducted by our ICRs. Out of a total of 150 segments, sixty were modified. However, our in-house translators accepted only forty-five corrections made by the ICRs. The interventions were identified and summarized based upon the variables described in the typology of errors (Jiménez-Crespo 2011: 321) in section 4.3 and modified to suit our own revision requirements.

Table 16 highlights the type and number of interventions made by the ICRs who revised the original 150 UI segments as explained above. These results are based on a model introduced by Arthern (1987: 21).

Table 16. Interventions by Spanish ICRs

| Type of intervention | Number of interventions | Failed interventions |
|---|---|---|
| Necessary corrections | 45 | 3 |
| Unnecessary changes | 16 | |
| Corrections missed but no real error or Error introduced by reviser | 0 | |
| No decision | 2 | 2 |
| Style improved segments | 45 | |
| **Total number of segments (60)** | **55** | **5** |

Additionally we have indicated the example numbers of the specific interventions that were rejected, those that were accepted by the in-house translators, as well as the failed interventions and two instances where no decision was made due to the ambiguity in the English text. The number of corrections differs from the number of segments. Such areas as formatting and layout are outside our scope.

*UI segments with rejected corrections (14):*
Examples number 1, 2, 15, 19, 34, 39, 42, 43, 48, 49, 51, 55, 56* and 59

*UI segments with accepted corrections (42):*
3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38, 40, 41, 44, 47, 50, 52, 54, 57 and 58

*UI segments with failed interventions (3):*
Examples number 45, 46 and 56*

*UI segments with no decision (2):*
Examples number 53 and 60

### *5.2.1. In-country reviewers' corrections*

Table 17 lists all the issues found by the ICRs in the revised content. They are classed according to their type in one of the nine categories ranked in the following order: Lexical, Syntactic, Stylistic, Pragmatic, Localization, Translation, Terminology and

Spelling. Also included in this table is the number of errors, their occurrences, and total count.

Table 17. Corrections made by ICRs

| Main category | Subcategory | Number of occurrences | Total |
|---|---|---|---|
| Lexical | Coherence (micro-textual) | 1 | 6 |
| | Wrong lexical item | 3 | |
| | Loanword | 2 | |
| Syntactic | Inadequate preposition | 2 | 5 |
| | Missing preposition | 1 | |
| | Inadequate verb tense | 2 | |
| Stylistic | None | 0 | 0 |
| Typographic | Ampersand | 1 | 2 |
| | Capitalization | 1 | |
| Pragmatic | None | 0 | 0 |
| Localization | Untranslatable term | 2 | 3 |
| | Missing placeholder | 1 | |
| Translation | Opposite sense | 4 | 16 |
| | Wrong sense | 5 | |
| | Nonsense | 2 | |
| | Addition | 1 | |
| | Omission | 1 | |
| | Inconsistency | 2 | |
| | Wrong lexical item | 1 | |
| Terminology | Wrong lexical item | 11 | 12 |
| | Inconsistent lexical item | 1 | |
| Spelling | Omission | 1 | 1 |
| **Total** | | **45** | **45** |

A first glance at this table indicates that the most recurrent errors are found in the Translation category (6 subcategories and 15 occurrences), followed by the Lexical and Syntactic categories with three subcategories each. Typographic, Localization, and Terminology have two subcategories and three errors each, and Spelling has one error. However, both the Stylistic and Pragmatic categories show zero corrections. In other words, the prevalent error types are Translation and Terminology.

Our close analysis attempts to determine whether these problems are actually solved by the intervention of our local or in-country reviewers.

### *5.2.2. Analysis of interventions*

For a detailed analysis of the 60 UI Spanish-localized segments in question, please refer to Appendix H (Revision practice). We will now answer the questions presented in section 4.3 regarding the corrections introduced by our ICRs in the UI content selected for this particular purpose.

To make sure that the whole UI content in question had not been over-, under- or hyper-revised, an independent Spanish reviser was hired by the researcher to conduct an additional revision. This language professional agreed on the corrections made by our ICRs and reported no language or translation issues in the remaining 90 segments that were left intact.

We will now answer the questions presented in section 4.3 regarding the corrections introduced by local revisers in the 60 examples chosen for this particular purpose. These responses will help as determine whether translation revision has improved accuracy and consistency in the UI content.

1. Does the revised Spanish text communicate the same message as the English does? (Accuracy or correctness)

Yes, we can state that the revision reflects the message of the source text. Eleven semantic issues were detected and corrected by the local reviser out of a total of 150. These are examples 7, 10, 11, 13, 14, 26, 37, 38, 40, 50 and 58.

2. Have any elements of the message been left out or added? (Completeness)

Yes, two sentences had been left untranslated. This is example no. 25. Additionally, example no 24 contained an extra sentence that was deleted by the local reviser.

3. Can the end-user understand the revised content? (Clarity)

In general, the localized text is clear in spite of some of its technical terms and telegraphic style. However, most customers are used to a specialized technology, given their solid engineering or design background, as shown in the surveys.

4. Does the sequence of ideas make sense? Is there any nonsense or contradiction? (Logic)

The Spanish localized text follows the sequence of ideas used in the English segments. It should be remembered that these are UI text strings that will be read in an electronic format. In other words, this is not lineal text. As García states "[t]his type of text is not normally intended to be read sequentially and will be most likely transmitted and consumed in electronic format only" (2008: 49).

5. Were there any factual, conceptual or mathematical errors? (Facts)

We have not found any instances of factual errors in the examples provided.

6. Is the language suited to the users of the translation? (Style)
Yes, it is. No issues were reported regarding register, ambiguity or phrasing.

7. Have the technical terms been consistently translated? (Terminology)
No, they have not. There are 16 instances (or 0.31%) where the local reviser changed a term or phrase for consistency purposes. These are examples 3, 4, 6, 9, 16, 17, 20, 21, 27, 29, 30, 32, 33, 44 and 52.

8. Were there any grammatical errors, spelling mistakes, false cognates, punctuation, missing accents, incorrect capitalization? (Mossop 2010: 125; Muzzii 2005: 21)
Yes, the local reviser found five minor grammatical errors (examples 1, 8, 18, 31 and 59), one spelling mistake (example 35), zero false cognates, zero punctuation issues, no missing graphical accents, and one instance of incorrect capitalization (example no. 36). There was also one instance in which a brand name was misspelled in the source text (example no. 46).

In general we can state that the grammar in the revised content matches as closely as possible the message of the source text. Finally, we can conclude that the interventions by the ICRs have helped improve accuracy and consistency in the draft translation of the UI segments. It should be recalled that our Spanish-speaking ICRs are in direct contact with some UI developers and are also application users.

### *5.2.3. Necessary and unnecessary interventions*

Table 18 lists the corrections rejected by the in-house translators, arranged according to the following categories: Lexical, Syntactic, Typographic, Terminology, and Pragmatic. No issues were reported in the Stylistic, Localization, Translation, and Spelling categories.

Table 18. Corrections rejected by in-house translators

| Main category | Subcategory | Number of occurrences | Total |
|---|---|---|---|
| Lexical | Coherence (micro-textual) | 1 | 4 |
| | False friends | 1 | |
| | Wrong lexical item | 1 | |
| | Loanword | 1 | |
| Syntactic | Inadequate preposition | 3 | 6 |
| | Syntactic calque | 1 | |
| | Omission | 1 | |
| | Unnecessary preposition | 1 | |
| Typographic | Numbers | 2 | 3 |
| | Capitalization | 1 | |
| Pragmatic | Regional variance | 1 | 1 |
| Terminology | Wrong lexical item | 2 | 2 |
| **Total** | | **16** | **16** |

A first glance at Table 18 shows that the Syntactic category ranks first in the number of interventions rejected by the in-house translators, mainly in the Preposition subcategory. This is followed by the Lexical and the Typographic subcategories. As seen in Table 17, both the Translation and Terminology categories rank highest in the number of corrections.

In-house translators have accepted 45 corrections (or 30%) and rejected 16 (or 10.6%) out of a total of 150 segments contained in the review file. In three instances the reviser failed to intervene when it was necessary to do so. In two other instances there was no clear decision as to whether the translation was valid or not, since these particular segments (examples 53 and 60) are difficult to translate out of context. They will be revised during the testing stage of this particular application.

First of all we want to clarify that we are not evaluating the work of either the in-house translators or ICRs, given their production conditions, that is, working outside context and outside the applications. In general, we can state that the ICRs have attempted to provide a faithful rendition of each English segment by either producing an almost word-for-word translation or using a grammatical structure similar to the source text. On the other hand, unnecessary interventions are a waste of time for both the translator and the reviser (Arthern 1986: 19). In this particular case we counted 16 unnecessary changes. Unnecessary changes can backfire. Software customers are used to seeing menus, commands translated in a certain way and when terms are changed, users might not be able to find a tool, for instance, as quickly as they did before the change was introduced.

The main question to be asked is whether the Spanish translation (TT) contains the same information as the English segment (ST). For example, if the source text says ‘invalid’ and the translation reads ‘valid’, there is a semantic mistake. From the analysis of the 60 modified segments we can conclude that some translated segments contained minor semantic issues. Therefore, the changes introduced by the local reviser have improved the translation output but do not result in a perfect translation.

As far as initialisms are concerned, local revisers prefer to leave them in English so as not to confuse the end-user. At the time of this writing, our initialisms database contains 2,635 entries and their constituent words for the PLM software products. Here are some examples: LOV (List of Values), OD (External Diameter), B-Rep (Boundary Representation), IRM (Immediate Release Mechanism), UOM (Unit of Measure); VASTD (Vehicle Assembly Standard Time Data), WSO (Workspace Object).

### *5.2.4. Quality of revision practices*

The purpose of this analysis was not to judge anyone’s skills but to detect issues or mistakes that might encourage Spanish-speakers not to use the translations into Spanish. The top priority of local revisers is to make sure that the meaning has been communicated as faithfully as possible in the target language, almost nearing word for word rendering, and that the technical terminology has been translated as accurately and consistently as possible. However, mistakes are always made, and from our own experience we can conclude that even though some segments seem to have been properly translated and revised, they will need to be corrected and adapted in context, that is, when the translator and/or the local reviser is reading the localized segments in the beta testing of each software product. And once more, testing activities are not part of our research.

Given that the testing stage may pick up and correct the few remaining issues, we conclude that the revision and review process brings the UI segments up to a level that should *not* justify the Spanish-speaking user turning to the English-language interface.

## 5.3. Analysis of end-users' surveys

Our bilingual Web-based surveys (English and Spanish) were conducted between November 19, 2010 and December 24, 2010. The questionnaire surveys ran for 35 full consecutive days on one of the Siemens PLM servers, and no technical issues were reported to the survey managers. During this period a total of 48 customers completed and submitted the electronic surveys, out of a total of 352. We selected 47 questionnaires for data analysis, and discarded one since it was partially complete. After breaking down the survey results, we will analyze the collected survey data and describe the findings discovered in our research. The data regarding the 'Not applicable' category has been entirely omitted from all the tables.

### *5.3.1. General questions section*

We will provide the responses to our questions as a distribution table and as a verbal explanation (List 2007: 153). It should be noted that all respondents were asked the questions listed in this section, independently of the language selected for the user interface evaluation. All the questions included an instruction on how to answer.

#### *5.3.1.1. User interface - Language for feedback*

Question no. 1: For which user interface language versions are you able to provide feedback?
Base: All respondents (n=47).
Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from a limited choice: English and Spanish.
Sample size: A total of 47 respondents answered this question, which, in this case, is the same as the entire sample size of the survey.

Table 19. Frequency distribution per language

| Language for feedback | Absolute frequency | Relative frequency |
|---|---|---|
| English | 27 | 57.5% |
| Spanish | 20 | 42.5% |
| **Total** | 47 | 100% |

Verbal summary: Note that almost 58% of respondents preferred to evaluate the English-language interface even though their first language was Spanish. The difference in language usage is around 15%, with more customers using the English user interface than the Spanish-localized version of the PLM software applications. However, as shown in question number 7 below, 40 respondents indicated that their strongest language was Spanish.

*5.3.1.2. NX user interface - Language preference*

Question no. 2a: For NX, which language version do you use most often?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 36 respondents answered this question.

Table 20. NX frequency distribution by language preference

| Language preference (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Always English | 26 | 72.2% |
| Always Spanish | 6 | 16.6% |
| English and Spanish equally | 4 | 11.1% |
| **Total** | **36** | **100%** |

Verbal summary: Almost 73% of these respondents used NX in the English language, as opposed to almost 17% who used the Spanish-localized version. Four respondents (11.1%) indicated that they used both versions equally. However, when asked what their strongest language was, 40 participants out of a total of 47 responded that Spanish was their first language.

*5.3.1.3. SE user interface - Language preference*

Question no. 2b: For Solid Edge, which language version do you use most often?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.Sample size: A total of 36 respondents answered this question.

Table 21. SE frequency distribution by language preference

| Language preference (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Always English | 21 | 65.6% |
| Always Spanish | 7 | 21.8% |
| English and Spanish equally | 4 | 12.5% |
| **Total** | **32** | **100%** |

Verbal summary: Almost 66% of respondents used Solid Edge in the English language, as opposed to almost 22% who used the Spanish-localized version, in spite of the fact that most respondents spoke Spanish as their first language and lived in Spanish-speaking countries, as per questions 6 and 7 below. Four respondents (12.5%) indicated that they used both versions equally.

*5.3.1.4. Tc user interface - Language preference*

Question no. 2c: For Teamcenter, which language version do you use most often?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 28 respondents answered this question.

Table 22. Tc frequency distribution by language preference

| Language preference (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Always English | 16 | 57.1% |
| Always Spanish | 7 | 25% |
| English and Spanish equally | 5 | 17.8% |
| **Total** | **28** | **100%** |

Verbal summary: Fifty-seven percent of respondents indicated that they used Teamcenter in the English version, as opposed to only 25% who used the Spanish-localized version. It is interesting to note that five other respondents (17.8%) indicated that they used *both* the English and Spanish versions of Teamcenter.

*5.3.1.5. NX user interface - Frequency of use*

Question no. 3a: How often do you use NX?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 36 respondents answered this question.

Table 23. NX frequency distribution by use

| Frequency of use (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Daily | 22 | 61.1% |
| Weekly | 5 | 13.8% |
| Monthly | 0 | 0% |
| Yearly | 4 | 11.1% |
| Never | 5 | 13.8% |
| **Total** | **36** | **100%** |

Verbal summary: Almost 62% of respondents indicated that they used NX on a daily basis.

*5.3.1.6. SE user interface – Frequency of use*

Question no. 3b: How often do you use Solid Edge?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 35 respondents answered this question.

Table 24. SE frequency distribution by use

| Frequency of use (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Daily | 10 | 28.6% |
| Weekly | 12 | 34.3% |
| Monthly | 6 | 17.2% |
| Yearly | 0 | 0% |
| Never | 7 | 20% |
| **Total** | **35** | **100%** |

Verbal summary: Almost 29% of respondents indicated that they used Solid Edge on a daily basis.

*5.3.1.7. Tc user interface – Frequency of use*

Question no. 3c: How often do you use Teamcenter?

Base: All respondents (n-=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 30 respondents answered this question.

Table 25. Tc frequency distribution by use

| Frequency of use (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Daily | 6 | 20% |
| Weekly | 10 | 33.3% |
| Monthly | 6 | 20% |
| Yearly | 4 | 13.3% |
| Never | 5 | 16.6% |
| **Total** | **30** | **100%** |

Verbal summary: These figures show that most respondents used this application on a weekly basis, although there is a wide distribution over the other time periods.

*5.3.1.8. NX user interface – Length of experience*

Question no. 4a: How long have you been using NX?

Base: All respondents (n=47).

Type of question: Numerical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 30 respondents answered this question.

Table 26. NX frequency distribution by length of experience

| Length of experience (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Less than 1 year | 6 | 20% |
| Between 1 and 3 years | 9 | 30% |
| Between 3 and 5 years | 5 | 16.6% |
| Between 5 and 10 years | 6 | 20% |
| More than 10 years | 4 | 13.3% |
| **Total** | **30** | **100%** |

Verbal summary: There is a wide dispersion across the different time periods. There were more users (9) in the 1- and 3-year range than in any other category.

*5.3.1.9. SE user interface – Length of experience*

Question no. 4b: How long have you been using Solid Edge?

Base: All respondents (n=47).

Type of question: Numerical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 28 respondents answered this question.

Table 27. SE frequency distribution by length of experience

| Length of experience (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Less than 1 year | 9 | 32.1% |
| Between 1 and 3 years | 10 | 35.1% |
| Between 3 and 5 years | 4 | 14.2% |
| Between 5 and 10 years | 3 | 10.7% |
| More than 10 years | 2 | 7.1% |
| **Total** | **28** | **100%** |

Verbal summary: Almost 77% of respondents are new users since they have been using SE in between 1 and three years.

*5.3.1.10. Tc user interface – Length of experience*

Question no. 4c: How long have you been using Teamcenter?

Base: All respondents (n=47).

Type of question: Numerical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 26 respondents answered this question.

Table 28. Tc Frequency distribution by length of experience

| Length of experience (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Less than 1 year | 7 | 26.9% |
| Between 1 and 3 years | 12 | 46.1% |
| Between 3 and 5 years | 4 | 15.3% |
| Between 5 and 10 years | 3 | 11.5% |
| More than 10 years | 0 | 0% |
| **Total** | **26** | **100%** |

Verbal summary: Teamcenter's primary user community is in large enterprises in the United States and EMEA (Europe, Middle East and Asia). Its adoption by Spanish-speaking customers is probably relatively recent, "within the past 5-7 years" (Sayen 2010: 1).

*5.3.1.11. Application user's job function*

Question no. 5: Please describe your job function.

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered. We included exactly the same categories used by Siemens PLM in the Voice of the Customer survey, which is conducted yearly to help management understand how the customer thinks about, uses and interacts with a product or service.

Sample size: A total of 47 respondents answered this question, which, in this case, is the same as the entire sample size of the survey.

Table 29. Frequency distribution by job distribution

| Job function | Absolute frequency | Relative frequency |
|---|---|---|
| CAE user | 1 | 2.1% |
| CAM user | 2 | 4.2% |
| Configuration Manager | 0 | 0% |
| Designer | 20 | 45.5% |
| Executive | 2 | 4.2% |
| Information Technology (IT) | 6 | 12.7% |
| Manager | 2 | 4.2% |
| Program Manager | 3 | 6.4% |
| Systems Engineering | 2 | 4.2% |
| Other | 9 | 19.1% |
| **Total** | **47** | **100%** |

Verbal summary: When asked to describe their job function, almost 46% of respondents identified themselves as designers. No one selected Configuration Manager. The number of responses to the other categories ranged between 1 and 9. Nine respondents (19.1%) chose the 'Other' category, however, they did not provide any specifics.

*5.3.1.12. Application user's country of residence*

Question no. 6: Please indicate your country of residence.

Type of question: Categorical and open-ended.

Base: All respondents (n=47).

Sample size: A total of 45 respondents answered this question.

Table 30. Frequency distribution by country

| Country | Absolute frequency | Relative frequency |
|---|---|---|
| El Salvador | 1 | 2.2% |
| Euskal Herria or the Basque Country (Spain) | 1 | 2.2% |
| Mexico | 36 | 80% |
| Spain | 7 | 15.5% |
| **Total** | **45** | **100%** |

Verbal summary: When asked to indicate their country of residence, 36 respondents (80%) reported that they were from Mexico. Seven respondents (15.5%) reported they were from Spain, one (2.2%) from the Basque Country (which is part of Spain), and one (2.2%) from El Salvador. Note that two participants chose not to respond to this question.

*5.3.1.13. Application user's first language*

Question no. 7: What is your strongest language?

Base: All respondents (n=47).

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 44 respondents answered this question, that is, three answers short of the entire sample size of the survey.

Table 31. Frequency distribution by strongest language

| Language | Absolute frequency | Relative frequency |
|---|---|---|
| English | 0 | 0% |
| More English than Spanish | 0 | 0% |
| English and Spanish equally | 0 | 0% |
| More Spanish than English | 4 | 9% |
| Spanish | 40 | 90.9% |
| **Total** | **44** | **100%** |

Verbal summary: When asked what their strongest language was, 40 respondents (90.9%) stated that Spanish was their first language. None of the respondents selected the English language option in this particular question. However, 27 of them chose to evaluate the user interface of the PLM software products in the English-language version, according to the results in question 1 above. Four respondents (9%) indicated that they used the PLM software applications in both languages. Interestingly, three respondents selected the 'Not applicable' option.

*5.3.2. Specific Questions Section: English-language user interface*

The Specific Questions section collected information on the English-language text in the user interface of the PLM software applications. In this section we will analyze the responses received. All the questions include an instruction on how to answer. It should be noted that those respondents who chose to evaluate the Spanish-localized user interface were not asked question no. 8.

*5.3.2.1. NX English-language user interface – Usage*

Question no. 8a: Why do you *not* use the Spanish-localized version of the NX user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 22 respondents answered this question.

Table 32. NX frequency distribution by English-language usage

| English-language usage (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| I do not like how the Spanish text reads. | 8 | 36.3% |
| I do not know how to use the Spanish text. | 3 | 13.6% |
| I know how to use the Spanish text but I do not like it. | 1 | 4.5% |
| I know how to use the Spanish text and I like the text but I am not used to it. | 3 | 13.6% |
| I want to use the Spanish text but I am instructed not to do so. | 1 | 4.5% |
| Other (Please specify) | 6 | 27.2% |
| **Total** | **22** | **100%** |

Verbal summary: About a third of these respondents said they did not like how the Spanish-localized text read. Although six respondents (27.2%) checked the "Other reason" box, no one provided an explanation.

*5.3.2.2. SE English-language user interface – Usage*

Question no. 8b: Why do you not use the Spanish-localized version of the Solid Edge user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 19 respondents answered this question.

Table 33. SE frequency distribution by English-language usage

| English-language usage (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| I do not like how the Spanish text reads. | 7 | 36.8% |
| I do not know how to use the Spanish text. | 4 | 21.0% |
| I know how to use the Spanish text but I do not like it. | 2 | 10.5% |
| I know how to use the Spanish text and I like the text but I am not used to it. | 0 | 0% |
| I want to use the Spanish text but I am instructed not to do so. | 0 | 0% |
| Other (Please specify) | 6 | 31.5% |
| **Total** | **19** | **100%** |

Verbal summary: This time just under a third of the respondents did not like how the Spanish-localized user interface read. Those who chose the 'Other reason' option did not provide any specifics.

*5.3.2.3. Tc English-language user interface – Usage*

Question no. 8c: Why do you not use the Spanish-localized version of the Teamcenter user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 16 respondents answered this question.

Table 34. Tc frequency distribution by English-language usage

| English-language usage (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| I do not like how the Spanish text reads. | 4 | 25% |
| I do not know how to use the Spanish text. | 2 | 12.5% |
| I know how to use the Spanish text but I do not like it. | 2 | 12.5% |
| I know how to use the Spanish text and I like the text but I am not used to it. | 2 | 12.5% |
| I want to use the Spanish text but I am instructed not to do so. | 2 | 12.5% |
| Other (Please specify) | 4 | 25% |
| **Total** | **16** | **100%** |

Verbal summary: Here only four respondents (25%) reported that they did not like how the Teamcenter Spanish user interface read, while two respondents (12.5%) reported that they knew how to use the Spanish user interface and liked it but they were not used to it. Two further respondents (12.5%) reported that they wanted to use the Spanish user interface but had been instructed not to do so. Those respondents who checked the 'Other reason' option did not provide any specifics.

*5.3.2.4. NX English-language user interface – Consistency*

Question no. 9a: How would you assess the consistency of the English technical terminology used in the NX user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 20 respondents answered this question.

Table 35. NX frequency distribution by English-language consistency

| English-language consistency (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 9 | 45% |
| Good | 9 | 45% |
| Average | 0 | 0% |
| Poor | 1 | 5% |
| Very poor | 1 | 5% |
| **Total** | **20** | **100%** |

Verbal summary: Ninety percent of these respondents found the English-language consistency to be good or very good.

*5.3.2.5. SE English-language user interface – Consistency*

Question no. 9b: How would you assess the consistency of the English technical terminology used in the Solid Edge user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 17 respondents answered this question.

Table 36. SE frequency distribution by English-language consistency

| English-language consistency (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 6 | 35.2% |
| Good | 8 | 47.1% |
| Average | 1 | 5.8% |
| Poor | 2 | 11.7% |
| Very poor | 0 | 0% |
| **Total** | **17** | **100.00** |

Verbal summary: More than 80% of respondents found the English language consistency to be good or very good.

*5.3.2.6. Tc English-language user interface – Consistency*

Question no. 9c: How would you assess the consistency of the English technical terminology used in the Teamcenter user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 11 respondents answered this question.

Table 37. Tc frequency distribution by English-language consistency

| English-language consistency (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 3 | 27.2% |
| Good | 7 | 63.6% |
| Average | 1 | 9.1% |
| Poor | 0 | 0% |
| Very poor | 0 | 0% |
| **Total** | **11** | **100%** |

Verbal summary: Some 90% of respondents found the consistency to be good or very good, although in this case a further 45% said that the question was ‘not applicable’. There was no explanation for this choice.

*5.3.2.7. NX English-language user interface – Fluency and naturalness*

Question no. 10a: How would you assess the fluency and naturalness of the English-language used in the NX user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the English language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 20 respondents answered this question.

Table 38. NX frequency distribution by English-language fluency and naturalness

| English-language fluency (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 7 | 35% |
| Moderately fluent and natural | 10 | 50% |
| A little difficult but understandable | 3 | 15% |
| Sometimes hard to understand | 0 | 0% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **20** | **100%** |

Verbal summary: Some 85% of respondents found the English-language version of the NX application to be moderately or highly fluent and natural.

*5.3.2.8. SE English-language user interface – Fluency and naturalness*

Question no. 10b: How would you assess the fluency and naturalness of the English-language used in the Solid Edge user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 18 respondents answered this question.

Table 39. SE frequency distribution by English-language fluency and naturalness

| English-language fluency (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 6 | 33.3% |
| Moderately fluent and natural | 10 | 55.5% |
| A little difficult but understandable | 0 | 0% |
| Sometimes hard to understand | 2 | 11.1% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **18** | **100%** |

Verbal summary: Almost 90% of respondents found the English-language version of the Solid Edge application to be moderately or highly fluent and natural.

*5.3.2.9. Tc English-language user interface – Fluency and naturalness*

Question no. 10c: How would you assess the fluency and naturalness of the English-language used in the Teamcenter user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 11 respondents answered this question.

Table 40. Tc frequency distribution by English-language fluency

| English-language fluency (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 4 | 36.3% |
| Moderately fluent and natural | 7 | 63.6% |
| A little difficult but understandable | 0 | 0% |
| Some times hard to understand | 0 | 0% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **11** | **100%** |

Verbal summary: Almost 100% of the respondents to whom this question applied found the English-language version of the Teamcenter application to be moderately or highly fluent and natural.

*5.3.2.10. NX English-language user interface - Functional errors*

Question no. 11a: When using NX, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 19 respondents answered this question.

Table 41. NX frequency distribution by English-language functional errors

| English-language functional errors (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 9 | 47.3% |
| A few | 7 | 36.8% |
| Some | 3 | 15.7% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **19** | **100%** |

Verbal summary: Some 83% of respondents found either no or “a few” functional errors related to the language and/or terminology used in the NX English-language application.

*5.3.2.11. SE English-language user interface - Functional errors*

Question no. 11b: When using Solid Edge, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 19 respondents answered this question.

Table 42. SE frequency distribution by English-language functional errors

| English-language functional errors (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 9 | 47.3% |
| A few | 7 | 36.8% |
| Some | 3 | 15.7% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **19** | **100%** |

Verbal summary: Some 83% of respondents encountered either no or “a few” functional errors related to the language and/terminology used in the English-language version of the Solid Edge application.

*5.3.2.12. Tc English-language user interface - Functional errors*

Question no. 11c: When using Teamcenter, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface?

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 16 respondents answered this question.

Table 43. Tc frequency distribution by English-language functional errors

| English-language functional errors (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 9 | 56.2% |
| A few | 4 | 25% |
| Some | 3 | 18.7% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **16** | **100%** |

Verbal summary: Some 81% of respondents found no or “a few” functional errors related to the language and/or terminology used in the Teamcenter English-language application.

*5.3.2.13. NX English-language user interface - Overall satisfaction*

Question no. 12a: Please rate your overall satisfaction with the English-language version of the NX user interface.

Base: This question was asked only of those respondents who chose to evaluate the English language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from seven choices based on a semantic differential scale. This type of scale asked participants to rate their overall satisfaction with the English NX user interface based on a seven-point scale that shows two emoticons at each end and one in the middle (Marshall 1998: 591). The left-hand phrase identifies the negative end of the semantic scale (1), and the right-hand expression identifies the positive end (7). For clarification purposes, this could only be seen on the Web-based surveys.

(7) Smiling face (to express Very satisfied)

(6)

(5)

(4) Indifferent-looking face (to express neither satisfied nor dissatisfied)

(3)

(2)

(1) Sad-looking face (to express Very dissatisfied)

Sample size: A total of 19 respondents answered this question.

Table 44. NX frequency distribution by English overall satisfaction

| English-language overall satisfaction (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 7 | 36.8% |
| 2 | 11 | 57.8% |
| 3 | 1 | 5.2% |
| 4 | 0 | 0% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **19** | **100%** |

Verbal summary: Some 94% of respondents were very or extremely satisfied with the English-language version of the NX user interface.

*5.3.2.14. SE English-language user interface - Overall satisfaction*

Question no. 12b: Please rate your overall satisfaction with the English-language version of the Solid Edge user interface.

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer based on a seven-point semantic differential scale as explained above.

Sample size: A total of 17 respondents answered this question.

Table 45. SE frequency distribution by English overall satisfaction

| English-language overall satisfaction (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 7 | 41.1% |
| 2 | 5 | 29.4% |
| 3 | 2 | 11.7% |
| 4 | 3 | 17.4% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **17** | **100%** |

Verbal summary: Some 70% of respondents were very or extremely satisfied with the English-language version of the Solid Edge user interface.

*5.3.2.15. Tc English-language user interface - Overall satisfaction*

Question no. 12c: Please rate your overall satisfaction with the English-language version of the Teamcenter user interface.

Base: This question was asked only of those respondents who chose to evaluate the English language version of the Teamcenter user interface.

Sample size: A total of 11 respondents answered this question.

Table 46. Tc frequency distribution by English overall satisfaction

| English-language overall satisfaction (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 4 | 36.3% |
| 2 | 4 | 36.3% |
| 3 | 2 | 18.1% |
| 4 | 1 | 9% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **11** | **100%** |

Verbal summary: Some 72% of respondents were very or extremely satisfied with the English-language version of the Teamcenter application.

*5.3.3. Specific questions section: Spanish-localized user interface*

The Specific Questions section in the Spanish language collected information on the Spanish-language text used in the user interface of the PLM software applications. Here we will analyze the responses received. It should be noted that most of the respondents were asked all these questions with two exceptions: 1) respondents who chose to evaluate the Spanish-localized user interface were not asked why they did not use the Spanish version, and 2) these same respondents were asked about the similarity between the Spanish used in the user interface and the Spanish spoken in their country of residence. All the questions include an instruction on how to answer each question.

*5.3.3.1. NX Spanish-localized user interface – Consistency*

Question no. 13a: How would you assess the consistency of the Spanish technical terminology used in the NX user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish-language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 10 respondents answered this question.

Table 47. NX frequency distribution by Spanish-language consistency

| Spanish-language consistency (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 2 | 20% |
| Good | 7 | 70% |
| Average | 1 | 10% |
| Poor | 0 | 0% |
| Very poor | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: Ninety percent of respondents found the consistency in the NX Spanish terminology to be good or very good.

*5.3.3.2. SE Spanish-localized user interface – Consistency*

Question no. 13b: How would you assess the consistency of the Spanish technical terminology used in the Solid Edge user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish-language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 8 respondents answered this question.

Table 48. SE frequency distribution by Spanish-language consistency

| Spanish-language consistency (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 2 | 25% |
| Good | 6 | 75% |
| Average | 0 | 0% |
| Poor | 0 | 0% |
| Very poor | 0 | 0% |
| **Total** | **8** | **100%** |

Verbal summary: Here 100% of the respondents to whom this question applied found the consistency in the Solid Edge Spanish terminology to be good or very good.

*5.3.3.3. Tc Spanish-localized user interface – Consistency*

Question no. 13c: How would you assess the consistency of the Spanish technical terminology used in the Teamcenter user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish-language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 9 respondents answered this question.

Table 49. Tc frequency distribution by Spanish-language consistency

| Spanish-language consistency (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Very good | 2 | 22.2% |
| Good | 5 | 55.5% |
| Average | 2 | 22.2% |
| Poor | 0 | 0% |
| Very poor | 0 | 0% |
| **Total** | **9** | **100%** |

Verbal summary: Some 77% of the respondents to whom this question applied found the consistency in the Teamcenter Spanish terminology to be good or very good.

*5.3.3.4. NX Spanish-localized user interface – Fluency and naturalness*

Question no. 14a: How would you assess the fluency and naturalness of the Spanish language used in the NX user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 10 respondents answered this question.

Table 50. NX frequency distribution by Spanish-language fluency and naturalness

| Spanish-language fluency and naturalness (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 2 | 20% |
| Moderately fluent and natural | 7 | 70% |
| A little difficult but understandable | 1 | 10% |
| Sometimes hard to understand | 0 | 0% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: Ninety percent of respondents found the Spanish-localized NX application to be moderately or highly fluent and natural.

*5.3.3.5. SE Spanish-localized user interface – Fluency and naturalness*

Question no. 14b: How would you assess the fluency and naturalness of the Spanish language used in the Solid Edge user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the Spanish-language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 7 respondents answered this question.

Table 51. SE frequency distribution by Spanish-language fluency and naturalness

| Spanish-language fluency and naturalness (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 1 | 14.2% |
| Moderately fluent and natural | 5 | 71.4% |
| A little difficult but understandable | 1 | 14.2% |
| Sometimes hard to understand | 0 | 0% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **7** | **100%** |

Verbal summary: Some 85% of the respondents to whom this question applied found the Spanish-localized Solid Edge application to be moderately fluent and natural.

*5.3.3.6. Tc Spanish-localized user interface – Fluency and naturalness*

Question no. 14c: How would you assess the fluency and naturalness of the Spanish language used in the Teamcenter user interface? (Is the text clear to you? Do you understand it the first time you read it?).

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 9 respondents answered this question.

Table 52. Tc frequency distribution by Spanish-language fluency and naturalness

| Spanish-language fluency and naturalness (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Highly fluent and natural | 0 | 0% |
| Moderately fluent and natural | 8 | 88.8% |
| A little difficult but understandable | 0 | 0% |
| Sometimes hard to understand | 1 | 11.1% |
| Not at all fluent or natural, very hard to understand | 0 | 0% |
| **Total** | **9** | **100%** |

Verbal summary: Some 88% of respondents found the Spanish-localized Teamcenter application to be moderately fluent and natural.

*5.3.3.7. NX Spanish-localized user interface – Functional errors*

Question no. 15a: When using NX, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 10 respondents answered this question.

Table 53. NX frequency distribution by Spanish-language functional errors

| Spanish-language functional errors (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 1 | 10% |
| A few | 6 | 60% |
| Some | 3 | 30% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: Ninety percent of respondents said that there were “a few” or “some” functional errors caused by the Spanish language and/or terminology used in the NX user interface.

*5.3.3.8. SE Spanish-localized user interface – Functional errors*

Question no. 15b: When using Solid Edge, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 8 respondents answered this question.

Table 54. SE frequency distribution by Spanish-language functional errors

| Spanish-language functional errors (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 3 | 37.5% |
| A few | 4 | 50% |
| Some | 1 | 12.5% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **8** | **100%** |

Verbal summary: Some 87% of respondents said there were “a few” or no functional errors caused by the Spanish language and/or terminology used in the Solid Edge user interface.

*5.3.3.9. Tc Spanish-localized user interface – Functional errors*

Question no. 15c: When using Teamcenter, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface?

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the Teamcenter user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices offered.

Sample size: A total of 10 respondents answered this question.

Table 55. Tc frequency distribution by Spanish-language functional errors

| Spanish-language functional errors (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| None | 3 | 30% |
| A few | 4 | 40% |
| Some | 3 | 30% |
| Many | 0 | 0% |
| Too many | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: We can state that there were a few functional errors caused by the Spanish language and/or terminology used in the Teamcenter user interface.

*5.3.3.10. NX Spanish-localized user interface – Cultural sensitivity*

Question no. 16a: Please rate the cultural sensitivity of the Spanish-localized version of the NX user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from a seven-point semantic differential scale.

Sample size: A total of 10 respondents answered this question.

Table 56. NX frequency distribution by Spanish-language cultural sensitivity

| Spanish-language cultural sensitivity (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 4 | 40% |
| 2 | 1 | 10% |
| 3 | 0 | 0% |
| 4 | 3 | 30% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 2 | 20% |
| **Total** | **10** | **100%** |

Verbal summary: In this case there seems to be a clear division: two respondents (20%) reported that they were extremely dissatisfied, while three respondents (30%) reported that they were neither satisfied nor dissatisfied. However, 50% of respondents seemed to be extremely or very satisfied.

*5.3.3.11. SE Spanish-localized user interface – Cultural sensitivity*

Question no. 16b: Please rate the cultural sensitivity of the Spanish-localized version of the Solid Edge user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the Solid Edge user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from a seven-point semantic differential scale.

Sample size: A total of 8 respondents answered this question.

Table 57. SE frequency distribution by Spanish-language cultural sensitivity

| Spanish-language cultural sensitivity (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 3 | 37.5% |
| 2 | 1 | 12.5% |
| 3 | 1 | 12.5% |
| 4 | 3 | 37.5% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **8** | **100%** |

Verbal summary: Once again there seems to be a division of opinions: Almost 50% of respondents are extremely or very satisfied, while the same percentage of respondents are “neither satisfied nor dissatisfied”. The number of respondents is nevertheless low.

*5.3.3.12. Tc Spanish-localized user interface – Cultural sensitivity*

Question no. 16c: Please rate the cultural sensitivity of the Spanish-localized version of the Teamcenter user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from a seven-point semantic differential scale.

Sample size: A total of 9 respondents answered this question.

Table 58. Tc frequency distribution by Spanish-language cultural sensitivity

| Spanish-language cultural sensitivity (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 4 | 44.4% |
| 2 | 0 | 0% |
| 3 | 3 | 33.3% |
| 4 | 1 | 11.1% |
| 5 | 1 | 11.1% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **9** | **100%** |

Verbal summary: A similar division of opinions is suggested in this case, although the limited number of respondents limits the importance of the result.

*5.3.3.13. NX Spanish-localized user interface – Familiarity with Spanish*

Question no. 17a: How satisfied are you with the Spanish language used in the NX user interface? (Is it similar to the Spanish spoken in your native country?)

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the NX user interface.

Type of question: Categorical and closed-ended. Respondents were instructed to select one and only one answer from several choices based on a semantic differential seven-point scale.

Sample size: A total of 10 respondents answered this question.

Table 59. NX frequency distribution by familiarity with Spanish

| Familiarity with Spanish (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 3 | 30% |
| 2 | 4 | 40% |
| 3 | 3 | 30% |
| 4 | 0 | 0% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: We could say that most respondents found the Spanish-localized version of the NX user interface to be rather similar to the Spanish spoken in their country.

*5.3.3.14. SE Spanish-localized user interface – Familiarity with Spanish*

Question no. 17b: How satisfied are you with the Spanish language used in the Solid Edge user interface? (Is it similar to the Spanish spoken in your native country?)

Base: This question was asked only of those respondents who chose to evaluate the Spanish language version of the Solid Edge user interface.

Sample size: A total of 8 respondents answered this question.

Table 60. SE frequency distribution by familiarity with Spanish

| Familiarity with Spanish (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 3 | 37.5% |
| 2 | 4 | 50% |
| 3 | 0 | 0% |
| 4 | 1 | 12.5% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **8** | **100%** |

Verbal summary: Again, most of the respondents found the Spanish-localized version of the Solid Edge user interface to be similar to the Spanish spoken in their country.

*5.3.3.15. Tc Spanish-localized user interface – Familiarity with Spanish*

Question no. 17c: How satisfied are you with the Spanish language used in the Teamcenter user interface? (Is it similar to the Spanish spoken in your native country?)

Base: This question was asked only of those respondents who chose to evaluate the Spanish-language version of the Teamcenter user interface.

Sample size: A total of 9 respondents answered this question.

Table 61. Tc frequency distribution by familiarity with Spanish

| Familiarity with Spanish (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 4 | 44.4% |
| 2 | 4 | 44.4% |
| 3 | 0 | 0% |
| 4 | 1 | 11.1% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **9** | **100%** |

Verbal summary: Just under 90% of respondents were very or extremely satisfied with the Spanish-localized version of the Teamcenter user interface, and that it was rather similar to the Spanish spoken in their country.

*5.3.3.16. NX Spanish-localized user interface – Overall satisfaction*

Question no. 18a: Please rate your overall satisfaction with the Spanish-localized version of the NX user interface.

Base: This question was asked only of those respondents who chose to evaluate the Spanish-localized version of the NX user interface.

Sample size: A total of 10 respondents answered this question.

Table 62. NX frequency distribution by overall satisfaction with Spanish version

| Spanish-language overall satisfaction (NX) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 4 | 40% |
| 2 | 5 | 50% |
| 3 | 1 | 10% |
| 4 | 0 | 0% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **10** | **100%** |

Verbal summary: Again, 90% of respondents were very or extremely satisfied with the Spanish-localized version of the NX user interface.

*5.3.3.17. SE Spanish-localized user interface – Overall satisfaction*

Question no. 18b: Please rate your overall satisfaction with the Spanish localized version of the Solid Edge user interface.

Base: This question was asked only of those respondents who chose to evaluate the Spanish-localized version of the Solid Edge user interface.

Sample size: A total of 8 respondents answered this question.

Table 63. SE frequency distribution by overall satisfaction with Spanish version

| Spanish-language overall satisfaction (SE) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 3 | 37.5% |
| 2 | 3 | 37.5% |
| 3 | 2 | 25% |
| 4 | 0 | 0% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **8** | **100%** |

Verbal summary: Some 75% of respondents indicated that they were very or extremely satisfied with the Spanish-localized version of the Solid Edge user interface.

*5.3.3.18. Tc Spanish-localized User Interface – Overall satisfaction*

Question no. 18c: Please rate your overall satisfaction with the Spanish-localized version of the Teamcenter user interface.

Base: This question was asked only of those respondents who chose to evaluate the Spanish-localized version of the Teamcenter user interface.

Sample size: A total of 9 respondents answered this question.

Table 64. Tc frequency distribution by overall satisfaction with Spanish version

| Spanish-language overall satisfaction (Tc) | Absolute frequency | Relative frequency |
|---|---|---|
| Extremely satisfied | 3 | 33.3% |
| 2 | 4 | 44.4% |
| 3 | 2 | 22.2% |
| 4 | 0 | 0% |
| 5 | 0 | 0% |
| 6 | 0 | 0% |
| Extremely dissatisfied | 0 | 0% |
| **Total** | **9** | **100%** |

Verbal summary: Some 77% of these respondents were very or extremely satisfied with the Spanish-localized version of the Teamcenter user interface.

*5.3.4. Tentative conclusions on the survey data*

From the data presented in Tables 19 through 64 we can conclude the following regarding the English-language and Spanish-language PLM software products (NX, Solid Edge and Teamcenter):

1. User interface language preference: It is interesting to remark that even though 40 respondents out of a total of 47 indicated that their strongest language was Spanish, a higher number of customers preferred to use the English user interface of the three PLM software applications. This concords with the reports we received when beginning our research.

2. Frequency of use: A high number of respondents indicated that they used NX mainly on a daily basis, while Solid Edge and Teamcenter were reported to be used mainly on a weekly basis.

3. Length of experience in years: Our model listed five levels of experience with the software products: Novice, Beginner, Competent, Proficient and Advanced. The purpose of this question was to classify application users according to their level of

experience. Most respondents indicated that their level of experience was in between 1 and three years, that is, Beginner level.

4. Job function: Most of our respondents selected the 'Designer' category to describe their job function. The second largest number was found in the 'Other' category.

5. Country of residence: Eighty-eight percent of respondents indicated that they were from Mexico, while 15% indicated they were from Spain. We can conclude that all the respondents were from a country where Spanish is an official language.

6. First language: Eighty-five percent of our respondents indicated that their first language was Spanish.

7. Spanish-language user interface: Most of our respondents indicated that they did not use the Spanish-version of our software products because they did not like how it read or they did not know how to use it.

8. English-language consistency: Most respondents found the consistency level in the English-language terminology was good.

9. English-language user interface fluency and naturalness: Most respondents found the English-language fluency and naturalness to be moderately fluent and natural.

10. English-language functional errors: Most respondents found no functional errors related to the language and/or terminology used in the English-language versions.

11. English-language overall satisfaction: Most respondents indicated that they were as many times extremely satisfied and very satisfied with the English-language versions.

12. Spanish-language consistency: Most respondents found the consistency level in the localized language terminology to be good.

13. Spanish-language fluency and naturalness: Most respondents found the Spanish-language fluency and naturalness to be moderately fluent and natural.

14. Spanish-language functional errors: Most respondents found a few functional errors related to the language and/or terminology used in the Spanish-language versions.

15. Spanish-language cultural sensitivity: Most respondents indicated that they were extremely satisfied with the cultural sensitivity found in the localized versions.

16. Familiarity with the Spanish-language: Most respondents indicated that they were as many times extremely satisfied and very satisfied with the localized-language familiarity.

17. Spanish-language overall satisfaction: Most respondents indicated that they were as many times extremely satisfied and very satisfied with the Spanish-language versions.

From the conclusions mentioned above, we can state that the main difference pointed out by our customers regarding both the English- and the Spanish-language versions of our three PLM software products resides in the number of functional errors found in the localized versions. Secondly, we can state that the number of end-users who preferred to use the English-language versions is higher.

*5.3.5. Participants' comments*

In this section we will report on the opinions expressed in the survey by customers regarding the PLM software applications. An approximate 30% of respondents expressed their views on the software products.

In this section we will indicate the number of comments, the language the comments were written in (English or Spanish), and their translations whenever necessary. We will also describe the respondents' feedback (positive or negative) and we will incorporate the verbatim quotes from the surveys below. The respondents were especially instructed to provide the name of the application whenever pertinent.

Question 20: Please add any other comments or suggestions about the Spanish-localized user interface of NX, Solid Edge and/or Teamcenter. Your responses will be kept anonymous.
Base: All respondents (n=47).
Type of question: Open-ended (allows respondents to give an answer in their own words).

When asked if they wanted to add or leave a comment, fourteen respondents (29.8%) out of a total of 47 chose to do so. Only one respondent wrote a comment in English while thirteen preferred to use Spanish. Thirty-two respondents (68.1%) made no comment.

*5.3.5.1. Comments expressed in English*

There were two comments expressed in English, however, we decided to delete comment 2 since it was unclassifiable.
Comment 1: We need to incorporate more industry specific terminology into the software vs. user interface specific terminology (sic).

*5.3.5.2. Comments expressed in Spanish*

Comment 1 (con respecto a la aplicación Solid Edge): Compramos esta aplicación en México desde el 2007 y siempre nos han dado solamente la versión en inglés. Yo conocí la versión en español por páginas Web de España. Nunca nos ofrecieron Solid Edge en español. Sería muy bueno que se nos ofreciera, ya que habría un mejor manejo del programa y se tendrían menos dudas.

Translation: (Regarding the Solid Edge application) - We have been buying this application in Mexico since 2007. We have always received the English version only. I learned that there was a Spanish-localized version through websites published in Spain. However, we have never been asked if we wanted to purchase the Spanish-localized version. Purchasing the Spanish version would be very beneficial to us because we could use the program better and we would not have so many questions about it.

Comment 2: Muchas traducciones parecen de un traductor automático y no de alguien que comprende el español.

Translation: Much of the localized text sounds like machine translation-processed as opposed to sounding as if translated by someone who understands the Spanish language.

Comment 3 (con respecto a la aplicación NX): El display (pantalla de trabajo) es muy pequeño o se va haciendo pequeño conforme se activan más barras de herramientas. Se podrían activar las barras de herramientas desglosando en espiral o abanico todas las aplicaciones y así ahorrar espacios para la interfaz. En ocasiones las aplicaciones son difíciles de encontrar, ya que se ocultan por la activación de las barras de herramientas, se podría utilizar una opción o espacio en la interfaz donde se pueda escribir la aplicación.

Translation: (Regarding the NX application) – The display (graphics window) is too small or it becomes smaller as more toolbars are opened. You could turn on the toolbars and view all of them in either a spiral or a fan display. Therefore, you could add more space to the graphics window. Sometimes it is very difficult to view other objects because they are hidden once you turn on the toolbars. You could either add an option or use some place in the graphics window where you could write in the user interface.

Comment 4: En general me gustan las interfaces y se me hacen cómodas, siempre hay espacio para la mejora y eso me agrada de Siemens.

Translation: In general, I like the user interfaces, they are user-friendly, and there is always room for improvement, and this is what I like about Siemens.

Comment 5 (con respecto a la aplicación Teamcenter): Desde luego el traducir una aplicación tan complicada como un PLM es un trabajo enorme y es estupendo lo bien que está hecho (a pesar de las dificultades...).

Translation: (Regarding the Teamcenter application): To translate such a complex application as a PLM software product obviously involves great effort and work, and it is really great the way it has been done (in spite of all the difficulties…).

Comment 6: El material de entrenamiento usado en los cursos no existe en español. Los manuales están en inglés. Eso es un problema cuando los usuarios no son bilingües.

Translation: There is no Spanish-language version of the training materials. The manuals are in English only. And this is a problem when end-users are not bilingual.

Comment 7: Espero que aparte del software en español también tomen en cuenta las actividades y los cursos y las ayudas en español.

Translation: I hope that, besides translating into Spanish your software products, you should also translate the corresponding training materials, courseware, and online help.

Comment 8: Es necesario revisar la mayoría de los términos que se emplean porque la traducción prácticamente literal que se hace del inglés es mala o absurda en muchos casos.

Translation: It is necessary to review most of the terms used because the translation, which is practically a literal translation from the English, sounds poor or absurd in many cases.

Comment 9: Se deben crear manuales en español latinoamericano en lugar de traducir literalmente los contenidos de los manuales en inglés, sino creando ideas y explicaciones propias.

Translation: You should write manuals in Latin American Spanish instead of literally translating the English manual content; you should create concepts and their explanations in Spanish.

Comment 10: No conozco la interfaz que se quiere evaluar en este cuestionario. Las presentaciones, material de apoyo para las aplicaciones TMX siempre están en inglés, y cuando ha habido necesidad de traducirlas al español hemos sido nosotros mismos quienes las han traducido, de acuerdo con el sector industrial al que nos refiramos. Por otro lado, la interfaz del software que utilizamos solo está en inglés y en alemán.

Translation: I am not familiar with the user interface that is being evaluated in this survey. The presentations and support material for the TMX (sic) applications are written in English only. When it was necessary to translate them into Spanish, we were the ones who did it, according to the industrial section we were addressing. On the other hand, the user interface of the software we use only comes in English and German.

Comment 11: Crear cursos de NX SE CAD CAM CAE en español, ya que sin cursos en español no es factible adquirir la plataforma de Siemens PLM.

Translation: It is important to create NX and Solid Edge CAD, CAM, and CAE training courses in Spanish, because if you do not have them in Spanish, we will not be able to purchase the Siemens PLM platforms.

Comment 12: Hay muy poca información tanto en los manuales como en los portales de internet, por tal razón no hay mucho de donde se pueda comparar. Considero que si tuviéramos manuales en español, se podría tener una opinión más objetiva.

Translation: There is very little information in the user guides or in the Internet portals. For this reason, there is not a whole lot to compare. I think that if we had Spanish-language user guides, we could provide a more objective feedback.

### *5.3.6. Analysis of participants' comments*

A significant number of respondents noted that the training material, courseware and other guides were not provided in the Spanish language. One respondent even said that he had to translate that documentation into Spanish for use among his colleagues. Two respondents indicated that the user interface of the PLM software products only came in English and German. Two respondents complained about the Spanish translation, indicating it was "absurd" sometimes and that it sounded as if it had been machine-translated. However, no specific software product was indicated. On the other side of the spectrum, one user said that he realized how difficult it was to translate Tc into Spanish given the complex nature of programming and localization.

Table 65 shows the number of comments per language and their frequencies.

Table 65. Frequency distribution by comment

| Comments | Absolute frequency | Relative frequency |
|---|---|---|
| English | 1 | 2.1% |
| Spanish | 13 | 27.6% |
| None | 33 | 70.2% |
| **Total** | **47** | **100%** |

The feedback expressed by our respondents has been classified by topic and type and is summarized in table 66. We tried to organize the comments so that they would contain only one idea. And observations containing more than one concept were split apart. To each comment we assigned a value of positive, negative or neutral content. The main categories resulting from the participants' comments were: company and products, translation, functional issues and Spanish documentation.

Table 66. Frequency distribution by type of comment and topic

| Topic | Type of comment | Number of comments and relative frequency |
|---|---|---|
| Company and products | Positive | 1 (7.1%) |
| Software products | Positive | 1 (7.1%) |
| Spanish translation | Negative | 3 (21.4%) |
| Functional issues | Negative | 1 (7.1%) |
| Software products | Neutral | 1 (7.1%) |
| Lack of Spanish documentation | Negative | 6 (42.8%) |
| Unrelated | Neutral | 1 (7.1%) |
| | | **14 (100%)** |

Verbal summary: Out of a total of 14 comments, there were two positive comments (14.2%), two neutral comments (14.2%) and ten negative comments (71.4%). A glance at the above table shows that there was a preponderance of negative comments and these included complaints about the lack of Spanish documentation as well as disapproval of translated UI content. One respondent in particular said that technical documentation should not be translated but rather authored directly in Spanish.

### *5.3.7. Survey results request*

Question no. 21: If you would like us to email you the survey results, please leave your email address in the space provided below.
Base: All respondents (n=47).
Type of question: Dichotomous, also known as a two-way question that seeks only one of two answers. Respondents were offered two choices: 'yes' and 'no', and were asked to leave an email address in case they answered in the affirmative.
A total of 22 respondents said they would like to receive the survey results. We created two separate PDF files containing the findings from the Web-based surveys in both English and Spanish. The files were emailed to those twenty-two respondents who had requested the results on February 4, 2011.

## 5.4. Analysis of Problem Reports

We mentioned in Chapter 4 the data elements that are contained in each Problem Report (PR), such as product name, build or version, and originator's name. Given the confidentiality of these documents we only analyzed the titles and descriptions of eight linguistic problem reports filed by customers on our three PLM software products over a six-month period (January through June 2011). The problem report data was obtained from an internal system that tracks this type of information. We then selected only the linguistic PRs related to the Spanish language and downloaded the data into a Word document for analysis. The problems were as follows:

1. Wrong translation in dropdown LOV values for status
2. Spanish locale has old versions of File Translators help
3. Mistranslation based on the context in Main Menu -> Insert -> View (View should have been translated as a noun as opposed to a verb)
4. Old file and directory names
5. Source language text in localized version
6. Truncated segment
7. Text fields are too short for text (2)

*5.4.1. PR classification and priority*

We classified the Problem Reports under three categories: Wrong translation, Non-translated segments, and Old file and directory names. We have not taken into consideration those PRs describing truncation or other formatting issues because that is outside our revision scope. At a glance we can see that some of the reports describe issues related to translation. This concords with some of the problems referring to lexical items described in the UI content revision (Part A). Some other reports identify code or data problems, such as different file names or old versions. This might affect the usability of a software program. A report entitled 'untranslated segments' generally indicates that this might be due to some source code error. The problems titled 'wrong translation' and 'untranslated segments were' classified as of normal priority. Those related to different file names were classified as critical. However, in most situations problem reports need to be addressed and resolved almost immediately.

It is interesting to note that so far we have not found any PR related to inconsistent terminology in our Spanish-localized versions. Are there too many inconsistencies to submit or is there another reason? We are not saying that there are not any. However, we believe that translators and local revisers are more aware of terminology issues because they deal with language problems on a daily basis and because they work with both the source and the target languages. On the other hand, end-users deal with one language version only and might not have both the source text and the Spanish content at hand for comparison.

Upon analysis of the data collected regarding the functional errors caused by the Spanish language and/or terminology, eighty-two percent of respondents said that there were “a few” or “some” functional errors in the three software products. Some application users might think that there are functionality issues in the localized UI content but there are few problem reports on them.

Although some of these ‘modification requests’ add weight into our translation revision tasks, they do not have significant implications for translators and revisers, since very few reports might drive a change in our terminology. PRs have a limited impact on our localized versions. As explained above, they are part of the control mechanism that helps maintain quality and correct errors that were not caught by the in-house translators or our local revisers. No matter how much effort and time are spent on translation revision, it seems that some faults continue to slip through.

## 5.5. Final remarks

To measure the success rate of the Spanish revised UI segments, we analyzed the changes made by our ICRs in sixty UI segments, surveyed a select group of Spanish-speaking customers for their feedback on how they perceived and interacted with the UI content, and identified a number of Problem Reports submitted by some Spanish-speaking customers.

The data from our surveys revealed that our UI content was linguistically correct, natural sounding and/or suitable for the end-user after being revised by our ICRs.

We can conclude the following:

1. The revision process is important to correct language defects that might have been missed by in-house translators.
2. We can state that the main difference pointed out by our customers regarding both the English- and the Spanish-language versions of our three PLM software products resides in the number of functional errors found in the localized versions.

We found that the number of Spanish-speaking customers who used the English-language version was higher than those who used the Spanish-localized user interface (27 versus 20). We also learned that some Spanish-speaking customers did not like the Spanish user interface. Some respondents reported that some training material and courseware were not provided in the Spanish language. They also pointed out to some issues related to the Spanish translation of the technical terminology, and the literalness in the translation.

In the next chapter we will present our discussion, test our hypotheses and reflect on the main findings of our research.

# Chapter 6: Discussion

## 6.1. Introduction

In this chapter we will compare and interpret the results given by our data-collection tools. This mainly involves using comparative statistics to describe the main features of what the Siemens PLM Spanish-speaking sampled customers think of the localized software products.

Here we are going to measure all the variables and look for relations (correlations) between them. In the first place we will analyze the results obtained from the Spanish-language online surveys on the localized software products. Secondly, we will analyze the results obtained from the English-language surveys on the source software products. And finally, we will compare the results between the two groups (English and Spanish) to see which language version scores higher for one group of subjects.

In the last section of this chapter we will present both the quantitative and qualitative findings, and test the hypotheses proposed in Chapter 4.

## 6.2. Restatement of variables and hypotheses

The Specific Questions section of the survey instruments collected information on both the English-language and the Spanish-language user interface of the PLM software applications. In the table below we have listed all the categorical variables that concern us:

Table 67. English-language and Spanish-language variables

| Spanish-localized user interface | English user interface |
|---|---|
| Terminology consistency (Q 13) | Terminology consistency (Q* 9) |
| Fluency and naturalness (Q 14) | Fluency and naturalness (Q 10) |
| Functional errors (Q 15) | Functional errors (Q 11) |
| Cultural sensitivity (Q 16) | N/A |
| Language familiarity (Q 17) | N/A |
| Overall satisfaction (Q 18) | Overall satisfaction (Q 12) |

*Q: question

The hypotheses proposed were:

($H_1$) The translated interface is unclear since it contains linguistic or stylistic errors.

($H_2$) Mexican users perceive the translated interface to be defective.

We have selected below only those variables that we consider important for testing our hypotheses, as indicated in our methodology chapter. However, there might be other constructs that play a role in how Spanish-speaking customers judge the localized software products.

In order to test the hypotheses we will be using the following questions:

1. Is the technical terminology used consistently throughout the Spanish-localized user interface?
2. Does the Spanish-localized user interface sound fluent and natural? Is it highly fluent, a little difficult or hard to understand?
3. Are there any functional errors in the Spanish-localized user interface related to the terminology or language used? None, a few or too many functional errors?
4. Does the Spanish-localized user interface take into account the customers' cultural sensitivity? Are end-users extremely satisfied, neither satisfied or dissatisfied or extremely dissatisfied?
5. Is the Spanish language used in the user interface similar to the language used in the customer's country of origin? Are end-users extremely satisfied, neither satisfied or dissatisfied or extremely dissatisfied?
6. What is the respondents' overall satisfaction with the Spanish user interface? Are end-users extremely satisfied, neither satisfied or dissatisfied or extremely dissatisfied?

By answering these questions, we will determine if the meaning of the source text has been preserved in the Spanish translation, and why some Spanish-speaking PLM customers prefer to use the English-language versions.

### 6.3. General results from the user questionnaire

Since these questions were directly addressed in our customer survey, we will first bring together the responses offered in that survey. We will then compare those responses with the data from our more qualitative instruments.

#### *6.3.1. General results on the Spanish-language user interfaces*

Here we will first bring together the survey results concerning the Spanish-localized interfaces, then compare them with those for the English-language interfaces.

*6.3.1.1. Spanish-language consistency*

The following summary table shows the results from question no. 13 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 27 participants. (For organization purposes the results from the 'Non-applicable' option were excluded from all the tables in this chapter).

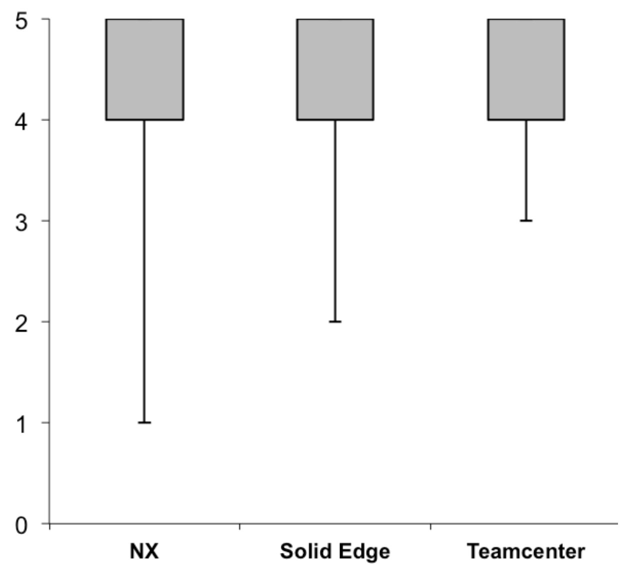
Question 13: How would you assess the consistency of the Spanish-language technical terminology used in the NX/SE/Tc user interface?

Table 68. Frequency distribution by Spanish-language consistency and software product

| Spanish-language consistency | NX | Solid Edge | Teamcenter | Total count and percentage |
|---|---|---|---|---|
| Very good | 2 | 2 | 2 | 6 (22.2%) |
| Good | 7 | 6 | 5 | 18 (66.6%) |
| Average | 1 | 0 | 2 | 3 (11.1%) |
| Poor | 0 | 0 | 0 | 0 (0%) |
| Very poor | 0 | 0 | 0 | 0 (0%) |
| **Total** | **10** | **8** | **9** | **27 (100%)** |

An ANOVA test indicates that there is no statistically significant difference between the scores for the three software products (p=0.947), although a box-and-feather quartile analysis (Figure 5) doe0s indicate the different spread.

Figure 5. Quartile analysis of three products for Spanish-language consistency (1= Very poor, 5 = Very good)



We observe that most of the values are significantly higher than the midpoint 3: there is enough evidence to conclude that the consistency of the Spanish terminology is generally good.

*6.3.1.2. Spanish-language fluency and naturalness*

The following summary table shows the results from question no. 14 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 26 participants.

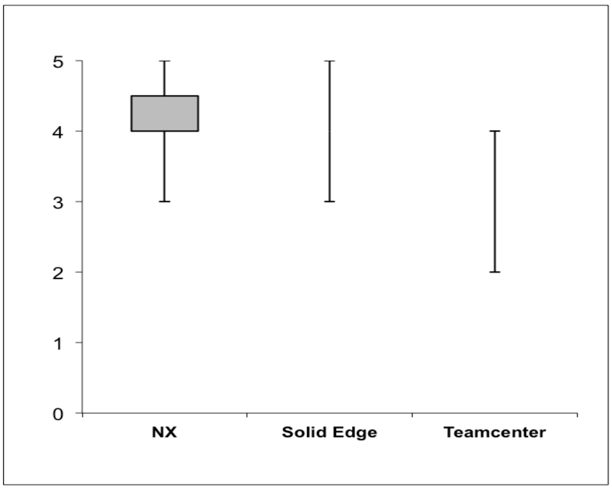
> Question 14: How would you assess the fluency and naturalness of the Spanish language used in the NX/SE/Tc user interface?

Table 69. Frequency distribution by Spanish-language fluency and naturalness and software product

| Spanish-language fluency/ naturalness | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Highly fluent and natural | 2 | 1 | 0 | 3 (11.53%) |
| Moderately fluent and natural | 7 | 5 | 8 | 20 (76.92%) |
| A little difficult but understandable | 1 | 1 | 0 | 2 (7.69%) |
| Sometimes hard to understand | 0 | 0 | 1 | 1 (3.84%) |
| Not at all fluent, very hard to understand | 0 | 0 | 0 | 0 (0%) |
| **Total** | **10** | **7** | **9** | **26 (100%)** |

Once again, the ANOVA test indicates no significant difference between the software products (p=0.918). The different distribution can nevertheless be seen in Figure 6.

Figure 6. Quartile analysis of three products for Spanish-language fluency and naturalness (1= Not at all fluent, 5 = Highly fluent)



We observe that most of the values are significantly above point 3: there is enough evidence to conclude that the fluency level of the Spanish-localized products is generally high.

*6.3.1.3. Spanish-language functional errors*

The following summary table shows the results from question no. 15 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 28 participants.

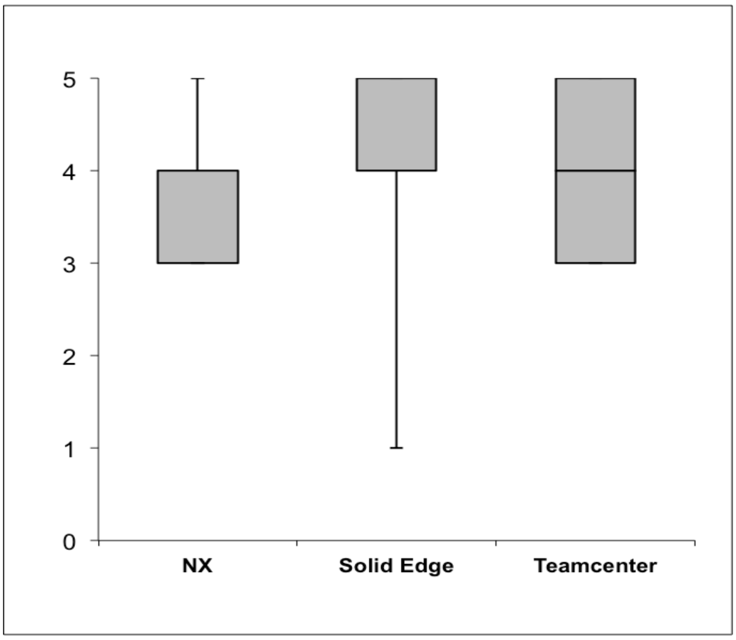
> Question 15: When using NX/SE/Tc, how many functional errors do you encounter that you believe are caused by the language and/or terminology used in the Spanish user interface?

Table 70. Frequency distribution by Spanish-language functional errors and software product

| Spanish-language functional errors | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| None | 1 | 3 | 3 | 7 (25%) |
| A few | 6 | 4 | 4 | 14 (50%) |
| Some | 3 | 1 | 3 | 7 (25%) |
| Many | 0 | 0 | 0 | 0 (0%) |
| Too many | 0 | 0 | 0 | 0 (0%) |
| **Total** | **10** | **8** | **10** | **28 (100%)** |

The ANOVA test once again indicates that the software products are not significantly different (p=0.904), although the distributions are clear in Figure 7. There is enough evidence to conclude that there are a few functional errors in the Spanish-localized versions.

Figure 7. Quartile analysis of three products for Spanish-language functional errors (1= Too many, 5 = None)




*6.3.1.4. Spanish-language cultural sensitivity*

The following summary table shows the results from question no. 16 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 27 participants.

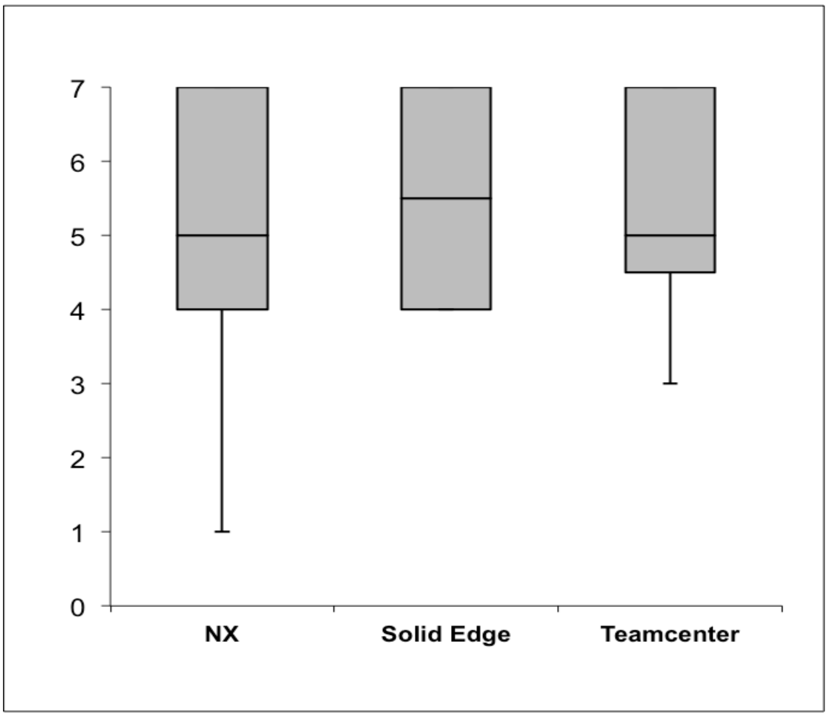
> Question 16: Please rate the cultural sensitivity of the Spanish-localized version of the NX/SE/Tc user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

Table 71. Frequency distribution by Spanish-language cultural sensitivity and software product

| Spanish-language cultural sensitivity | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Extremely satisfied | 4 | 3 | 4 | 11 (40.74%) |
| Very satisfied | 1 | 1 | 0 | 2 (7.40%) |
| Moderately satisfied | 0 | 1 | 3 | 4 (14.81%) |
| Neither satisfied nor dissatisfied | 3 | 3 | 1 | 7 (25.92%) |
| Moderately dissatisfied | 0 | 0 | 1 | 1 (4.44%) |
| Very dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Extremely dissatisfied | 2 | 0 | 0 | 2 (3.70%) |
| **Total** | **10** | **8** | **9** | **27 (100%)** |

The ANOVA test once again indicates that the software products are not significantly different (p=0.924), although the distributions are clear in Figure 8.

Figure 8. Quartile analysis of three products for Spanish cultural sensitivity
(1= Extremely dissatisfied, 7 = Extremely satisfied)




We observe that most of the values are significantly above the mid-point 4: there is enough evidence to conclude that the cultural sensitivity of the Spanish-localized versions is generally good.

*6.3.1.5. Spanish-language familiarity*

The following summary table shows the results from question no. 17 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 27 participants.

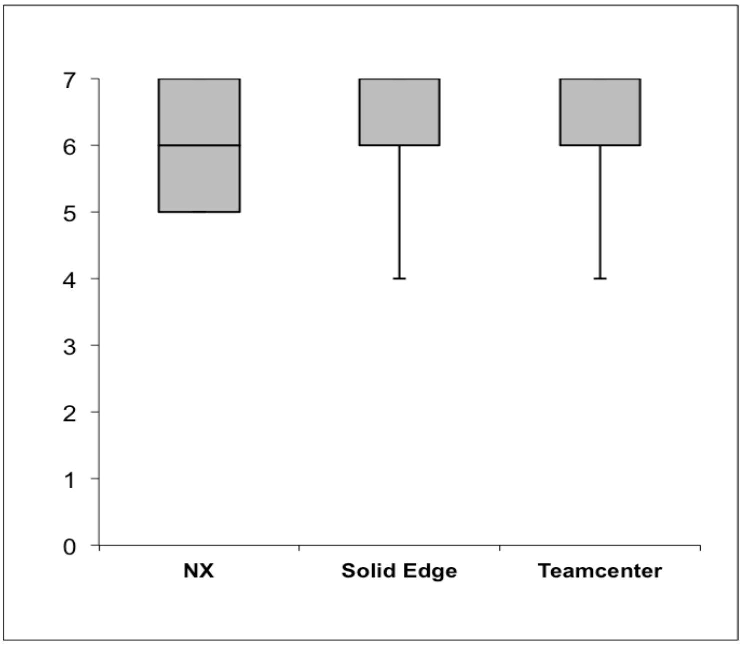
Question 17: Please rate the Spanish language used in the NX/SE/Tc user interface. (Is it similar to the Spanish spoken in your country of origin?)

Table 72. Frequency distribution by familiarity with Spanish language and software product

| Familiarity with Spanish | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Extremely satisfied | 3 | 3 | 4 | 10 (37.04%) |
| Very satisfied | 4 | 4 | 4 | 12 (44.44%) |
| Moderately satisfied | 3 | 0 | 0 | 3 (11.11%) |
| Neither satisfied nor dissatisfied | 0 | 1 | 1 | 2 (3.7%) |
| Moderately dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Very dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Extremely dissatisfied | 0 | 0 | 0 | 0 (0%) |
| **Total** | **10** | **8** | **9** | **27 (100%)** |

The ANOVA test once again indicates that the software products are not significantly different (p=0.947), although the distributions are clear in Figure 9.

Figure 9. Quartile analysis of three products for Spanish-language familiarity (1= Extremely dissatisfied, 7 = Extremely satisfied)




We observe that most of the values are around the 6.0 level: there is enough evidence to conclude that customer's satisfaction with the Spanish-language familiarity is good.

*6.3.1.6. Spanish-language overall satisfaction*

The following summary table shows the results from question no. 18 presented in the Web-based survey instruments comparing the three PLM software products in the Spanish language with 27 participants.

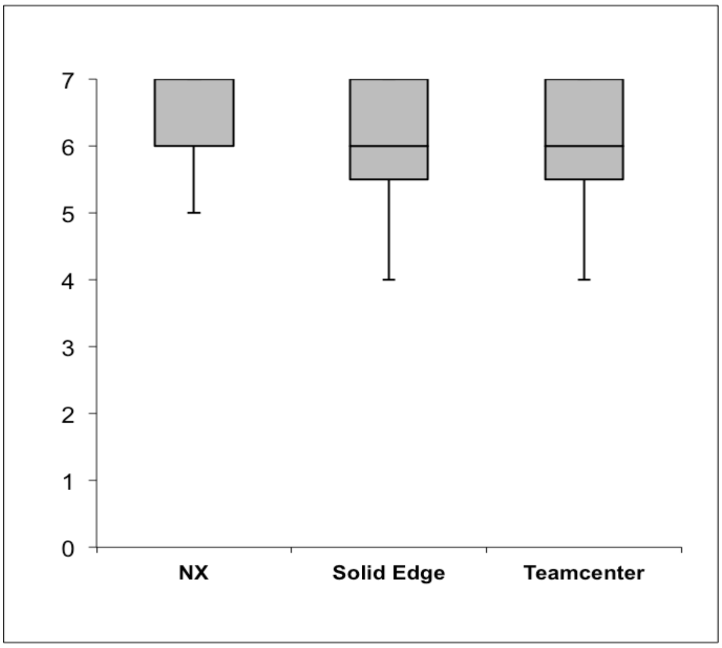
Question 18: Please rate your overall satisfaction with the Spanish-localized version of the NX/SE/Tc user interface.

Table 73. Frequency distribution by overall satisfaction with the Spanish-localized software products

| Spanish-language overall satisfaction | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Extremely satisfied | 4 | 3 | 3 | 10 (37.04%) |
| Very satisfied | 5 | 3 | 4 | 12 (44.44%) |
| Moderately satisfied | 1 | 2 | 2 | 5 (18.51%) |
| Neither satisfied nor dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Moderately dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Very dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Extremely dissatisfied | 0 | 0 | 0 | 0 (0%) |
| **Total** | **10** | **8** | **9** | **27 (100%)** |

The ANOVA test once again indicates that the software products are not significantly different (p=0.945), although the distributions are clear in Figure 10.

Figure 10. Quartile analysis of three products for Spanish-language overall satisfaction (1= Extremely dissatisfied, 7 = Extremely satisfied)




We observe that most of the values are close to the 6.0 level: there is enough evidence to conclude that customers' overall satisfaction with the Spanish-localized versions is good.

#### *6.3.1.7. Evaluation of the Spanish-language user interfaces*

Judging from the evidence presented in the previous sections, we can conclude the following:

1. Most of the responses fall in the ‘good’ category or above average. Terminology seems to have been used consistently throughout the Spanish-localized user interface and it is evaluated positively.
2. In general, we can state that UI segments were not translated literally. In other words, the translated segments are perceived as sounding natural and fluent, as if they had been authored in the Spanish language. Most of the responses fall in the ‘moderately fluent and natural’ category or above the mid-point.
3. Wrong URL addresses or file names, text expansion, truncation, incorrect translation or placement, font issues or non-translated UI segments can impact any software product’s performance. According to the data collected, the Spanish-localized software products contain a few functional errors.
4. The Spanish-localized user interface is general perceived as taking into account the customers’ cultural sensitivity. Most of the responses fall in the ‘extremely satisfied’ category.
5. The Spanish language variety used in the user interface is generally perceived as being similar to the language used in the customer’s country of origin. Most of the responses fall in the ‘very satisfied’ category, even though we aim to localize our products into a neutral or standard Spanish language.

In general, it can be stated that the Spanish-language end-users seem to be very satisfied with the three localized software applications. Customer satisfaction is related to loyalty to the brand. Satisfied customers will be more likely to continue buying the PLM software products.

The quantitative evidence thus suggests that the translation revision process produces a Spanish language text that the targeted readership regards as communicative, intelligible and acceptable.

### *6.3.2. General results on the English-language interfaces*

We will now bring together the corresponding results concerning the English-language user interfaces.

#### *6.3.2.1. English-language consistency*

The following summary table shows the results from question no. 9 presented in the Web-based survey instruments comparing the three PLM software products in the English language with 48 participants.

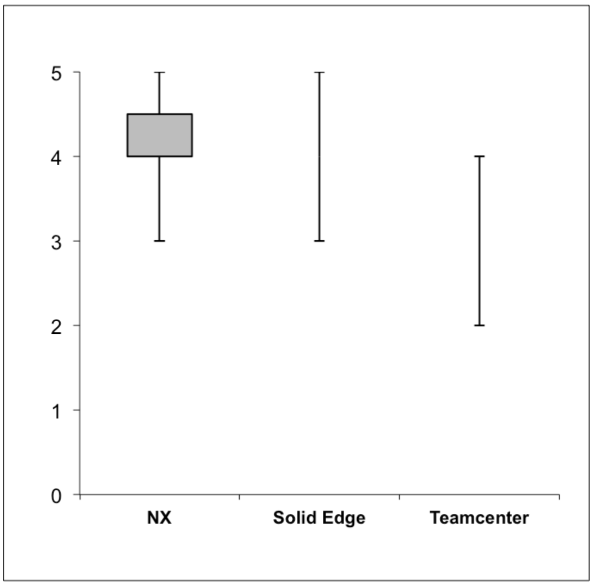
> Question 9: How would you assess the consistency of the English-language technical terminology used in the NX/SE/Tc user interface?

Table 74. Frequency distribution by English-language consistency and software product

| English-language consistency | NX | Solid Edge | Teamcenter | Total count and percentage |
|---|---|---|---|---|
| Very good | 9 | 6 | 3 | 18 (37.5%) |
| Good | 9 | 8 | 7 | 24 (50%) |
| Average | 0 | 1 | 1 | 2 (4.16%) |
| Poor | 1 | 2 | 0 | 3 (6.25%) |
| Very poor | 1 | 0 | 0 | 1 (2.08%) |
| **Total** | **20** | **17** | **11** | **48 (100%)** |

Once again, the ANOVA test indicates no significant difference between the software products (p=0.470). The different distribution can nevertheless be seen in the following figure.

Figure 11. Quartile analysis of three products for English-language consistency (1= Very poor, 5 = Very good)



We observe that most of the values are significantly above point 3: there is enough evidence to conclude that the consistency of the English terminology level is good.

*6.3.2.2. English-language fluency and naturalness*

The following summary table shows the results from question no. 10 presented in the Web-based survey instruments comparing the three PLM software products in the English language with 49 participants.

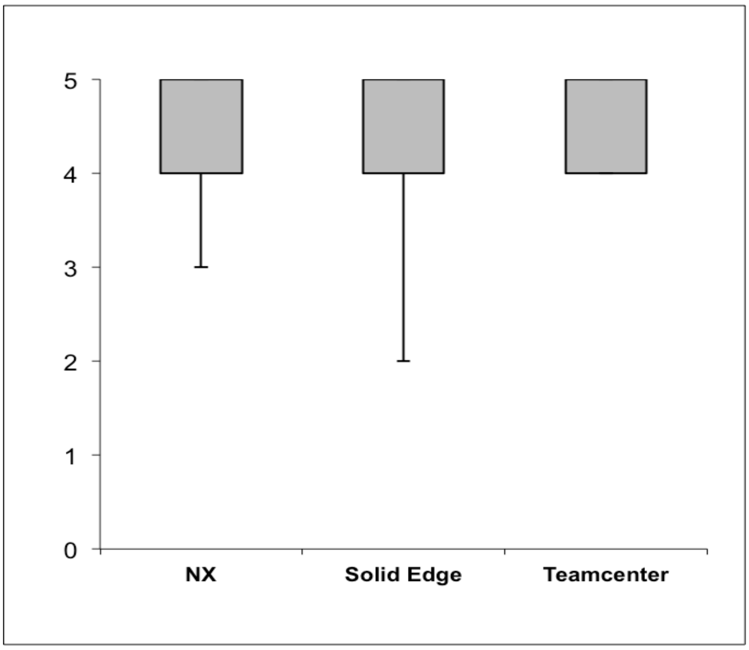
Question 10: How would you assess the fluency and naturalness of the English language used in the NX/SE/Tc user interface?

Table 75. Frequency distribution by English-language fluency and software product

| English-language fluency/naturalness | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Highly fluent and natural | 7 | 6 | 4 | 17 (34.69%) |
| Moderately fluent and natural | 10 | 10 | 7 | 27 (55.10%) |
| A little difficult but understandable | 3 | 0 | 0 | 3 (6.12%) |
| Sometimes hard to understand | 0 | 2 | 0 | 2 (4.08%) |
| Not at all fluent, very hard to understand | 0 | 0 | 0 | 0 (0%) |
| **Total** | **20** | **18** | **11** | **49 (100%)** |

Once again, the ANOVA test indicates no significant difference between the software products (p=0.509). The different distribution can nevertheless be seen in the following figure.

Figure 12. Quartile analysis of three products for English-language fluency (1= Very poor, 5 = Very good)




We observe that the median consistency level for the three software products is 4. Therefore, we can conclude that the English-language consistency level is high.

*6.3.2.3. English-language functional errors*

The following summary table shows the results from question no. 11 presented in the Web-based survey instruments comparing the three PLM software products in the English language with 54 participants.

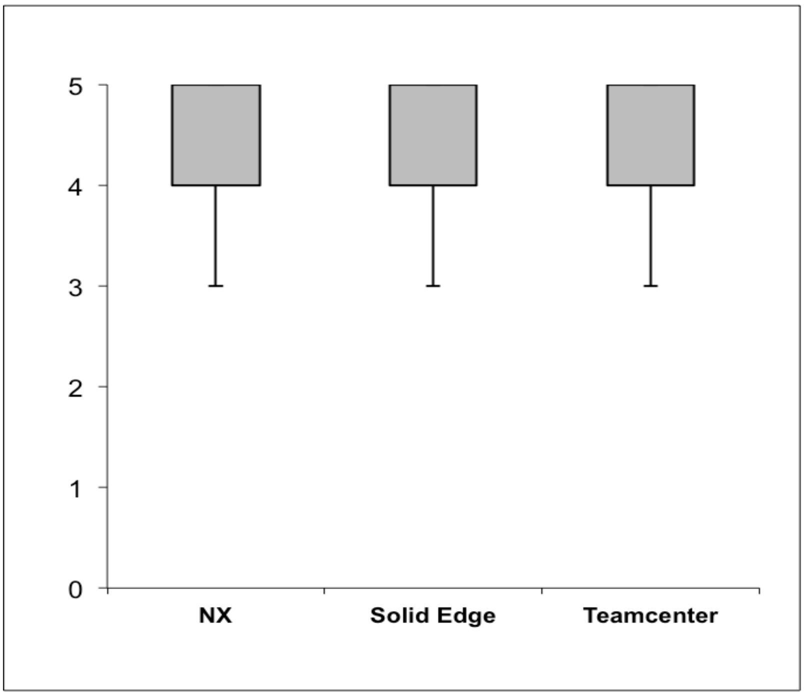
> Question 11: When using NX/SE/Tc, how many functional errors do you encounter that you believe are caused by the language and/or terminology used in the English user interface?

Table 76. Frequency distribution by English-language functional errors and software product

| English-language functional errors | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| None | 9 | 9 | 9 | 27 (50%) |
| A few | 7 | 7 | 4 | 18 (33.33%) |
| Some | 3 | 3 | 3 | 9 (16.6%) |
| Many | 0 | 0 | 0 | 0 (0%) |
| Too many | 0 | 0 | 0 | 0 (0%) |
| **Total** | **19** | **19** | **16** | **54 (100%)** |

Once again, the ANOVA test indicates no significant difference between the software products (p=0.873). The different distribution can nevertheless be seen in the following figure.

Figure 13. Quartile analysis of three products for English-language functional errors (1= Too many, 5 = None)




We observe that most of the values are around the 4.00 level: there is enough evidence to conclude that there are almost none functional errors in the English-language versions.

*6.3.2.4. English-language overall satisfaction*

The following summary table shows the results from question no. 12 presented in the Web-based survey instruments comparing the three PLM software products in the English language with 47 participants.

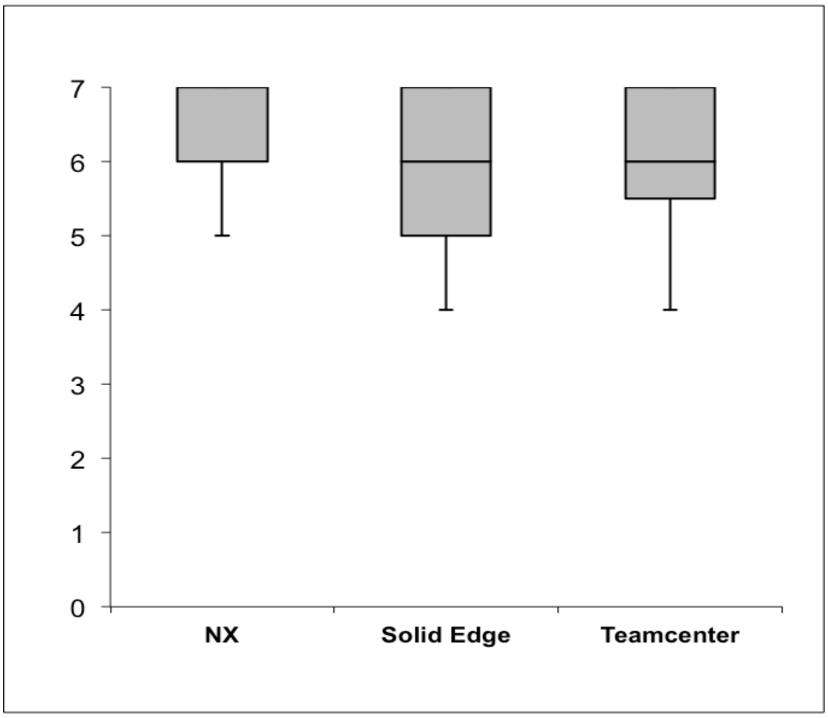
Question 12: Please rate your overall satisfaction with the English-language version of the NX/SE/Tc user interface.

Table 77. Frequency distribution by overall satisfaction with the English-language version and software products

| English-language overall satisfaction | NX | Solid Edge | Teamcenter | Total/Percentage |
|---|---|---|---|---|
| Extremely satisfied | 7 | 7 | 4 | 18 (38.29%) |
| Very satisfied | 11 | 5 | 4 | 20 (42.55%) |
| Moderately satisfied | 1 | 2 | 2 | 5 (10.63%) |
| Neither satisfied nor dissatisfied | 0 | 3 | 1 | 4 (8.51%) |
| Moderately dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Very dissatisfied | 0 | 0 | 0 | 0 (0%) |
| Extremely dissatisfied | 0 | 0 | 0 | 0 (0%) |
| **Total** | **19** | **17** | **11** | **47 (100%)** |

Once again, the ANOVA test indicates no significant difference between the software products (p=0.674). The different distribution can nevertheless be seen in the following figure.

Figure 14. Quartile analysis of three products for English-language overall satisfaction (1= Extremely dissatisfied, 7 = Extremely satisfied)




We observe that the median consistency level for the three software products is 6: there is enough evidence to conclude that the customers' satisfaction level is high.

*6.3.3. Evaluation of the three English-language user interfaces*

Judging from the evidence presented in the previous sections, we can conclude the following:

1. The technical terminology is used consistently throughout the English-language user interface and it is above average. Most of the responses fall in the 'good' category or above the mid point.
2. The English-language content sounds fluent and natural. Most of the responses fall in the 'moderately fluent and natural' category or above average.
3. The English-language software applications contain almost no functional errors.
4. The English-language end-users are very satisfied with the three software applications. In other words, their satisfaction level is above average.

*6.3.4. Comparative evaluation of the two language versions*

As mentioned above, these are the four variables tested for the English- and the Spanish-languages versions:

Terminology consistency

Language fluency and naturalness

Functional errors related to language

Overall satisfaction with the language used in the user interface

We will answer the following questions in the last section of this chapter: Which language version obtains the higher scores? Does localization improve, keep the same, or deteriorate the quality of the Spanish-language user interface?

*6.3.4.1. English-language and Spanish-language - consistency*

Regarding the consistency level in the terminology used in the user interface, is there a significant difference between the English-language and the Spanish-localized versions?

The following table shows the consistency level means obtained for the three Spanish-localized and English-language software products:

Table 78. Consistency level comparison for both language groups

| Name of application | Spanish-language consistency | English-language consistency |
|---|---|---|
| NX | 4.10 | 4.094 |
| Solid Edge | 4.25 | 4.058 |
| Teamcenter | 4.00 | 4.181 |
| **Total** | **4.111** | **4.012** |

It is very clear that the means for the English-language applications are higher than for the Spanish-localized versions. It is also interesting to note that NX scores the highest in each group. Within the Spanish-language group, Teamcenter is the second highest score followed by Solid Edge. However, within the English-language group, the opposite is true.

The results produced a p-value of 0.937 for a two-tailed heteroscedastic t-test, indicating that this difference is not significant. By comparing the means in each language we can see that the English-language software products rank slightly higher than the Spanish-localized products.

*6.3.4.2. English-language and Spanish-language - fluency and naturalness*

Regarding the principle of fluency and naturalness in the language used in the user interface, is there a significant difference between the English-language and the Spanish-localized versions?

The following table shows the fluency and naturalness means obtained for the three Spanish-localized and English-language products:

Table 79. Fluency level comparison for both language groups

| Name of application | Spanish-language fluency | English-language fluency |
|---|---|---|
| NX | 4.00 | 4.26 |
| Solid Edge | 4.00 | 4.111 |
| Teamcenter | 3.60 | 4.36 |
| **Total** | **3.90** | **4.229** |

It is very clear that the means for the English-language applications are higher than for the Spanish-localized versions. It is also interesting to note that NX scores the highest in each group. Within the Spanish-language group, Teamcenter is the second highest score followed by Solid Edge. However, within the English-language group, the opposite is true.

The results produced a p-value of 0.1178 for a two-tailed heteroscedastic t-test, indicating that this difference is not significant. By comparing the means in each language we can see that the English-language software products rank slightly higher than the Spanish-localized products.

*6.3.4.3. English-language and Spanish-language – functional errors*

Regarding the number of functional errors related to the language content used in the user interface, is there a significant difference between the English-language and the Spanish-localized versions?

The following table shows the functional errors means obtained for the three Spanish-localized and English-language products:

Table 80. Functional error level comparison for both language groups

| Name of application | Spanish-language functional errors | English-language functional errors |
|---|---|---|
| NX | 3.80 | 4.31 |
| Solid Edge | 3.80 | 4.31 |
| Teamcenter | 4.00 | 4.37 |
| **Total** | **3.88** | **4.333** |

It is very clear that the means for the English-language applications are higher than for the Spanish-localized versions. It is also interesting to note that NX and Teamcenter score the same within the Spanish-language group, whereas NX and Solid Edge score the same within the English-language group.

The results produced a p-value of 0.0468 for a two-tailed heteroscedastic t-test, indicating that this difference is significant. By comparing the means in each language we can see that the English-language software products rank higher than the Spanish-localized products.

*6.3.4.4. English-language and Spanish-language – overall satisfaction*

Regarding the respondents' overall satisfaction levels with the user interface, is there a significant difference between the English-language and the Spanish-localized versions?

The following table shows the general satisfaction level means obtained for the three Spanish-localized and English-language products:

Table 81. Satisfaction level comparison for both language groups

| Name of application | Spanish-language satisfaction | English-language satisfaction |
|---|---|---|
| NX | 6.30 | 6.38 |
| Solid Edge | 6.12 | 5.83 |
| Teamcenter | 6.12 | 6.20 |
| **Total** | **6.192** | **6.148** |

It is very clear that the means for the English-language applications and the Spanish-localized versions are very close. However, within the English-language group, Solid Edge ranks lower than its Spanish counterpart. It is also interesting to note that NX scores the highest in each group. Within the Spanish-language group, both the Solid Edge and Teamcenter scores are identical. The English-language Teamcenter scores higher as well.

The results produced a p-value of 0.718 for a two-tailed heteroscedastic t-test, indicating that this difference is not significant. By comparing the means in each language we can see that the English-language software products rank higher than the Spanish-language products.

## 6.4. Summary of quantitative findings

The detailed results from the comparative evaluation of the English-language and the Spanish-localized versions of the PLM software products presented above can be summarized as follows: There seems to be no statistically significant difference between the English-language version and the Spanish-localized user interface regarding consistency, fluency, and overall satisfaction. However, there is a significant difference ($p=0.0468$) with respect to functional errors, where the English-language interfaces score higher (i.e. are perceived as having significantly fewer errors).

## 6.5. Summary of qualitative findings

A summary of our qualitative findings follows here; overviews of the application users' comments as well as data from the analysis of revised UI content and problem reports are included.

### *6.5.1. Application users' comments*

Based on our customers' comments from the Web-survey related to the Spanish versions only, we can conclude the following:

1. Specialized terminology: One of the respondents indicated that the Spanish-language versions lack an industry-specific terminology, and suggested there is a need for a more precise terminology to be incorporated into the software. A second customer also

indicated that it was necessary to review most of the translated terms because they were literal, poor or absurd in many cases.

Developers write source code based on highly specialized terminology and complicated subject matter. Many times, specific terms or what is worse, the combination of three or five nouns together, are hard to find in print or online dictionaries. And when found, and this is not the norm, the same term has different translations according to different authors/translators.

2. Marketing of Spanish-language versions: Some customers observed that one of the Spanish-localized PLM software products was not offered for sale to Spanish-speaking groups. However, they learned about the existence of that particular localized version while searching for information on some websites from Spain.

If these customers were able to purchase the Spanish-localized version, they would be able to understand and use the application better and would not have so many language questions.

3. Not so naturally sound and fluent: Contrary to the general quantitative data obtained and described earlier, one respondent indicated that some Spanish versions sounded like machine-translated output, and that the translation seemed to have been done by someone who did not understand the Spanish language.

4. Acknowledgement of efforts made in localized versions: One respondent indicated that they liked the PLM applications since they were very user-friendly and, though there were some issues, there was always room for improvement. Some customers value Siemens PLM because it can anticipate customers' needs.

5. Lack of Spanish training material: One respondent indicated that the training material or courseware and some online help documentation were offered in the English language only. And this created many problems for end-users who were not bilingual (English-Spanish) and were forced to use the English materials. Another respondent observed that he/she had to translate some courses into Spanish using the industry-specific terminology. The latter also complained that the user interface was only offered in English and German.

6. Content authored by Spanish-speaking writers: One respondent suggested that Spanish-speaking writers should author training materials as well as online help documentation. Content created in Spanish would be more appropriate and would not sound as literal as its translation does. This respondent also mentioned that those materials should use a Spanish variety spoken by Latin American end-users. A third

respondent indicated that without NX and Solid Edge CAD, CAM, and CAE training courses in Spanish, they would not be able to purchase the Siemens PLM platform.

The reasons why some Mexican customers resort to English-language versions of PLM software products might include the lack of training materials and manuals in Spanish, the independent marketing of some English-language versions, as well as some perceived functional problems.

*6.5.2. Revised UI content*

During the revision practice we saw that the most recurrent errors were found in the Translation category, followed by the Lexical and Syntactic categories with three subcategories each. Typographic, Localization, and Terminology had two subcategories and three errors each, and Spelling had one error. We can conclude that the most prevalent error types were Translation and Terminology.

*6.5.3. Problem Reports*

The most prevalent complaints filed by some customers through the problem report system were mistranslations and source language text in localized versions. This was followed by wrong file or directory names in the user applications.

## 6.6. Hypotheses testing

The evidence presented and the results we obtained through the three different instruments (surveys, analysis of UI content and Problem reports) do not support the hypotheses formulated:

($H_1$) The translated interface is unclear since it contains linguistic or stylistic errors.

($H_2$) Mexican users perceive the translated interface to be defective.

The quantitative analysis suggests that the localized versions of the user interface of the PLM software products convey the same message as the English-language versions. From the data we analyzed in this chapter we can say that, in general, our application users are rather satisfied with the Spanish versions of our PLM software products, in spite of the number of functional issues indicated. The checking of the Spanish-language user interfaces also suggests a high standard as far as consistency, fluency, language sensitivity, familiarity with the language and overall satisfaction are concerned.

The quantitative analysis of the questionnaire suggests a perceived significant difference with respect to the number of functional errors found in the Spanish localized versions as compared with the English-language UI content. However, the problem reports do not really back up this perception. So there is a certain contradiction between the results given by the three main instruments since functional errors were not reported through the Problem Report system during the time frame assigned to the Web-based surveys. Besides, functional errors are hard to detect during the translation revision stage of the UI content by either translators or ICRs. Testing is a critical step within the localization process to solve usability and functional errors before the applications are released to market. Unfortunately, some errors might go unnoticed, just as it happens with language defects.

The qualitative analysis of the customers' responses seem to indicate that their preference for the English-language versions is not based on linguistic issues but rather on other factors, such as lack of Spanish training materials.

In the next chapter we will present a summary of the main points as well as some recommendations for future research.

# Chapter 7: Conclusions

## 7.1. Introduction

The final chapter in this study provides an overview of the main challenges found in the translation revision process within a localization scenario as well as our final conclusions regarding this research.

## 7.2. Translation revision challenges

Our examination and analysis of the source text and the difficulties it presents to both translators and revisers has made us more aware that: 1) translation revision goals vary according to the intended audience, the digital publisher's requirements and the difficulties found in the source text; 2) revising processes are important to track data regarding Spanish-language technical changes and evolution; and 3) working with in-country revisers provides translators with an enormous enrichment of their knowledge and expertise at both professional and cultural levels.

## 7.3. Advantages of translation revision

The goal of both in-house translators and local revisers is to deliver a software product in the target language that is as close to the original as possible from a linguistic and a cultural point of view. Translation revision also minimizes time spent on software testing and reduces the number of PRs. We have seen that translation revision is a rather new activity that is both diagnostic and formative, since it can determine areas for translation improvement and can be used in training translators.

The main and primary purpose of most digital publishers is to increase revenues and operating profits, and the number of per-seat licenses sold is the measure of their success. Application users may or may not recommend the Siemens software products to their colleagues based on their perceived quality of the national-language versions.

### 7.4. Localization constraints

We have shown that the specialized terminology used in our applications is very complex and laden with acronyms, jargon words and neologisms that are hard to find in technical dictionaries or glossaries.

One of the main problems when translating specialized terminology into Spanish is the lack of equivalents. This linguistic absence, coupled with the speed of localization requirements, seems to force the absorption of more English terms into the Spanish versions. So should translators and revisers wait for several months to come up with the right term or just resort to the English term? When application users are exposed to the English term for the first time, they will probably remember it better than its future translation. Since English is the language of the Internet, users seem to be more prone to adopting and 'spanglishize' English terms.

Another problem facing translators and revisers when deciding on how to translate a new English term is the different translations found in technical dictionaries. A recent example comes from researching terminology related to polymers. 'Edge gate' has been translated into Spanish as: *cavidad lateral* and *compuerta al filo.*

We have noted that Spanish-localized text in our software products is not completely monolingual: it contains a high percentage of "company and product names, which would make up for 5% of the text" (Schäler 2008: 204). This is also accompanied by the extended use of English terms and abbreviations as well as names of preferences, file names, directory names, paths, as well as concatenated segments that are left non-translated in the localized UIs. Therefore, localized software products cannot read as if they had been authored in the Spanish language.

### 7.5. Limitations of software localization

We explained in earlier chapters that some linguistic errors might prevent customers from using a software product in the same fashion as an English-speaker end-user does. The most common language problems at the linguistic level found during translation revision are as follows:

Table 82. Main linguistic issues

| Source text | Translated text |
|---|---|
| Unedited English segments | Mistranslation |
| Segmentation issues | Lack of Spanish equivalents |
| Equivocal brand names | Incorrect punctuation |
| Terminology inconsistencies | Concatenated words in Spanish versions |
| Inconsistent use of punctuation marks | Both English and Spanish terms in an application |
| Obscure jargon, and buzzwords | Bilingual environment (file names, directory names, brand names) |
| Spelling issues | |
| Synonymy, homonymy, polysemy, etc. | Stylistic and formatting issues |
| Dubious meaning | Omissions |
| Grammar issues | Wrong variables |
| Unexplained acronyms | Entity problems |
| Changes in the source text after completion of translation revision of localized segments | Grammar issues |

Localization is not perfect, and its outcome might be far from either the translator's or the reviser's expectations. Its shortcomings arise from its own 'architectures' or how different modules of the system communicate with each other and with other systems.

We have shown that many software customers prefer to familiarize themselves with the English-language versions, provided that they have some English technical knowledge. In this way, they avoid having to deal with some translation inconsistencies and a mixed environment. Besides, when working in a bilingual environment, users are forced to learn the original and the target terminologies.

As we mentioned in Chapter 1, the number of Mexican customers who prefer to use the Siemens PLM Software English versions remains high. No matter how well translated and revised the UI segments in our localized software applications are, there will always be Spanish-speaking customers who prefer to use the English versions.

### 7.6. What does it take to produce a successful localized product?

We set out to test whether or not the application user can perfectly understand the Spanish-localized content. The question we asked in Chapter 1 was whether the source meaning and the message have remained the same in the target language. Was the message understood by the customer/reader?

We collected data through a survey questionnaire on the attitudes and opinions of customers of the Spanish-localized user interface of three Siemens PLM software applications (NX, Solid Edge, and Teamcenter). The data analyzed in the findings chapter support our conclusions:

1. Level of comprehensibility: When Spanish-speaking users have some knowledge of technical English terminology, they prefer to use the English-language versions, since it is not a combination of two languages (source and target), and the terminology seems to be more consistent throughout the source applications. It will be easier for them to understand the various meanings of the English term offset, independently of the different Spanish translations.
2. Level of consistency: The technical terminology is used consistently throughout the Spanish-localized user interface.
3. Level of adequacy and fluency of the translation: The Spanish-localized user interface sounds fluent and natural.
4. Level of usability: The functional errors in the Spanish-localized user interface are not related to the terminology or language used. The data analyzed showed that were a few functional errors in the three applications and that they resulted from translation mistakes.
5. Level of cultural sensitivity of translation: The Spanish-localized user interface takes into account the customers' cultural sensitivity.
6. Level of appropriateness of translation: The Spanish language used in the user interface is similar to the language used in the customer's country of origin.
7. Level of overall satisfaction with translation: The Spanish-speaking customers are satisfied with the Spanish-localized user interface of the PLM software products.

From the comparison of both language versions of our software products in Chapter 6, we concluded that the main statistical difference was found in the perception of functional errors. A functional error is a bug or defect that will prevent the customer from using a certain feature or features in the software application. To avoid functional errors, testers run scripts through all aspects of a software application to find and correct defects before the release date. In some situations, a functional error is not the result of a linguistic issue. A variable that was not written properly in the source version, or over-translation of a system variable that is supposed to be invisible to the target user, or even a third-party software application can cause malfunctioning. Consequently, when functional errors are found in any enterprise software, end-users might feel more inclined to use the original version or even switch brands, since the quality of the product will be in question.

The number of functional errors in the Spanish-localized versions might be a reason why some Spanish-speaking customers preferred to use the English versions.

Now, if those errors are not linguistic, their language preference might be related to other factors, such as: 1) the *perception*, but not necessarily the existence, that there are functional errors resulting from language mistranslation; 2) the lack of full marketing of the Spanish-localized interfaces; and 3) the lack of training and support materials in Spanish, as explained in Chapter 6.

We conclude that it is not sufficient to translate and revise UI content that has the least number of linguistic or stylistic errors and defects. Undoubtedly, software localization is an extremely complex process, but, if it is to be successful, also has to involve cross-functional teams, such as marketing and services in the target language.

### 7.7. Limitations of our own research

This research has not included linguistic, cosmetic or functional testing of the PLM software applications, since it would have taken much longer to complete. However, such testing would have been an interesting research topic because it could have added some information about software localization from a translation aspect.

We would have liked to conduct a second survey two or three years after the first one, in order to see how our end-users perceive our localized products at the present time. And we would have also liked to provide them with a second survey to compare our customers' satisfaction with our products versus those of similar digital publishers.

### 7.8. Considerations and future directions

We recommend that future research focus on the following topics:

1) Data collection on the attitudes and opinions of customers of other localized user interfaces of the Siemens PLM software applications in different language pairs (English translated into Simplified and Traditional Chinese, French, German, Italian, Japanese, Korean, Portuguese, and Russian).

2) Identification and comparison of common areas in which there might be language proficiency issues, basically the appropriateness of the grammar, the consistency of the specific technical terminology and the fluency or comprehensiveness of both language versions (source and target texts).

3) In-context linguistic review or testing. In spite of the time spent on translation revision, application testing exposes language issues that cannot be solved during either the self-revising phase or the bilingual revision stage of any software product. These include but are not limited to mistranslations, functional errors, cosmetic issues and ambiguities. Traditionally, software testing is mainly performed on the English versions of software products. By comparison, very little time is dedicated to testing localized versions by revisers. We consider testing in a localization setting as a necessary and complement effort to translation revision.

4) The figure of the bilingual tester or specialist opens up more opportunities for researchers, such as skills and competencies, as well as college or university training. Promoting and raising the profile of this specialist could be advantageous as well. Furthermore, we consider that research is needed on the challenges of teaching linguistic in a localization setting.

5) We also conjectured that there is a certain association between translation revision and translation review processes, and that this association would generate more positive results when other elements are included. Those elements are edited source texts, collaboration efforts, and a more solid communication between developers and translators and reviewers.

Localization is the new frontier where diverse languages and cultures interact with each another, where translators and revisers attempt to reproduce English content in Spanish, and where the result might not be as perfect as they would have desired. However, this Spanish content will allow thousands of application users around the world to better understand the latest PLM software applications.

# References

Abaitua, Joseba. 1999. "Is it worth learning translation technology?" Presentation in *3rd Forum on Translation in Vic. Training Translators and Interpreters: New Directions for the Millennium.* May 12-15, 1999. Universitat de Vic, Barcelona, Spain. http://goo.gl/lRMouc. Accessed March 2011.

Alcántara Mejía, José Ramón. 2003. *La escondida senda: poética y hermenéutica en la obra castellana de Fray Luis de León*. Ciudad de México: Universidad Iberoamericana.

Allman, Spencer. 2007. "Negotiating translation revision assignments". http://goo.gl/aIzcEP. Accessed March 2012.

American Society for Quality (ASQ). "Quality assurance vs. quality control." http://goo.gl/AnS0N. Accessed September 2013.

Angelelli, Claudia. 2003. *Revisiting the Interpreter's Role: A Study of Conference, Court, and Medical Interpreters in Mexico, Canada and the United States*. Amsterdam/Philadelphia: John Benjamins Publishing.

Arthern, Peter J. 1986. "Four eyes are better than two". In C. Picken (ed). *Translating and the Computer 8*, *Proceedings of a conference... 13-14 November 1986.* London: Aslib. 14-26. http://goo.gl/zn5FVJ. Accessed April 2013.

Austermühl, Frank. 2006. "Training translators to localize". In A. Pym, A. Perekrestenko, and B. Starink (eds.). *Translation Technology and its Teaching*. Tarragona: Servei de Publicacions. 69-82. http://goo.gl/N8xEsP. Accessed March 2014.

Bates, Daniel G. and Plog, Fred. 1990. *Cultural Anthropology*, 3rd edition. New York, NY: McGraw-Hill.

Belda Medina, José. 2003. *El lenguaje de la informática e Internet y su traducción*. San Vicente del Raspeig, Alicante: Publicaciones de la Universidad de Alicante.

Bell, Roger T. 1991. *Translation and Translating. Theory and Practice*. London and New York, NY: Longman.

Bevan, Nigel, Kirakowski, Jurek and Maissel, Johnattan. 1991. "What is usability?" *Proceedings of the 4th International Conference on Human-Computer Interaction.* Stuttgart, September 1991. http://goo.gl/74QZgU. Accessed December 2011.

Biau Gil, José Ramón. 2005. "Flying blind: Translation interfaces and non-verbal elements in hypermedia texts". http://goo.gl/znE4VI. Accessed July 2012.

Biel, Lucia. 2011. "Training translators or translation service providers? EN 15038:2006 standard of translation services and its training implications". *The Journal of Specialised Translation*, 16: 61-76.

Brown, Peter F., Cocke, John, Della Pietra, Stephen A., Della Pietra, Vicent J., Jelinek, Frederick, Lafferty, John D., Mercer, Robert L. and Roosin, Paul S. "A statistical approach to machine translation". *Computational Linguistics*, 16 (2): 79-85. http://goo.gl/1gfr5Q. Accessed February 2015.

Brundtland Report (Our Common Future). 1987. United Nations Publications. The World Commission on Environment and Development (WCED). http://goo.gl/2VPHKc. Accessed March 2010.

Brunette, Louise. 2000. "Towards a terminology for translation quality assessment: A comparison of TQA practices". *The Translator*, 6 (2): 169-182.

Brunette, Louise, Cagnon, Chantal and Hine, Jonathan. 2005. "The GREVIS Project: Revise or court calamity". *Across languages and cultures*, 6 (1): 29-45 (17).

Burian, Kenneth. 1998. "Making decisions: Investing in computer technology". http://goo.gl/J8EokK. Assessed March 2011.

Byrne, Jody. 2006. *Technical Translation: Usability Strategies for Translating Technical Documentation*. Dordrecht, The Netherlands: Springer.

------ 2007. "Caveat translator: Understanding the legal consequences of errors in professional translation". *The Journal of Specialised Translation,* 7: 2-24.

------ 2009. "Localisation - when language, culture and technology join forces". *Language at Work*. http://goo.gl/a8Rz1L. Accessed April 1013.

Campbell-Kelly, Martin. 2003. *A History of the Software Industry: From Airline Reservations to Sonic the Hedgehog*. Cambridge, MA: MIT Press.

Campbell-Kelly, Martin and Aspray, William. 2004. *Computer: A History of the Information Machine.* Second edition. Boulder, CO: West View Press.

Ceruzzi, Paul E. 2004. *A History of Modern Computing*. Second edition. Cambridge, MA: MIT Press.

CIMdata Inc. 2010. Solid Edge. Insight. "A Microsoft SharePoint-based dedicated design data management solution for Solid Edge communities". http://goo.gl/hgnoha. Accessed December 2011.

Clapp, Judith A., Stanten, Saul F., Peng, W. W., Wallace, D. R., Cerino, Deborah A., Dziegiel Jr. Roger J. 1995. *Software Quality Control, Error Analysis, and Testing*. Noyes Data Corporation. (e-book)

Computer Desktop Encyclopedia. http://goo.gl/kMfDMX. Accessed June 2010.

Cook, T.D. and Campbell, D.T. 1979. *Quasi-Experimentation: Design and Analysis for Field Settings*. Chicago, Ill.: Rand McNally.

Cusumano, Michael A. 2004. *The Business of Software: What Every Manager, Programmer, and Entrepreneur Must Know to Thrive and Survive in Good Times and Bad.* New York, NY: Free Press.

Dean, Al. 2010. “Siemens PLM Software NX 7.5”. *Develop 3D Technology for the Product Lifecycle Magazine*. http://goo.gl/PiLZH0. Accessed September 2010.

DeFeo, Joseph A. 2001. “The tip of the iceberg: When accounting for quality do not forget the hidden costs of poor quality”. *Quality Progress,* May: 27-29.

Dillman, Don A. and Christian, Leach. 2002. “The influence of words, symbols, numbers, and graphics on answers to self-administered questionnaires: Results from 18 experimental comparisons”. Washington State University. http://goo.gl/GhQWdl. Accessed June 2010.

Doherty, Stephen and Gaspari, Federico. 2013. “Machine translation workflows: critical knowledge & techniques”. http://goo.gl/yH2rc7. Accessed December 2013.

Dohler, Per N. 1997. “Facets of software localization”. *Translation Journal,* 1 (1). http://goo.gl/atOHQo. Accessed December 2011.

Dorchies, Greg. 2012. “Cohesion”. http://goo.gl/he1MFe. Accessed January 2014.

Dorn, Randy I. 2013. “Notice of special education procedural safeguards for students and their families”. http://goo.gl/f1rbvP. Accessed June 2014.

Ellis, Lisa. 2002. “The transition of social research: The ins, outs and possible solutions for internet research”. http://goo.gl/5cMHmR. Accessed January 2009.

Encyclopedia Britannica online. http://goo.gl/nra6hA. Accessed April 2011.

Encyclopedia of business, 2nd edition. SIC 7372. Prepackaged software. 2012. http://goo.gl/9Xclje. Accessed April 2013.

Enriquez-Raído, Vanessa and Austermühl, Frank. 2003. “Translation and localization tools: Current developments” In L. Pérez-Gonzalez (ed.). *Speaking in Tongues: Language Across Contexts and Users*. Valencia: GUADA. 225-250.

Esselink, Bert. 2000. *A Practical Guide to Localization.* Amsterdam/Philadelphia: John Benjamins Publishing.

------ 2003. “The evolution of localization”. *The Guide to Localization*, supplement to *Multilingual Computing and Technology*, 14 (5): 4-7. http://goo.gl/f6alQc. Accessed April 2011.

European Commission's Directorate-General for Translation (DGT). 2010 Spanish Department. Revision Manual. Brussels and Luxembourg. http://goo.gl/SkTb9w. Accessed July 2012.

European Commission's Directorate-General for Translation (DGT). 2012. "Studies on translation and multilingualism. Quantifying quality costs and the cost of poor quality in translation". http://goo.gl/fTJMkD. Accessed July 2012.

Fernández, Pablo Martín. 2009. "Excursión a los cuarteles centrales de Facebook". Interview with Naomi Gleit. *Diario La Nación*. July 31, 2009. http://goo.gl/okAOrD. Accessed March 2010.

Folaron, Deborah. 2010. "Translation tools." In Y. Gambier and L. van Doorslaer (eds.). *Handbook of Translation Studies*. Amsterdam/Philadelphia: John Benjamins Publishing. 429-436.

Foltz, Peter W. 1993. "Reader's comprehension and strategies in linear text and hypertext". ICS Technical Report #93-01. http://goo.gl/ZPxqUb. Accessed March 2012.

------ 1996. "Comprehension, coherence and strategies in hypertext and linear text". In J. F. Rouet, J. J. Levonen, A. P. Dillon, and R. J. Spiro (eds). *Hypertext and Cognition.* Hillsdale, NJ: Lawrence Erlbaum Associates. 109-136.

Forbes 2000 Magazine. 2010. "The world's leading companies". http://goo.gl/ph9zE. Accessed November 2011.

Franco Aixelá, Javier. 2004. "The study of technical and scientific translation: An examination of its historical development". *The Journal of Specialized Translation*, 1: 29-49. http://goo.gl/tdmzh3. Accessed November 2013.

Freij, Nabil. 1998. "Exporting technology: Localize your product to globalize your business". *MASS High-Tech*, March: 23-29. http://goo.gl/awLTf1. Accessed May 2011.

Friesen, Jeff. 1998. "Internationalize your software, Part I". Java World. December 9, 1998. http://goo.gl/tazFxA. Accessed April 2012.

Gadamer, Hans-George. 1975. *Truth and Method*. Translated by Garrett Braden and John Cumming. London: Sheed and Ward.

GALA. Globalization and Localization Organization. http://goo.gl/XcgsxT. Accessed November 2012.

García, Ignacio. 2008. "Translation and revising for localisation: What do we know? What do we need to know?" *Perspectives: Studies in Translatology,* 16 (1-2): 49-60. http://goo.gl/fNxiZK. Accessed March 2012.

----- 2009. “Beyond translation memory: Computers and the professional translator”. *The Journal of Specialized Translation,* 12: 199-214. http://goo.gl/u2o8s3. Accessed November 2012.

Gesmer, Lee. 1995. “Perspective: Lotus Development Corp. v. Borland International’. *MASS High Tech*. http://goo.gl/lUhHnV. Accessed May 2012.

Gladwell, Malcolm. 2008. *Outliers: The Story of Success*. New York, Boston and London: Little, Brown and Company.

Glossary of technical terms. http://goo.gl/i2N1ZW. Accessed July 2013.

Gouadec, Daniel. 2007. *Translation as a Profession*. Amsterdam/Philadelphia: John Benjamins Publishing.

Graham, Stuart J. H. and Mowery, David C. 2003. “Intellectual property protection in the software industry”. In W. M. Cohen and S. A. Merrill (eds). *Patents in the Knowledge-Based Economy.* Atlanta: The National Academy Press. 217-258.

Dictionary.com. Graphical user interface. http://goo.gl/y2pF6H. Accessed June 2013.

Grindstaff, Chuck. 2012a. Siemens Website. Congratulations JPL and NASA on the successful landing of Curiosity on Mars! http://goo.gl/J8NjQ9. Accessed January 2013.

------ 2012b. “On a mission to Mars”. PLM World. http://goo.gl/LMcglB. Accessed January 2013.

Guerra Martínez, Lorena. 2003. *Human Translation versus Machine Translation and Full Post-Editing of Raw Machine Translation Output*. MA dissertation in Translation Studies, Dublin City University, Ireland. http://goo.gl/NiOblh. Accessed March 2012.

G*uide to Localization Management.* 2004. Rubric North America. http://goo.gl/hFEM70. Accessed July 2014.

Hall, Patrick A. V., 2002. “Bridging the digital divide, the future of localization”. *The Electronic Journal on Electronic Systems in Developing Countries* EJISDC 8 (1): 1-9.

Hansen, Gyde. 2008. “The dialog in translation process research”. In *Translation and Cultural Diversity. Selected Proceedings of the XVIII FIT World Congress*. Shanghai, 2-7 August 2008. Beijing: Foreign Languages Press (forthcoming). 386-397. http://goo.gl/kG9Dln. Accessed January 2012.

------ 2009. “The speck in your brother’s eyes – the beam in your own: Quality management in translation and revision”. In H. Gyde, A. Chesterman and H. Gerzymisch-Arbogast (eds). *Efforts and Models in Interpreting and Translation Research: A Tribute to Daniel Gile*. Amsterdam: John Benjamins Publishing. 255-280.

------ 2010. “Translation errors”. In Y. Gambier and L. van Doorslaer (eds). *Handbook of Translation Studies*, Vol. 1, Amsterdam: John Benjamins Publishing. 385-388.

Hartley, Tony. 2009. “Technology and translation”. In J. Munday (ed). *The Routledge Companion to Translation Studies,* London and New York: Routledge. 116-128.

Hatim, Basil and Munday, Jeremy. 2004. *Translation: An Advanced Resource Book*. London and New York: Routledge.

Hatim, Basil and Mason, Ian. 1997. *The Translator as Communicator*. London and New York: Routledge.

Hermans, Theo. 2002. “Paradoxes and aporias in translation and translation studies”. In A. Riccardi (ed). *Translation Studies: Perspectives on an Emerging Discipline,* Cambridge: Cambridge University Press. 10-24.

Hernández Guerrero, María José. 2005. “La revisión en el aprendizaje de la traducción”. Universidad de Málaga. IV Coloquio de la Asociación de Profesores de Francés de la Universidad Española. http://goo.gl/zjceWw. 685-695. Accessed May 2013.

Hernández-Lasa, Iñaki. 2011. “Which type of machine translation is best?” Machine translation and localization technology. http://goo.gl/L6Uq85. Accessed March 2015.

Hinckley, Martin C. 1997. “Defining the best quality-control systems by design and inspection. *Clinical Chemistry,* 43 (5): 873-879.

Hofmann, Cornelia and Mehnert, Thorsten. 2000. "Multilingual information management at Schneider Automation". In R. C. Sprung (ed). *Translating into Success*. *Cutting-edge strategies for going multilingual in a global age.* Amsterdam/Philadelphia: John Benjamins Publishing. 59-79.

Hönig, Hans G. 2010. “Positions, power and practice: Functionalist approaches and translation quality assessment”. *Current Issues in Language and Society*, 4 (1): 6-34.

Horguelin, Paul and Brunette, Louise. 1998. *Pratique de la révision*. Québec: Linguatec.

Hosington, Brenda M. and Horguelin, Paul. 1980. *A Practical Guide to Bilingual Revision*. Québec, Canada: Linguatech Éditeur.

Hurtado Albir, Amparo and Alves, Fabio. 2009. "Translation as a cognitive activity". In J. Munday (ed). *The Routledge Companion to Translation Studies*, London and New York: Routledge. 54-73.

Hutchins, W. John, and Somers, Harold L. 1992. *An Introduction to Machine Translation*. London: Academic Press.

Hymes, Dell H. 1972. "On communicative competence". In: J.B. Pride and J. Holmes (eds). *Sociolinguistics. Selected Readings*. Harmondsworth: Penguin. 269-293.

Iarossi, Giuseppe. 2006. *The Power of Survey Design: A User's Guide for Managing Surveys, Interpreting Results, and Influencing Respondents*. Washington, DC: The World Bank.

IBM glossary of Unicode terms. IBM. http://goo.gl/ZYMC2z. Accessed March 2010

International Organization for Standardization. http://goo.gl/CnPf38. Accessed December 2011.

Ishikawa, Kaoru. 1985. *What is Total Quality Control? The Japanese Way*. Translated by David J. Lu. Englewood Cliffs, N.J.: Prentice-Hall.

ISO Standards. ISO 9241-11:1998. Ergonomic requirements for office work with visual display terminals (VDTs): Part 11: Guidance on usability. http://goo.gl/lxe2xI. Accessed December 2012.

IT Encyclopedia. http://goo.gl/fSJVxy. Accessed January 2012.

IT Standards and organizations glossary. http://goo.gl/LYAO9l. Accessed September 2013.

Jackson, Daniel. 2006. "Dependable software by design". *Scientific American Magazine.* May 22. http://goo.gl/Va0HpE. Accessed December 2011.

Jiménez, Alfredo. 2003. "Space, time, peoples: Continuities in the great Spanish north from its beginnings to the present". In: P. Dimas (ed). *Provincias internas: Continuing Frontiers. Proceedings of a Symposium. The Arizona Historical Society*. http://goo.gl/VDv3Hb. Accessed March 2010.

Jiménez-Crespo, Miguel A. 2009. "Conventions in localisation: a corpus study of original vs. translated web texts". *The Journal of Specialized Translation,* 12: 79-102.

------ 2011. "A corpus-based error typology: towards a more objective approach to measuring quality in localization". *Perspectives: Studies in Translatology,* 19 (4): 315-338. http://goo.gl/UUxdGu. Accessed March 2014.

Johnson, Luanne. 2002. “A view from the sixties: How the software industry began”. In A. Akera and F. Nebeker (eds). *From 0 to 1: An Authoritative History of Modern Computing*. New York, NY: Oxford University Press. 101-110.

Juran, Joseph M. 1992. *Juran on Quality by Design: The New Steps for Planning Quality into Goods and Services*. New York, NY: The Free Press.

Karami, Omid. 2009. “The brief view on Google Translate machine”. http://goo.gl/yW1kiJ. Accessed March 2014.

Keniston, Kenneth. 1997. “Software localization: Notes on technology and culture”. http://goo.gl/Vccs4D. Accessed October 2010.

Koo, Siu Ling and Kinds, Harold. 2000. “A quality-assurance model for language projects”. In R. C. Sprung (ed.). *Translating Into Success: Cutting-edge strategies for going multilingual in a global age.* Amsterdam/Philadelphia: John Benjamins Publishing. 147-158.

Koskinen, Kaisa. 2008. *Translating Institutions: An Ethnographic Study of EU Translation*. Manchester and Kinderhook: St. Jerome Publishing.

Krings, Hans P. 2001. *Repairing Texts: Empirical Investigations of Machine Translation Post-Editing Processes*. Kent, OH: The Kent State University Press.

Künzli, Alexander. 2007a. “The ethical dimension of translation revision: An empirical study”. *The Journal of Specialised Translation*, 8: 42-56.

------ 2007b. “Translation revision”. In Y. Gambier, M. Schlesinger, and R. Stolze (eds). *Doubts and Directions in Translation Studies: Selected Contributions from the EST Congress, Lisbon 2004.* Amsterdam and Philadelphia: John Benjamins Publishing Company.

Laurian, Anne-Marie. 1984. “Machine translation: What type of post-editing on what type of documents for what type of users”. In *Proceedings du Congrés COLING 84*, Stanford, CA: Stanford University Press. 236-238. http://goo.gl/7AxRQe. Accessed July 2012.

Leal, Fernando and Shipley, Patricia. 2002. “From value conflicts to multiple mandates: On organizing ethical knowledge and its paradoxes”. In S. R. Glegg (ed). *Management and Organization Paradoxes,* Amsterdam/Philadelphia: John Benjamins Publishing. 139-161.

LionBridge Translation Guidelines. 2011. What should be localized? http://goo.gl/MjCe06. Accessed December 2011.

List, Dennis. 2007. *Know your Audience: A Practical Guide to Media Research*. Adelaide: John Goslino.

Loney, Jim. 1998. "Interfacing through cyber-Spanglish". *Los Angeles Times*, January 19, 1998. http://goo.gl/9U5Zo9. Accessed February 2010.

Mackenzie, Rosemary. 2004. "The competencies required by the translator's roles as a professional". In. K. Malmkjaer (ed). *Translation in Undergraduate Degree Programs*. Amsterdam/Philadelphia: John Benjamins Publishing. 31-38.

Mahoney, Luanne. 2002. "Software: The self-programming machine". In A. Akera and F. Nebeker (eds). *From 0 to 1: An Authoritative History of Modern Computing,* New York, NY: Oxford University Press. 91-100.

Malone, Thomas W., Weill, Peter, Lai, Richard, D'Durso, Victoria, Herman, George, Apel, Thomas, and Woerner, Stephanie. 2006. "Do some business models perform better than others?" Working paper 4615-06. Cambridge, MA: MIT Sloan School of Management. http://goo.gl/cJRSLi. Accessed October 2012.

Manzoor, Jawad. 2011. "A crowdsourcing framework for software localization". http://goo.gl/JLxLkl. Accessed March 2013.

Marmaridou, Sophia S. 1996. "Directionality in translation. Processes and practices". *Target 8* (1): 49-73.

Martin, Charles. 2012. "The dark side of translation revision". *Translation Journal* 16(1). http://goo.gl/L5zYZs. Accessed March 2012.

Martin, Tim. 2007. "Managing risks and resources: a down-to-earth view of revision". *The Journal of Specialised Translation,* 8: 57-63.

Mazur, Iwona. 2009. "The metalanguage of localization: Theory and practice". In Y. Gambier and L. van Doorslaer (eds). *The Metalanguage of Translation.* Amsterdam/
Philadelphia: John Benjamins Publishing. 145-166.

McDonell, Tommy B. 2003. "The effects of text presentation: Linear and hypertext on English language learners". Instructional Technology Forum. http://goo.gl/jhTthz. Accessed January 2014.

McElhaney, Terrence and Vasconcellos, Muriel. 1988. "The translator and the postediting experience". American Translation Association. Scholarly Monograph Series II: 140-148. http://goo.gl/Rsojkq. Accessed June 2013.

Merriam-Webster's Collegiate® Dictionary, Eleventh Edition. 2008. Springfield, MA: Merriam-Webster.

Mezak, Steve 2006. *Software without borders: A step-by-step guide to outsourcing your software*. Los Altos, CA: Earthrise Press.

Mick, Graciela. 2008. *Shifting capitals: In-house translators in corporate America*. MA Dissertation in Translation and Cultural Studies. Universitat Rovira i Virgili, Tarragona, Spain.

Microsoft Go Global Developer Center. Localization step-by-step. Localization team. https://goo.gl/z8ZaSC. Accessed July 2014.

Microsoft News Center. Blog. Hello mother: MS makes native languages more accessible. http://goo.gl/g5s8kU. Accessed July 2012.

Microsoft. Globalization step by step. Localization team. http://goo.gl/JgxSx0. Accessed March 2013.

Montiel-Ponsoda, Elena. 2009. "Ontology localization: a key issue in the semantic Web of the future". In E. Tabares Plasencia (ed). *Translatione via facienda (Studien Zur Romanischen Sprachwissenschaft Und Interkulturellen Kommunikation)*, Frankfurt: Peter Lang. 152-168.

Mossop, Brian. 2006. "Has computerization changed translation?" *Meta: journal des traducteurs / Meta: Translators' Journal,* 51 (4): 787-805. http://goo.gl/LsTFQY. Accessed March 2011.

------ 2007. "Empirical studies of revision: what we know and need to know". *The Journal of Specialized Translation,* 8: 5-20. http://goo.gl/SqDUxL. Accessed April 2012.

------ 2010. *Revising and Editing for Translators: Translation Practices Explained.* Second edition. Manchester and Kinderhook: St. Jerome Publishing.

Neil, Stephanie. 2007. "Siemens startles industry with UGS acquisition". *Managing Automation*. http://goo.gl/iKTkrt. Accessed July 2010.

Neill, Jennifer O. 2010. "Planning your In-country reviews". Society for Technical Communication's Europe SIG. http://goo.gl/a9mhIU. Accessed: January 2010.

Muzzii, Luigi. 2005. "Quality assessment and economic sustainability of translation". https://goo.gl/aIaf8p. Accessed: January 2012.

Nettle, Daniel and Romaine, Suzanne. 1981. *Approaches to Translation*. Oxford: Pergamon Press.

------ 1988. *A Textbook of Translation*. New York, London, Toronto, Sidney and Tokyo: Prentice Hall.

------ 2000. *Vanishing Voices: The Extinction of the World's Languages*. New York, NY: Oxford University Press.

Nielsen, Jakob. 2012. “Usability 101: Introduction to usability”. Nielsen Norman Group. http://goo.gl/wi6T8A. Accessed March 2012.

Nikolaropoulos, Evangelos, Schewring Jorg and Pirrung, Andreas. 1997. “Effective testing of localized software”. *Hewlett-Packard Journal,* 49 (3): 89-94.

Nixon, Seneya. 2009. “Linear text”. http://goo.gl/lN7Z43. Accessed March 2012.

Norcio, Anthony F. and Chmura, Louis J. 1986. “Design activity in developing modules for complex software”. In E. Soloway and S. Lyengar (eds). *Empirical Studies of Programmers.* New York, NY: Ablex Publishing Corporation. 98-116.

Nord, Christiane. 1996. “Translating as a purposeful activity: A prospective approach”. *TEFLIN Journal*, 17 (2): 131-143. http://goo.gl/CwD2Ew. Accessed April 2012.

------ 2001. *Translating as a Purposeful Activity: Functionalist Approaches Explained*. Cornwall, UK: T.J. International Ltd.

------ 2005. *Text Analysis in Translation: Theory, Methodology, and Didactic Application of a Model for Translation-Oriented Text Analysis*. Second Edition. Amsterdam and New York: Editions Rodopi B.V.

O’Brien, Sharon. 2002. “Teaching post-editing: A proposal for course content”. *6th EAMT Workshop Teaching Machine Translation*. Dublin City University, Ireland. 99-106. http://goo.gl/JMHm3X. Accessed March 2013.

------ 2010. “Introduction to post-editing: Who, what, how and where to next?” Center for Next Generation Localisation. Dublin City University, Ireland. http://goo.gl/giOrXA. Accessed March 2012.

------ 2012. “Towards a dynamic evaluation model for translation”. *The Journal of Specialized Translation* 17: 55-78. http://goo.gl/VCIuCJ. Accessed March 2012.

O’Hagan, Minako. 2006. “Training for localization (replies to a questionnaire)”. In A. Pym, A. Perekrestenko, and B. Starink (eds.). *Translation Technology and its Teaching*. Tarragona: Servei de Publicacions. 39-43. http://goo.gl/N8xEsP. Accessed March 2012.

O’Sullivan, Siegrun. 1992. “Quality management in translation”. Presentation at the *14th ASLIB International Conference on Translating and the Computer: Quality standards and the implementation of technology in translation*, 10-11 November 1992. London. http://goo.gl/W6ge06. Accessed July 2014.

Online Encyclopedia and Dictionary. http://goo.gl/8srVAm. Accessed June 2012.

Pan, Jiantao. 1999. “Software reliability”. Carnegie Mellon University. Spring 1999. http://goo.gl/LMqXs9. Accessed December 2011.

Parra Galiano, Silvia. 2005. La revisión de traducciones en la Traductología: aproximación de la práctica de la revisión en el ámbito profesional mediante el estudio de casos y propuestas de investigación. PhD diss., Universidad de Granada, Facultad de Traducción e Interpretación. http://goo.gl/kfQCRf. Accessed November 2013.

------ 2007. Propuesta metodológica para la revisión de traducciones: principios generales y parámetros. *Trans: Revista de traductología,* 22: 197-214.

Patil, Zumbarlal Namdeorao. 2006. "On the nature and role of the English in Asia". *The Linguistics Journal* 1 (2): 88-131.

Payàs, Gertrudis. 1997. "Ética para traductores". Tercera reunión del CRNA en Colorado Springs, CO. http://goo.gl/hHKF72. Accessed March 2010.

PC Magazine Encyclopedia. http://goo.gl/NBozf1. Accessed December 2011.

Peterson, Ivars. 2000. "Software's beginnings". *Science News,* 157 (22): 351. http://goo.gl/Kr0C9m. Accessed October 2012.

Ponzano, Paolo. 2008. "Revising translations". Translation Centre for the Bodies of the European Union. http://goo.gl/Xn2zCD. Accessed July 2013.

Problem report sample. Center for Software Engineering. http://goo.gl/Gzc0zi. Accessed July 2012.

Pym, Anthony. 2000. Training Translators and European Unification: A Model of the Market. A talk presented to the European Commission's Translation Service 'Theory Meets Practice' forum, 12-14 April 2000. http://goo.gl/4R54jU. Accessed June 2013.

------ 2004. *The Moving Text: Localization, Translation and Distribution*. Amsterdam/ Philadelphia: John Benjamins Publishing.

------ 2011a. "What technology does to translating". *Translation and Interpreting.* 3 (1). http://goo.gl/iJbPrf. Accessed March 2013.

------ 2011b. "Translation research terms: a tentative glossary for moments of perplexity and dispute". In A. Pym (ed). *Translation Research Projects 3.* Tarragona: Intercultural Studies Group. 75-110. http://goo.gl/PjubWE. Accessed January 2015.

Radhakrishna, Rama B. 2007. "Tips for developing and testing questionnaires and/or instruments". *Journal of extension*. February 2007. Tools of the Trade. 1TO2. 45 (1). http://goo.gl/DlOqjU. Accessed July 2010.

Randell, Brian. 2002. "The new electronic technology". In A. Akera and F. Nebeker, (eds). *From 0 to 1: An Authoritative History of Modern Computing.* New York, NY: Oxford University Press. 41-50.

Rasmussen, Kirsten Wølch and Schjoldager, Ann. 2011. "Revising Translations: A survey of revision policies in Danish translation companies". *The Journal of Specialised Translation,* 15: 87-120. http://goo.gl/Gi29Ic. Accessed January 2013.

Reeves, Jack W. 2005. "What is software design?" *Developer Magazine,* February 23, 2005. http://goo.gl/UsVuXc. Accessed December 2011.

Robert, Isabelle. 2008. "Translation revision procedures: An exploratory study". In P. Boulogne (ed). *Translation and Its Others. Selected Papers of the CETRA Research Seminar in Translation Studies 2007*. http://goo.gl/RpNT5L. Accessed November 2012.

Robinson, Douglas. 2003. *Becoming a Translator: An Introduction to the Theory and Practice of Translation*. Second Edition. London and New York: Routledge.

*Routledge Spanish Technical Dictionary: Inglés-español*, (volumes 1 and 2) 1997. New York, NY: Routledge.

Sagarra, Nuria and Herschensohn, Julia. 2013. "Asymmetries in gender and number agreement processing in late bilinguals". *Selected Proceedings of the 13th Hispanic Linguistics Symposium. International Journal of Bilingualism,* 17 (5): 169-177. http://goo.gl/FyVnRs. Accessed July 2014.

Salevsky, Heidemarie and Ller, Ina M. 2010. *Translation as Systemic Interaction. A New Perspective and a New Methodology.* Berlin: Frank & Timme GmbH.

Sargent, Benjamin B. 2002. "Calculating ROI in software localization". *Software Business Magazine* 8 (3): 48-51.

Saridakis, Ioannis E., and Kostopoulou, Georgia. 2003. Methods and the role of revision in academic and professional environments of translation. 4th FEDER.CEN.TR.I. Conference, Bologna, 10-11 October 2003. http://goo.gl/pi5pNo. Accessed April 2012.

Savourel, Yves. 2001. *XML: Internationalization and Localization*. Indianapolis, US: Sams Publishing.

Sayen, Michael. 2011. VP Strategy for Siemens Industry. Internal communication.

Schäffner, Christina. 2008. "Action (Theory of 'translatorial action')". In M. Baker (ed). *Routledge Encyclopedia of Translation Studies,* London and New York: Routledge. 3-5.

Schäler, Reinhard. 2002. "The cultural dimension in software localization". *Localisation Focus*, 1 (2): 5-8. http://goo.gl/g87IrZ. Accessed November 2012.

------ 2003. "Making a business case for localization". Presentation at the *25th ASLIB International Conference on Translating and the Computer*. 24-25 November 2005. London. http://goo.gl/RX7hF9. Accessed November 2013.

------ 2004. "Language resources and localisation". *Proceedings of the Second International Workshop on Language Resources for Translation Work, Research and Training*. Geneva. 27-34. http://goo.gl/vbVd2g. Accessed December 2011.

------ 2005. GUI Localisation Workshop. Consortium for Training Translation Teachers (CTTT). Braga, Portugal. 27 June – 01 July 2005. http://goo.gl/tsJO5Z. Accessed March 2010.

------ 2008. "Linguistic resources and localisation". In E. Yuste Rodrigo (ed). *Topics in Language Resources for Translation and Localisation*, Amsterdam/Philadelphia: John Benjamins Publishing. 195-214.

Schopp, Jürgen F. 2007. "The European translation standard EN 15038 and its terminology. A mirror of missing professionalism?" ELETO. Sixth Conference. Hellenic Language and Terminology. Athens, Greece. 1-3 November 2007. http://goo.gl/m5Omwr. Accessed January 2012.

Schütz, Jorg. 1999. "Deploying the SAE J2450 translation quality metric in language technology evaluation projects". Paper presented at the Twenty-first International Conference on Translating and the Computer, 10-11 November 1999. London. http://goo.gl/81M4FN. Accessed March 2014.

SDL glossary of technical terms. http://goo.gl/Lz95b8. Accessed July 2013.

Secară, Alina. 2005. "Translation evaluation - a state of the art survey" http://goo.gl/p7Pbqb. Accessed February 2014.

Senez, Dorothy. 1998. "Post-editing service for machine translation users at the European Commission". Presentation at the *20th ASLIB International Conference on Translating and the Computer,* 12-13 November 1998, London. http://goo.gl/FdBY6L. Accessed March 2012.

Shankland, Stephen. 2010. "Study: 350 Android code flaws pose security risks". *CNET News.* http://goo.gl/iJpP7x. Accessed December 2011.

Siemens PLM web site. Explore NX – Simulation. http://goo.gl/PeyzpV. Accessed February 2011.

Siemens PLM web site. "Outlining the Voice of the Customer". Best Practice Brief. http://goo.gl/4fFM0Y. Accessed October 2014.

Siemens Web site. What is PLM software? http://goo.gl/rDjevo. Accessed January 2010.

Sievers, Marco. 2006. *No translation is perfect: Gain and loss of linguistic and cultural features*. Norderstedt: Books on Demand, GmbH.

Snell-Hornby, Mary. 2006. *Turns of Translation Studies: New Paradigms or Shifting Viewpoints?* Amsterdam/Philadelphia: John Benjamins Publishing.

Stark, John. 2005. *Product Lifecycle Management: 21st Century Paradigm for Product Realisation*. London: Springer-Verlag.

Storrer, Angelika. 2002. "Coherence in text and hypertext". Document Design Magazine. http://goo.gl/zlN1QZ. Accessed July 2013.

Systran Website. "What is machine translation?" http://goo.gl/rNpibc. Accessed February 2014.

Tardáguila, Esperanza. 2009. "Reflexiones sobre la revisión de traducciones". *Mutatis Mutandis*, 2 (2): 367-376. http://goo.gl/uAuyJC. Accessed September 2012.

The American Standard Guide for Quality Assurance in Translation. Designation: F2575 – 06. 2006. West Conshohocken, PA: ASTM International.

The Cincinnati Enquirer. 2012. Technical Translators/Localization Specialist Ad. Classified Jobs. http://goo.gl/RpE0mY. Accessed December 2012.

The Common European Council Framework of Reference for Languages: Learning, Teaching, Assessment. 2001. Language Policy Unit, Strasbourg. http://goo.gl/MtQF5V. Accessed February 2013.

The European Standard EN 15038 Translation Services – Service Requirements. 2006. English version. European Committee for Standardization. Management Center, rue de Stassart, 36. B1050-Brussels.

The Linux Information Project (LIP). Terms definition. http://goo.gl/H6sgmO. Accessed February 2015.

The Localization Tool. Localization Glossary. http://goo.gl/M27jok. Accessed March 2014.

The Online Etymology Dictionary. http://goo.gl/riS5fZ. Accessed October – November 2013.

The PC Encyclopedia. http://goo.gl/mZ2Tez. Accessed July 2010

The Tech Terms Computer Dictionary. http://goo.gl/kc3No. Accessed January 2013.

Tian, Jeff. 1990. "Quality assurance alternatives and techniques: A defect-based survey and analysis". American Society for Quality. http://goo.gl/sMmT6A. Accessed Jan 2012.

Trochim, William M. K. 2006. Measurement Validity Types. Research Methods Knowledge Base. http://goo.gl/iKol7M. Accessed June 2010.

Trujillo Vargadá, Susan. 2005. “Ética, traducción y sociedad: los jaladores ¿una nueva estrategia de márquetin o simplemente un recurso fuera de lugar?” Fundación Litterae. Recomendaciones bibliográficas. http://goo.gl/bwwrjV. Accessed March 2010.

Tsang, Hector, W. H. “Social skills”. International Encyclopedia of Rehabilitation. http://goo.gl/dFjcb0. Accessed January 2012.

Ulitkin, Ilya. 2013. “Human translation vs. machine translation: Rise of the machines”. http://goo.gl/TqiGHp. Accessed Jan 2012.

US Department of Labor - Bureau of Labor Statistics. Career Guide to Industries, 2010-11 Edition. http://goo.gl/KBt2fw. Accessed January 2012.

US Department of Labor – Bureau of Labor Statistics. Occupational Outlook Handbook. Interpreters and Translators, 2012. http://goo.gl/BD7Bsh. Accessed July 2013.

Van Kooten, Michel. 2010. “Top 100 largest software companies in the US – 2010”. http://goo.gl/hjmDrV. Accessed April 2011.

Van Vliet, Hans. 2000. *Software Engineering: Principles and Practice*. New York, NY; John Wiley and Sons.

Vasconcellos, Muriel. 1986. “A comparison of MT post-editing and traditional revision”. In K. Kummer (ed). *Proceedings of the 28th Annual Conference of the American Translators Association,* Albuquerque, NM, October 1987. Medford, NJ: Learned Information. 408-416.

------ 1987. “Post-editing on-screen: machine translation from Spanish into English”. In C. Picken (ed). *Translating and the Computer 8. Proceedings of a conference… 13-14 November 1986*, London: Aslib. 133-146.

Venuti, Lawrence. 1999. *The Scandals of Translation: Towards an Ethics of Difference*. London and New York: Routledge.

Vermaat, Misty. 2013. *Microsoft Office 2013: Essential*. Boston, MA: Cengage Learning.

Vermeer, Hans. 1992. “Is translation a linguistic or a cultural process?” *Ilha do Desterro. A Journal of Language and Literature,* 28: 37-49. http://goo.gl/2MbLkw. Accessed November 2012.

Verna, Sanjay and Singh, Nishith. 2006. *Computer Graphics*. New Delhi: Tata-Mac Graw Hill.

Vinay, Jean-Paul and Darbelnet, Jean. 2000. "A methodology for translation" (translated by Juan C. Sager and J. Hamlin). In L. Venuti (ed). *The Translation Studies Reader*, New York, NY: Routledge. 84-93.

Walsh, Bill. 1995. "The lot of journalism's noble misfits". http://goo.gl/s66x1v. Accessed March 2014.

Williams, Malcolm. 1989. "The assessment of professional translation quality: Creating credibility out of chaos". *TTR: traduction, terminologie, rédaction* 2 (2): 13-33. http://goo.gl/0zSOQV. Accessed July 2012.

------ 2004. *Translation Quality Assessment: An Argumentation-Centred Approach*. Ottawa: University of Ottawa Press.

------ 2009. "Translation quality assessment". *Mutatis mutandis,* 2 (1): 3–23 http://goo.gl/bWwYlN. Accessed March 2012.

Wilson, Lisa H. 2001. "Software development industry study". http://goo.gl/dptlWJ. Accessed May 2011.

Wilson, Mike. 2003. *The Difference between God and Larry Ellison*. New York, NY: Harper Collins Publishers.

Woolsey, Wallace. 1974. "The art of translation". *The South Central Bulletin,* 34 (4): 166-168.

Yin, Robert K. 1994. *Case Study Research: Designs and Methods*. Second Edition. Thousand Oaks, London and New Delhi: Sage Publications.

# Appendix A – Glossary

Below is a list of terms and their definitions that are commonly used throughout this thesis. The aim of this list is to provide meaningful and clear definitions of the main concepts dealt with herein.

**Character**

"The association between a symbol and a binary number is known as a character" (Friesen 1998: 11).

**Computer-aided translation tools or Computer-assisted translation tools (CATs)**

A set of computerized tools used by professional translators to achieve more consistent translations. Among these tools are: spell-checkers, grammar checkers, terminology databases, translation memories and dictionaries. According to Pym this term is now a misnomer and should be replaced by translation memories, machine translation, terminology databases, etc. since translators and revisers work on computers (Pym 2011b: 77).

**Culture**

The word 'culture' comes from the Latin '*cultura'* and this from '*colere'*, which means to cultivate (*Real Academia Española*). Culture is a "system of shared beliefs, values, customs, behaviors, and artifacts that members of a society use to cope with their world and with one another, and that are transmitted from generation to generation through learning" (Bates and Plog, 1990: 7). These cultural patterns include "language, technology, institutions, beliefs, and values that are transmitted across generations and maintain continuity through learning, technically termed **enculturation"**. An underlying belief and value system is essential when we translate and adapt a text to a certain culture.

**Customer/Reader/End-user/Application user**

A current or potential buyer of a software product purchased from a software publisher, a seller or a vendor. A customer is both a reader and an end-user of the software applications.

**Directionality**

It is the direction of the translation, the language the translator is translating from and/or into. As a general practice, software publishers hire in-house translators to translate into their first or main language. Translating into one's main language is also known as direct translation. According to orthodox translation studies, translation into the mother tongue is considered more natural (Marmaridou 1996: 60), where reverse translation (from the main or first language into another language) is mainly used for pedagogical purposes.

**Editing**

Since this is a wide term, we will limit it to technical editing or copy-editing. It includes the processes mentioned in proofreading and looking for correctness in the text. Syntax and readability are important in editing. Word order is changed, and sentences are completely transformed. Editing is conducted on any source text.

**Graphical User Interface**

It refers to a software interface designed "to standardize and simplify the use of computer programs, as by using a mouse to manipulate text and images on a display screen featuring icons, windows, and menus". (dictionary.com)

**Globalization**

Term uses to refer to "[a] business strategy (not so much as an activity) addressing the issues of taking a product to the global market which also includes world-wide marketing, sales and support" (Schäler 2008: 196).

**ICE Match**

In SDL WorldServer, a type of exact match that is also a complete context match. If necessary, SDL WorldServer ranks multiple possible matches to find the most exact match, based on the most complete context matching.

**In-country reviewer (ICR) or local reviser**

Term used for an employee of the software publisher who performs reviewing and technical validation of the software products. ICRs work in close contact with in-house translators and on the same language combination. Their common goal is to deliver a software product in the target language that is as close to the original one as possible from both a linguistic and a cultural point of view. "They (ICRs) focus on technical consistency, completeness, and adherence to agreed terminology and language standards" (Esselink 2000: 15).

**In-house software translator**

An employee who provides technical translation as well as revising, proofreading, and testing of applications and online documentation to a company (a software publisher) on a daily basis in return for financial consideration. Throughout this paper the terms in-house translator, corporate translator, technical translator, techno-translator, and software translator are used interchangeably.

**Internationalization**

Term used to refer to "[t]he process of designing (or modifying) software so as to isolate the linguistically and culturally dependent parts of an application, as well as the development of a system that allows linguistic and cultural adaptation supporting users working in different languages and cultures" (Schäler 2008: 196).

**Language Service Provider (LSP)**

An organization that provides a wide range of services such as: translation, interpretation, localization, internationalization, management content, and desktop publishing to other organizations for a fee. They may hire in-house translators or contract out their work with freelance translators or even with other agencies. Some language service providers specialize in one language pair only (for example: English-Spanish). Some others cover a wider range of language pairs.

**Locale**

This term refers to a "geographical, political, or cultural region (possibly an entire country) that shares some combination of common geography, politics, or culture" (Friesen 1998: 10).

**Localization**

Term used to refer to "the provision of services and technologies for the management of 'multilingualism' across the digital global information flow" (Schäler 2004: 4). It covers all services, like translation, engineering, management, etc, and technologies; and applies to digital content. It aims at global information that can be accessed "anytime, anywhere and by anybody" (ibid.: 2004: 4).

**Localize (intransitive verb)**

According to Montiel-Ponsoda, in the seventeenth century the verb localize used to mean "to act in accordance with the custom of the place" (Harvey 1600). In modern usage it means "to make local" or "to orient locally" (2009: 156).

**Native language**

This term also known as first language or mother language refers to the language a person has learned since birth. When this term is used with reference to a person of limited English-speaking ability, native language means "the language normally used by that person, or in the case of a child, the language normally used by the parents of the child" (Dorn 2013: 3).

**Per seat license**

A software license is based on the number of users who have access to the software product. "For example, a 100-user license based on users means that up to 100 specifically named users have access to the program. Per seat licensing is administered by providing user-level security to the directory containing the program" (PC Magazine Encyclopedia).

**Proofreading**

Correcting a piece of writing or text by a person other than the drafter. This includes checking for mechanical errors (typos), grammar, spelling, and punctuation issues. Proofreaders need to use a style-guide protocol for consistency purposes. (The Merriam-Webster dictionary).

**Resource files (.rc or .dlg files)**

These are "text-only files that contain all translatable software components, such as menus, dialog boxes, messages, etc." (The Global Newsletter).

**Reviewer**

Term used to refer to "a subject-matter expert who examines a manuscript to determine whether it makes a contribution to its field, to suggest additions or subtractions from coverage of the topic, or to identify conceptual or terminological errors" (Mossop 2010: 201).

**Revising**

Term used to refer to "the process of checking a draft translation for errors and making appropriate amendments" (Mossop 2010: 201).

**Software**

"The current edition of the Oxford English Dictionary dates the word *software* back to 1960, though researchers have discovered an 1850 occurrence of the term in a very different context--for distinguishing two types of garbage, where 'soft-ware' referred to matter that would decompose and 'hard-ware' to anything else. An etymologist has now found that use of the term *software* to describe computer programs dates back to 1958 and first appeared in a mathematics journal" (Peterson 2000: 351).

**Software globalization**

Term used to describe the "process of developing, manufacturing, and marketing software products that are intended for worldwide distribution. This term combines two aspects of the work: internationalization (enabling the product to be used without language or culture barriers) and localization (translating and enabling the product for a specific locale)" (IBM Glossary of Unicode Terms).

**Software publisher**

It refers to an organization that develops and sells applications software. Software encompasses two main categories—applications software and systems software. "Applications software includes individual programs for computer users—such as word processing and spreadsheet packages, games and graphics packages, data storage programs, and Web browsing programs. Systems software, on the other hand, includes operating systems and all of the related programs that enable computers to function" (US Department of Labor – Bureau of Labor Statistics).

**Software translator or techno-translator**

This term is used to denote a professional linguist who provides translation services as employees of a software publisher.

**Source language**

It is the original language of a text that will be translated into another language, also known as the Target language. So far American English is the source language of the localization industry. The translated versions of a software product are called localized (translated) versions.

**String or segment**

In computer science, a "string is any finite sequence of characters (i.e., letters, numerals, symbols and punctuation marks)". The length of a string can be any natural number (zero or any positive integer) (The Linux Information Project).

**Target language**

It is the language a text or software product is translated into.

**Translation**

It is the process of rendering a text from a source language into a target language while maintaining the same meaning. "Translating means channeling meaning and influence, and connectedness through vast global communicative networks" (Robinson 2003: 169).

**Translation memory**

Term used to refer to a database that stores a combination of source text and one or more corresponding translations. The use of translation memories "makes it easy to reuse your existing translation efforts, in example in updates, or other related products" (The Localization Tool).

**Translation providers, language service providers or translation vendors**

These terms are used to denote companies that provide software publishers with translation services.

**Translator**

The English noun translator (mid-14$^{th}$ century) comes from the French noun (12$^{th}$ century) from or directly from L. *translatorem*, agent noun from *transferre* (Ontline Etymology Dictionary). It is worth noting that the word *traductor* (Spanish for translator) was incorporated into the Spanish language in 1611.

**User interface (UI)**

This term refers to "[t]he way a person interacts with a computer or electronic device. It comprises the screen menus and icons, keyboard shortcuts, command language and online help, as well as physical buttons, dials and levers. All input devices, such as a mouse, keyboard, touch screen, remote control, joystick, game controller or data glove, are also included. In the future, natural language recognition and voice recognition will become standard components of the user interface" (PC Magazine Encyclopedia).

# Appendix B - English email invitation

Below is a transcript of the official English email invitation sent out to the Siemens PLM Spanish-speaking customers.

"Dear Customer,

You are part of a selected group of Siemens PLM customers who have been invited to participate in this brief survey questionnaire for the purpose of evaluating the software applications you have purchased from Siemens PLM (NX, Solid Edge and/or Teamcenter). This survey will take you around 10 minutes to complete. Your responses will be kept ANONYMOUS. No identifiable information will be collected about you.

We appreciate you taking the time to evaluate the user interface of the English or Spanish languages of the PLM software applications. The data collected from you will be used for a Ph.D. Thesis in Translation and Intercultural Studies at the Universitat Rovira i Virgili in Tarragona, Spain. The supervisor for this research project is Dr. Anthony Pym, who is the Director of the Intercultural Studies Group at this university and a Visiting Scholar at Monterey Institute of International Studies. The researcher's name is Graciela Mick.

Due to data protection requirements, the option to save partially answered questionnaires is not offered. Please answer the entire questionnaire in one sitting. **Once you are done, please click the** "Submit Survey" button. Please complete and submit this survey by **Friday, December 24, 2010** at the latest.

If you have any questions about the survey questionnaires or if you would like to receive a copy of the results once the study is completed, please contact the Survey Manager by email at: *name@siemens.com* (for legal reasons the address has not been provided in this thesis).

We will then take appropriate action both locally and at the global level to address any issues you helped us to identify.

You need to complete only one survey instrument.

1. If you wish to evaluate the English text of the PLM software applications using the English-language survey, please click the following link:

2. But if you wish to evaluate the English text of the PLM software applications using the Spanish-language survey, please click the following link:

3. If you wish to evaluate the Spanish text of the PLM software applications using the Spanish-language survey, please click the following link:

4. But if you wish to evaluate the Spanish text of the PLM software applications using the English-language text, click the following link:"

For clarification purposes, the display of the online survey questionnaire layout is clearer than its draft version, and is more visually appealing. The links above have not been provided because they are now non-active.

# Appendix C – Spanish email invitation

Below is the Spanish translation of the email invitation sent to the Siemens PLM Spanish-speaking customers.

"Estimado o Apreciado cliente:
Usted forma parte de un grupo seleccionado de clientes de Siemens PLM que han sido invitados para participar del presente cuestionario a fin de evaluar las aplicaciones informáticas que adquirió de esta empresa (NX, Solid Edge o Teamcenter). Este cuestionario solamente le llevará unos 10 minutos. Sus respuestas serán anónimas y no se le solicitará ninguna información personal.

Le agradecemos enormemente su tiempo y colaboración para evaluar la interfaz de usuario del texto en inglés o español de las aplicaciones informáticas de Siemens PLM. Los datos que recogeremos en los cuestionarios serán utilizados para una tesis doctoral en Traducción y estudios interculturales en la Universidad Rovira i Virgili ubicada en Tarragona, España. El supervisor de este proyecto es el Dr. Anthony Pym, que es el director del Grupo de estudios interculturales de dicha universidad y también es investigador visitante en el Instituto de Estudios Internacionales en Monterey ubicado en California, EE.UU. La investigadora es Graciela Mick.

Debido a los requerimientos con respecto a la protección de datos, no ofrecemos la opción Guardar el cuestionario con respuestas no completas. Conteste todas las preguntas de una sola vez. Al finalizar, pulse el botón "Enviar el cuestionario". El plazo para el envío del cuestionario es el viernes 24 de diciembre de 2010.

Si tiene alguna duda con respecto a las preguntas o si desea recibir una copia de los resultados una vez que se haya completado la tesis, podrá comunicarse con la gestora de encuestas por correo electrónico en la dirección siguiente: *nombre@siemens.com* (por cuestiones legales no se ha proporcionado la dirección electrónica en este escrito).

Sus respuestas nos permitirán hacer cambios globales que usted ha identificado y ésto lo beneficiará tanto a usted como a nosotros.

Debe completar solamente uno de los cuestionarios. 1. Si utiliza la interfaz del usuario de las aplicaciones informáticas en inglés y desea contestar el cuestionario en inglés, seleccione el cuestionario número 1. Si utiliza la interfaz del usuario de las aplicaciones informáticas en inglés, pero desea contestar las preguntas en español, seleccione el cuestionario número dos. Si, en cambio, prefiere evaluar la interfaz del usuario de las aplicaciones informáticas en español y desea contestar las preguntas en español, seleccione el cuestionario número tres. Si desea evaluar la interfaz del usuario de las aplicaciones informáticas en español pero desea contestar las preguntas en inglés, pulse el cuestionario número 4.

Le agradecemos enormemente su tiempo y colaboración."

# Appendix D - English Survey to Evaluate the English User Interface

## User Interface - Language for Feedback

The purpose of this survey is to evaluate the language used in the user interface of the Siemens PLM software applications (NX, Solid Edge and/or Teamcenter), and to make the necessary changes to improve the UI. Please take the time to read and answer every question.

Your responses will be kept ANONYMOUS. No identifiable information will be collected about you.

· For which user interface languages are you able to provide feedback?(Select one.)

- English
- Spanish

## User Interface - Language Preference

· For NX, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

· For Solid Edge, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

· For Teamcenter, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

User Interface - Frequency of Use

· How often do you use NX? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

· How often do you use Solid Edge? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

· How often do you use Teamcenter? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

User Interface - Length of Experience

· How long have you been using NX? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

· How long have you been using Solid Edge? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

· How long have you been using Teamcenter? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

Your Job Function and Country

· Please describe your job function: (Select one.)

- Manager
- Executive
- Designer
- CAM User
- CAE User
- Information Technology (IT)
- Systems Engineering
- Configuration Manager
- Program Manager
- Other (Please specify):

· Please indicate your country of residence:

Native Language

· What is your strongest language? (Select one.)

- Spanish
- More Spanish than English
- Spanish and English equally
- More English than Spanish
- English
- Not Applicable

English Language Interface - Usage

· Why do you not use the Spanish-language version of the NX user interface? (Select one.)

- I do not like how the Spanish text reads.
- I do not know how to use the Spanish text.
- I know how to use the Spanish text but I do not like it.
- I know how to use the Spanish text and I like the text but I am not used to it.
- I want to use the Spanish text but I am instructed not to do so.
- Not Applicable
- Other (Please specify):

· Why do you not use the Spanish-language version of the Solid Edge user interface? (Select one.)

- I do not like how the Spanish text reads.
- I do not know how to use the Spanish text.
- I know how to use the Spanish text but I do not like it.
- I know how to use the Spanish text and I like the text but I am not used to it.
- I want to use the Spanish text but I am instructed not to do so.
- Not Applicable
- Other (Please specify):

· Why do you not use the Spanish-language version of the Teamcenter user interface? (Select one.)

- I do not like how the Spanish text reads.
- I do not know how to use the Spanish text.
- I know how to use the Spanish text but I do not like it.
- I know how to use the Spanish text and I like the text but I am not used to it.
- I want to use the Spanish text but I am instructed not to do so.
- Not Applicable
- Other (Please specify):

English Language Interface - Consistency

· How would you assess the consistency of the English technical terminology used in the NX user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

· How would you assess the consistency of the English technical terminology used in the Solid Edge user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

· How would you assess the consistency of the English technical terminology used in the Teamcenter user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

English Language Interface - Fluency

· How would you assess the fluency and naturalness of the English-language used in the NX user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

· How would you assess the fluency and naturalness of the English-language used in the Solid Edge user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

· How would you assess the fluency and naturalness of the English-language used in the Teamcenter user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

English Language Interface - Functional Errors

· When using NX, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

· When using Solid Edge, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

· When using Teamcenter, how many functional errors do you encounter that you believe might be caused by the language and/or terminology used in the English user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

English Language Interface - Overall Satisfaction

· Please rate your overall satisfaction with the English-language version of the NX user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|

· Please rate your overall satisfaction with the English-language version of the Solid Edge user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|

· Please rate your overall satisfaction with the English-language version of the Teamcenter user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|

Additional Comments/Suggestions

· Please add any other comments or suggestions about the English-language user interface of NX, Solid Edge and/or Teamcenter. Your responses will be kept anonymous.

· If you wish to receive a copy of the survey results, please enter your email address in the box below.

Many thanks for your participation!

# Appendix E - English Survey to Evaluate the Spanish User Interface

## User Interface - Language for Feedback

The purpose of this survey is to evaluate the language used in the user interface of the Siemens PLM software applications (NX, Solid Edge and/or Teamcenter), and to make the necessary changes to improve the UI. Please take the time to read and answer every question.

Your responses will be kept ANONYMOUS. No identifiable information will be collected about you.

· For which user interface languages are you able to provide feedback? (Select one.)

- English
- Spanish

## User Interface - Language Preference

· For NX, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

· For Solid Edge, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

· For Teamcenter, which language do you use most often? (Select one.)

- Always English
- English and Spanish equally
- Always Spanish
- Not Applicable

User Interface - Frequency of Use

· How often do you use NX? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

· How often do you use Solid Edge? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

· How often do you use Teamcenter? (Select one.)

- Daily
- Weekly
- Monthly
- Yearly
- Never

User Interface - Length of Experience

· How long have you been using NX? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

· How long have you been using Solid Edge? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

· How long have you been using Teamcenter? (Select one.)

- Less than 1 year
- Between 1 and 3 years
- Between 3 and 5 years
- Between 5 and 10 years
- More than 10 years
- Not Applicable

Your Job Function and Country

· Please describe your job function: (Select one.)

- Manager
- Executive
- Designer
- CAM User
- CAE User
- Information Technology (IT)
- Systems Engineering
- Configuration Manager
- Program Manager
- Other (Please specify):

· Please indicate your country of residence:

Native Language

· What is your strongest language? (Select one.)

- Spanish
- More Spanish than English
- Spanish and English equally
- More English than Spanish
- English
- Not Applicable

Spanish-Localized Interface - Consistency

· How would you assess the consistency of the Spanish technical terminology used in the NX user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

· How would you assess the consistency of the Spanish technical terminology used in the Solid Edge user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

· How would you assess the consistency of the Spanish technical terminology used in the Teamcenter user interface? (Select one.)

- Very Good
- Good
- Average
- Poor
- Very Poor
- Not Applicable

Spanish-Localized Interface - Fluency

· How would you assess the fluency and naturalness of the Spanish language used in the NX user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

· How would you assess the fluency and naturalness of the Spanish language used in the Solid Edge user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

· How would you assess the fluency and naturalness of the Spanish language used in the Teamcenter user interface? (Is the text clear to you? Do you understand it the first time you read it?) (Select one.)

- Highly fluent and natural
- Moderately fluent and natural
- A little difficult but understandable
- Sometimes hard to understand
- Not at all fluent or natural; very hard to understand
- Not Applicable

Spanish-Localized Interface - Functional Errors

· When using NX, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

· When using Solid Edge, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

· When using Teamcenter, how many functional errors do you encounter that you believe might be caused by the Spanish language and/or terminology used in the user interface? (Select one.)

- Too many
- Many
- Some
- A few
- None
- Not Applicable

Spanish-Localized Interface - Cultural Sensitivity

· Please rate the cultural sensitivity of the Spanish-localized version of the NX user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· Please rate the cultural sensitivity of the Spanish-localized version of the Solid Edge user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· Please rate the cultural sensitivity of the Spanish-localized version of the Teamcenter user interface. (By cultural sensitivity we mean if we have used any words that might have offended you.)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Spanish-Localized Interface - Familiarity with Spanish

· How satisfied are you with the Spanish language used in the NX user interface? (Is it similar to the Spanish spoken in your country of origin?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· How satisfied are you with the Spanish language used in the Solid Edge user interface? (Is it similar to the Spanish spoken in your country of origin?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· How satisfied are you with the Spanish language used in the Teamcenter user interface? (Is it similar to the Spanish spoken in your country of origin?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Spanish-Localized Interface - Overall Satisfaction

· Please rate your overall satisfaction with the Spanish-localized version of the NX user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· Please rate your overall satisfaction with the Spanish-localized version of the Solid Edge user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

· Please rate your overall satisfaction with the Spanish-localized version of the Teamcenter user interface.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/a |
|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

## Additional Comments/Suggestions

· Please add any other comments or suggestions about the English-language user interface of NX, Solid Edge and/or Teamcenter. Your responses will be kept anonymous.

· If you wish to receive a copy of the survey results, please enter your email address in the box below.

Many thanks for your participation!

# Appendix F - Spanish Survey to Evaluate the English User Interface

Evaluación de la interfaz del usuario

El objetivo de esta encuesta es evaluar el idioma usado en la interfaz del usuario de las aplicaciones informáticas de Siemens PLM (NX, Solid Edge o Teamcenter). Tómese el tiempo necesario para contestar todas las preguntas.

Recuerde que sus respuestas serán CONFIDENCIALES Y ANÓNIMAS y serán usadas únicamente para mejorar la interfaz. Esta encuesta no incluye ninguna pregunta sobre sus datos personales.

· ¿Sobre cuál idioma de la interfaz del usuario de NX, Solid Edge o Teamcenter prefiere darnos su opinión? (Seleccione una)

- Inglés
- Español

Preferencia de idioma de la interfaz del usuario

· ¿Qué idioma de la interfaz del usuario de NX usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

· ¿Qué idioma de la interfaz del usuario de Solid Edge usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

· ¿Qué idioma de la interfaz del usuario de Teamcenter usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

Uso de la interfaz del usuario

· ¿Con qué frecuencia usa NX? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

· ¿Con qué frecuencia usa Solid Edge? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

· ¿Con qué frecuencia usa Teamcenter? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

Experiencia con la interfaz del usuario

· ¿Cuánto tiempo hace que usa NX? (Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

· ¿Cuánto tiempo hace que usa Solid Edge? (Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

· ¿Cuánto tiempo hace que usa Teamcenter? (Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

Puesto de trabajo y país

· ¿Qué funciones desarrolla en su empresa? (Seleccione una)

- Director
- Ejecutivo
- Diseñador
- Usuario CAM
- Usuario CAE
- Informática
- Ingeniería de sistemas
- Director de configuración
- Director de programa
- Otro (especifique):

· Indique el país de residencia:

Lengua materna

· ¿Cuál es su lengua materna? (Seleccione una)

- Español
- Más la lengua española que la lengua inglesa
- Tanto la lengua española como la lengua inglesa
- Más la lengua inglesa que la lengua española
- Inglés
- No corresponde

Uso de la interfaz del usuario en idioma inglés

· ¿Por qué no utiliza la interfaz del usuario de NX en español? (Seleccione una)

- No me gusta la traducción de la interfaz al español.
- No sé cómo usar la interfaz del usuario en español.
- Sé cómo usar la interfaz del usuario en español pero no me gusta.
- Sé cómo usar la interfaz del usuario en español y me gusta, pero no estoy acostumbrado a usarla.
- Preferiría usar la interfaz del usuario en español pero tengo instrucciones de no usarla.
- No corresponde
- Otro (especifique):

· ¿Por qué no utiliza la interfaz del usuario de Solid Edge en español? (Seleccione una)

- No me gusta la traducción de la interfaz al español.
- No sé cómo usar la interfaz del usuario en español.
- Sé cómo usar la interfaz del usuario en español pero no me gusta.
- Sé cómo usar la interfaz del usuario en español y me gusta, pero no estoy acostumbrado a usarla.
- Preferiría usar la interfaz del usuario en español pero tengo instrucciones de no usarla.
- No corresponde
- Otro (especifique):

· ¿Por qué no utiliza la interfaz del usuario de Teamcenter en español? (Seleccione una)

- No me gusta la traducción de la interfaz al español.
- No sé cómo usar la interfaz del usuario en español.
- Sé cómo usar la interfaz del usuario en español pero no me gusta.
- Sé cómo usar la interfaz del usuario en español y me gusta, pero no estoy acostumbrado a usarla.
- Preferiría usar la interfaz del usuario en español pero tengo instrucciones de no usarla.
- No corresponde
- Otro (especifique):

Consistencia de la terminología de la interfaz del usuario en inglés

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de NX en inglés? (Seleccione una)

- Muy buena
- Buena
- Regular
- Mala
- Pésima
- No corresponde

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de Solid Edge en inglés? (Seleccione una)

- Muy buena
- Buena
- Regular
- Mala
- Pésima
- No corresponde

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de Teamcenter en inglés? (Seleccione una)

- Muy buena
- Buena
- Regular
- Mala
- Pésima
- No corresponde

Fluidez o competencia de la interfaz del usuario en idioma inglés

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en inglés de la interfaz del usuario de NX? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

- Muy fluido y natural
- Moderadamente fluido y natural
- Un poco difícil pero se entiende
- A veces es difícil de entender
- No es fluido ni natural y muy difícil de entender
- No corresponde

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en inglés de la interfaz del usuario de Solid Edge? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

- Muy fluido y natural
- Moderadamente fluido y natural
- Un poco difícil pero se entiende
- A veces es difícil de entender
- No es fluido ni natural y muy difícil de entender
- No corresponde

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en inglés de la interfaz del usuario de Teamcenter? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

- Muy fluido y natural
- Moderadamente fluido y natural
- Un poco difícil pero se entiende
- A veces es difícil de entender
- No es fluido ni natural y muy difícil de entender
- No corresponde

Errores funcionales relacionados con el texto en inglés de la interfaz del usuario

· Cuando usa NX ¿cuántos errores funcionales encuentra que están relacionados con el idioma o la terminología usados en el texto en inglés? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

· Cuando usa Solid Edge ¿cuántos errores funcionales encuentra que están relacionados con el idioma o la terminología usados en el texto en inglés? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

· Cuando usa Teamcenter ¿cuántos errores funcionales encuentra que están relacionados con el idioma o la terminología usados en el texto en inglés? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

Satisfacción general con la interfaz del usuario en idioma inglés

· ¿Cuál es su satisfacción general con el texto en inglés de la interfaz del usuario de NX?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

· ¿Cuál es su satisfacción general con el texto en inglés de la interfaz del usuario de Solid Edge?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

· ¿Cuál es su satisfacción general con el texto en inglés de la interfaz del usuario de Teamcenter?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

Comentarios o sugerencias adicionales

· Lo invitamos a dejar su opinión o sugerencia sobre la interfaz del usuario en inglés de las aplicaciones informáticas de Siemens PLM. Indique el nombre de la aplicación: NX, Solid Edge o Teamcenter. Le recordamos que sus respuestas se mantendrán anónimas.

· Si desea recibir una copia de los resultados de la encuesta, sírvase indicar su dirección de correo electrónica en el casillero siguiente:

¡Muchísimas gracias por vuestra participación!

# Appendix G - Spanish Survey to evaluate the Spanish User Interface

## Evaluación de la interfaz del usuario

El objetivo de esta encuesta es evaluar el idioma usado en la interfaz del usuario de las aplicaciones informáticas de Siemens PLM (NX, Solid Edge o Teamcenter). Tómese el tiempo necesario para contestar todas las preguntas.

Recuerde que sus respuestas serán CONFIDENCIALES Y ANÓNIMAS y serán usadas únicamente para mejorar la interfaz. Esta encuesta no incluye ninguna pregunta sobre sus datos personales.

· ¿Sobre cuál idioma de la interfaz del usuario de NX, Solid Edge o Teamcenter prefiere darnos su opinión? (Seleccione una)

- Inglés
- Español

## Preferencia de idioma de la interfaz del usuario

· ¿Qué idioma de la interfaz del usuario de NX usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

· ¿Qué idioma de la interfaz del usuario de Solid Edge usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

· ¿Qué idioma de la interfaz del usuario de Teamcenter usa con mayor frecuencia? (Seleccione una)

- Siempre el idioma inglés
- Tanto el idioma español como el idioma inglés
- Siempre el idioma español
- No corresponde

## Uso de la interfaz del usuario

· ¿Con qué frecuencia usa NX? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

· ¿Con qué frecuencia usa Solid Edge? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

· ¿Con qué frecuencia usa Teamcenter? (Seleccione una)

- Diariamente
- Semanalmente
- Mensualmente
- Anualmente
- Nunca

## Experiencia con la interfaz del usuario

· ¿Cuánto tiempo hace que usa NX? (Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

· ¿Cuánto tiempo hace que usa Solid Edge?(Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

· ¿Cuánto tiempo hace que usa Teamcenter? (Seleccione una)

- Menos de un año
- Entre uno y tres años
- Entre tres y cinco años
- Entre cinco y diez años
- Más de 10 años
- No corresponde

### Puesto de trabajo y país

· ¿Qué funciones desarrolla en su empresa? (Seleccione una)

- Director
- Ejecutivo
- Diseñador
- Usuario CAM
- Usuario CAE
- Informática
- Ingeniería de sistemas
- Director de configuración
- Director de programa
- Otro (especifique): The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

· Indique el país de residencia: The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

### Lengua materna

· ¿Cuál es su lengua materna? (Seleccione una)

- Español
- Más la lengua española que la lengua inglesa
- Tanto la lengua española como la lengua inglesa
- Más la lengua inglesa que la lengua española
- Inglés
- No corresponde

### Consistencia de la terminología de la interfaz del usuario en español

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de NX en español? (Seleccione una)

- Muy buena
- Buena
- Regular

Mala
Pésima
No corresponde

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de Solid Edge en español? (Seleccione una)

Muy buena
Buena
Regular
Mala
Pésima
No corresponde

· ¿Cómo evaluaría la consistencia de la terminología de la interfaz del usuario de Teamcenter en español? (Seleccione una)

Muy buena
Buena
Regular
Mala
Pésima
No corresponde

Fluidez o competencia de la interfaz del usuario en español

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en español de la interfaz del usuario de NX? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

Muy fluido y natural
Moderadamente fluido y natural
Un poco difícil pero se entiende
A veces es difícil de entender
No es fluido ni natural y muy difícil de entender
No corresponde

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en español de la interfaz del usuario de Solid Edge? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

- Muy fluido y natural
- Moderadamente fluido y natural
- Un poco difícil pero se entiende
- A veces es difícil de entender
- No es fluido ni natural y muy difícil de entender
- No corresponde

· ¿Cómo evaluaría la fluidez o competencia y la naturalidad del texto en español de la interfaz del usuario de Teamcenter? (¿Es claro? ¿Lo entiende la primera vez que lo lee?) (Seleccione una)

- Muy fluido y natural
- Moderadamente fluido y natural
- Un poco difícil pero se entiende
- A veces es difícil de entender
- No es fluido ni natural y muy difícil de entender
- No corresponde

Errores funcionales relacionados con el texto en español de la interfaz del usuario

· Cuando usa la interfaz del usuario de NX ¿cuántos errores funcionales comete que están relacionados con el idioma o la terminología en español? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

· Cuando usa la interfaz del usuario de Solid Edge ¿cuántos errores funcionales comete que están relacionados con el idioma o la terminología en español? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

· Cuando usa NX ¿cuántos errores funcionales encuentra que están relacionados con el idioma o la terminología usados en el texto en inglés? (Seleccione una)

- Demasiados
- Muchos
- Algunos
- Muy pocos
- Ninguno
- No corresponde

## Sensibilidad cultural de la interfaz del usuario en español

· Evalúe la sensibilidad cultural de la interfaz del usuario de NX en español. (Por sensibilidad cultural se entiende el uso de palabras que sean apropiadas en el idioma español que se habla en su país. Por ejemplo: ¿se han usado palabras o términos que pudieran haberle ofendido?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

· Evalúe la sensibilidad cultural de la interfaz del usuario de Solid Edge en español. (Por sensibilidad cultural se entiende el uso de palabras que sean apropiadas en el idioma español que se habla en su país. Por ejemplo: ¿se han usado palabras o términos que pudieran haberle ofendido?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

· Evalúe la sensibilidad cultural de la interfaz del usuario de Teamcenter en español. (Por sensibilidad cultural se entiende el uso de palabras que sean apropiadas en el idioma español que se habla en su país. Por ejemplo: ¿se han usado palabras o términos que pudieran haberle ofendido?)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | n/c |
|---|---|---|---|---|---|---|---|

## Familiaridad con el español usado en la interfaz del usuario

· ¿Cuál es su satisfacción con la clase de español usado en la interfaz del usuario de NX? (¿Se asemeja al español que se habla en su país?)

1 2 3 4 5 6 7 n/c

· ¿Cuál es su satisfacción con la clase de español usado en la interfaz del usuario de Solid Edge? (¿Se asemeja al español que se habla en su país?)

1 2 3 4 5 6 7 n/c

· ¿Cuál es su satisfacción con la clase de español usado en la interfaz del usuario de Teamcenter? (¿Se asemeja al español que se habla en su país?)

1 2 3 4 5 6 7 n/c

## Satisfacción general con la interfaz del usuario en español

· ¿Cuál es su satisfacción general con el texto en español de la interfaz del usuario de NX?

1 2 3 4 5 6 7 n/c

· ¿Cuál es su satisfacción general con el texto en español de la interfaz del usuario de Solid Edge?

1 2 3 4 5 6 7 n/c

· ¿Cuál es su satisfacción general con el texto en español de la interfaz del usuario de Teamcenter?

1 2 3 4 5 6 7 n/c

## Comentarios o sugerencias adicionales

· Lo invitamos a dejar su opinión o sugerencia sobre la interfaz del usuario en inglés de las aplicaciones informáticas de Siemens PLM. Indique el nombre de la aplicación: NX, Solid Edge o Teamcenter. Le recordamos que sus respuestas se mantendrán anónimas.

· Si desea recibir una copia de los resultados de la encuesta, sírvase indicar su dirección de correo electrónica en el casillero siguiente:

¡Muchísimas gracias por vuestra participación!

# Appendix H – UI content revision practice

Three review-formatted files containing a total of 150 UI English segments and their Spanish translated output were revised by three ICRs (50 segments per file). Out of the 150 total segments, only 60 (40%) were modified by the ICRs. This is the order followed to analyze those segments: Example number, English segment, Spanish translation, Local reviser's correction, Type of error, and Researcher's comment. And finally, we indicate whether the intervention has been accepted or rejected.

**Example 1**

English segment: %*s %s depends on %s

Spanish translation: %*s %s depende de %s

Local reviser's correction: %*s %s depende en %s

Type of error: Syntactic – inadequate preposition

Researcher's comment: This intervention is wrong since the Spanish preposition that follows the verb *depende* is *de* as opposed to *en*.

Additionally, the code written by the developer in this particular situation for the variable names (%s, %s and %s) makes translation more difficult, since the order and position of the variables may need to be changed according to the grammar of the target language. Variable names need to be unique, for example: %1, %2 and %3, making it easier to move the variables around as needed.

Correction rejected by in-house translator.

**Example 2**

English segment: Collide Category Specification

Spanish translation: Especificación de la categoría Colisionar

Local reviser's correction: Especificación de la categoría de Colisionar

Type of error: Syntactic – unnecessary preposition

Researcher's comment: This is an unnecessary intervention. The Spanish sentence sounds more natural without the Spanish preposition *de*.

Correction rejected by in-house translator.

**Example 3**

English segment: Base Flange Fill Areas

Spanish translation: Áreas de relleno de la pestaña base

Local reviser's correction: Áreas de relleno de la brida base

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention. The Spanish translation of the English technical term 'Flange' used in this particular application is *brida,* as opposed to *pestaña*. *Brida* is a Spanish term more appropriate for this context. The term is used in the engineering sector and was a change requested by a group of PLM distributors.

Correction accepted by in-house translator.

**Example 4**

English segment: Tool Nose Angle A

Spanish translation: Ángulo de punta A de la herramienta

Local reviser's correction: Ángulo de nariz A de la herramienta

Type of error: Terminology – wrong lexical item

Researcher's comment: This intervention is correct since the word *nariz* (English nose) is more appropriate in this context. Local revisers make sure that the same terminology is used throughout the same application whenever applicable.

Correction accepted by in-house translator.

**Example 5**

English segment: could not be found. It is either invalid or was specified incorrectly.

Spanish translation: no se pudo encontrar. Es válido o no se especificó correctamente.

Local reviser's correction: no se encontró. No es válido o no se especificó correctamente.

Type of error: Translation – opposite sense

Researcher's comment: This is a necessary correction because the translation was wrong. The English term 'invalid' was rendered as 'valid' and it would have probably mislead the user.

Correction accepted by in-house translator.

**Example 6**

English segment: Another seed set with the same name exists.

Spanish translation: Ya existe otro conjunto semilla con el mismo nombre.

Local reviser's correction: Ya existe otro conjunto originador con el mismo nombre.

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention. The correct technical term for seed is *originador*, which will keep the consistency throughout this application.

Correction accepted by in-house translator.

**Example 7**

English segment: Redefine Link imports new file

Spanish translation: Volver a definir el enlace importar un nuevo archivo

Local reviser's correction: Volver a definir el archivo nuevo Importaciones de enlace

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The Spanish translation would probably mislead the user because it is wrong. The back translation would have read: Redefine the link Import a new file.

Correction accepted by in-house translator.

**Example 8**

English segment: Reload this part to pick up this new component

Spanish translation: Volver a cargar esta pieza adquirir este nuevo componente

Local reviser's correction: Volver a cargar esta pieza para adquirir este componente Nuevo

Type of error: Syntactic – missing preposition

Researcher's comment: This intervention was necessary. The Spanish preposition *para* was missing in the translation. The back translation would have read: Reload this part pick up this new component.

Correction accepted by in-house translator.

**Example 9**

English segment: Break-&out Section View...

Spanish translation: Vista seccional de corte parcial...

Local reviser's correction: Vista seccional de &desconexión…

Types of error: Terminology – wrong lexical item and Typographic – ampersand

Researcher's comment: This is a necessary intervention. The Spanish translation for the technical phrase 'break out section' is *vista de desconexión*. Also missing in the translation is the ampersand character (&). Ampersands are used as hot or accelerator keys. They "provide an alternative way to access menu commands or dialog boxes options" (Esselink 2000: 70).

Corrections accepted by in-house translator.

**Example 10**

English segment: Checks

Spanish translation: Varias

Local reviser's correction: Verificaciones

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention. There was a translation mistake in the Spanish translation. The back translation for English term 'Checks' would be 'several'.

Correction accepted by in-house translator.

**Example 11**

English segment: Skip Weld Parameters

Spanish translation: Parámetros de la soldadura alterna

Local reviser's correction: Saltar los parametros de la soldatura

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention because Spanish translation is wrong. The back translation would have read: Alternate Weld Parameters.

Correction accepted by in-house translator.

**Example 12**

English segment: Opstop  - %C

Spanish translation: Parada en operación  - %C

Local reviser's correction: Opstop  - %C

Type of error: Localization – untranslatable term

Researcher's comment: This is a necessary intervention. Had the Spanish translation been kept, it would have caused a functionality issue and crashed the application. Some English words or phrases do not need to be translated. Very often software engineers include a comment in the Comment section of the review file explaining why a particular string should be left untranslated.

Correction accepted by in-house translator.

**Example 13**

English segment: Display part

Spanish translation: Visualizar la pieza

Local reviser's correction: Pieza de visualización

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The English term Display is not a verb in this context but a noun (part for display).

Correction accepted by in-house translator.

**Example 14:**

English segment: Dynamic Thickness Display

Spanish translation: Visualización del grosor dinámico

Local reviser's correction: Visualización dinámica del grosor

Type of error: Lexical – coherence (microtextual)

Researcher's comment: This intervention is correct. The adjective *dinámica* modifies display instead of thickness. It should be noted that the word order in the source text is wrong, it should read as follows: 'Thickness dynamic display', as in the following example.

Correction accepted by in-house translator.

Example 15

English segment: Click the "Activate **Thickness Dynamic Display**" button to clear any exisitng (sic) fringe color plot and vector display.

Spanish translation: Pulse el botón "Activar la visualización dinámica del grosor" para borrar todo ploteo de color de las franjas y la visualización del vector.

Local reviser's correction: Pulse el botón "Activar la visualización dinámica del grosor" para borrar todo ploteo de color de las franjas y la visualización del vector existentes.

Type of error: Syntactic – syntactic calque

Researcher's comment: This is an unnecessary intervention. The addition of the word existentes (existing) does not change the meaning of the translation.

Correction rejected by in-house translator.

**Example 16**

English segment: mm (kilogram f)

Spanish translation: mm (kilogramo f)

Local reviser's correction: mm (kilopondio)

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention to maintain the consistency throughout the application and across the other PLM applications. Kilopondio (kilogram force) also helps keep the minimum number of characters.

Correction accepted by in-house translator.

**Example 17**

English segment: Constrain Temperature at CG and Boundary Elements

Spanish translation: Temperatura de restricción en CG y elementos limitantes

Local reviser's correction:Temperatura de restricción en CG y elementos de frontera

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention to maintain the consistency throughout the application and across the other PLM applications. *Elementos de frontera* (boundary elements) is a term more frequently used in an engineering environment. *Conexión* (plug) is more frequently used in an engineering environment.

Correction accepted by in-house translator.

**Example 18**

English segment: Dimension Value Associativity

Spanish translation: Asociatividad del valor de la cota

Local reviser's correction: Asociatividad del valor con la cota

Type of error: Syntactic – inadequate preposition

Researcher's comment: This is a necessary intervention. It is important to know the relationship between the lexical items when translating multi-word segments. Is it the associativity of the value of the dimension? Or is it the associativity with the value of the dimension? Or is it the associativity of the value with the dimension? The right response is: "The associativity of the value with the dimension". We should also note that, as of this writing, the *Real Academia Española* has not yet admitted to its dictionary the Spanish term *asociatividad* (or 'associativity' in English).

Correction accepted by in-house translator.

**Example 19**

English segment: To reference

Spanish translation: A la referencia

Local reviser's correction: A referencia

Type of error: Syntactic – omission

Researcher's comment: This is an unnecessary intervention. Deleting the Spanish article la (the) does not change the meaning. The translation sounds more fluent than the correctd phrase. Local revisers are always paying attention to the character restriction in text strings.

Correction rejected by in-house translator.

**Example 20**

English segment: If a title is specified for the plunger hole depth, the value of the applied attribute will be the depth of the hole.

Spanish translation: Si se especifica un título para la profundidad del agujero de pistón, el valor del atributo aplicado será la profundidad del agujero.

Local reviser's correction: Si se especifica un título para la profundidad del agujero del émbolo, el valor del atributo aplicado será la profundidad del agujero.

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention. The Spanish translation of plunger is *émbolo* instead of *pistón*. When the right techincal translation cannot be found, a replacement term is used until both translators and local revisers are satisfied with its Spanish equivalent. This is an example of a Spanish term modified during the translation revision stage.

Correction accepted by in-house translator.

**Example 21**

English segment: If the requirements are stored in a spreadsheet file, this option specifies the field name in the above specified sheet for the percentage of test area C that must be found in the wiped area. If the requirements are stored in an XML file, this option specifies the requirement name in the above project for the percentage of test area C that must be found in the wiped area.

Spanish translation: Si se almacenan los requerimientos en un archivo de hoja de cálculo, esta opción especificará el nombre del campo en la hoja especificada arriba correspondiente al porcentaje del área de prueba C que se debe encontrar en el área limpiada. Si se almacenan los requerimientos en un archivo XML, esta opción especificará el nombre del requerimiento en el proyecto especificado arriba correspondiente al porcentaje del área de prueba C que se debe encontrar en el área de limpieza.

Local reviser's correction: Si se almacenan los requerimientos en un archivo de hoja de cálculo, esta opción especificará el nombre del campo en la hoja especificada arriba correspondiente al porcentaje del área de prueba C que se debe encontrar en el área de limpieza. Si se almacenan los requerimientos en un archivo XML, esta opción especificará el nombre del requerimiento en el proyecto especificado arriba correspondiente al porcentaje del área de prueba C que se debe encontrar en el área de limpieza.

Type of error: Terminology – inconsistent lexical item

Researcher's comment: This is a necessary intervention for consistency purposes. The Spanish translation of the phrase 'Wiped area' in the first sentence should be consistent with the same phrase in the last sentence, 'wiping area'.

Correction accepted by in-house translator.

**Example 22**

English segment: Assembly Parts

Spanish translation: Piezas de ensamble

Local reviser's correction: Piezas para ensamble

Type of error: Syntactic – inadequate preposition

Researcher's comment: This is a necessary intervention. There was a change in the Spanish preposition from *de* to *para*. The change from 'Parts of the assembly' to 'Parts for assembly' sounds more natural in Spanish.

Correction accepted by in-house translator.

**Example 23**

English segment: If this option is set and assembly level model geometry is created in an existing assembly part then all of the existing components of the assembly will be added automatically to the Model and Lightweight reference sets that are created. The components will be added to the reference sets using the Model and Lightweight reference sets in the components if these are available.

Spanish translation: Si esta opción está activada y se ha creado una geometría de modelo de nivel de ensamble en una pieza para el ensamble, todos los componentes del ensamble se añadirán automáticamente a los conjuntos de referencia Modelo y Ligero que se creen. Los componentes se añaden a los conjuntos de referencia mediante los conjuntos de referencia Modelo y Ligero de los componentes, siempre que estén disponibles.

Local reviser's correction: Si esta opción está activada y se creó una geometría de modelo de nivel de ensamble en una pieza para el ensamble existente, todos los componentes existentes del ensamble se añadirán automáticamente a los conjuntos de referencia Modelo y Ligero que se creen. Se agregan los componentes a los conjuntos de referencia mediante los conjuntos de referencia Modelo y Ligero de los componentes, siempre que estén disponibles.

Type of error: Syntactic – inadequate verb tense

Researcher's comment: Though this is a necessary intervention, changing the tense verb does not change the meaning of the sentence. The reviser remplaced 'has been created' with 'it was created'.

Correction accepted by in-house translator.

**Example 24**

If this option is set then Model reference sets in existing parts will be converted to have the property that components added to the part should be added to the reference set automatically.

Spanish translation: Si esta opción está activada, se convertirán los conjuntos de referencia Modelo y Ligero de las piezas para que tengan la propiedad de que los componentes añadidos a la pieza se añadan automáticamente al conjunto de referencia.

Local reviser's correction: Si esta opción está activada, se convertirán los conjuntos de referencia Modelo y Ligero de las piezas para que tengan la propiedad de que los componentes añadidos a la pieza se añadan automáticamente al conjunto de referencia. Los demás conjuntos serán eliminados.

Type of error: Translation - addition

Researcher's comment: This is a neccesary intervention since there was an additional Spanish sentence in this paragraph (The extra sets will be deleted).

Correction accepted by in-house translator.

**Example 25**

English segment: If this option is not set then newly created Model reference sets will not have the property that new components are added to them automatically and no attempt will be made to maintain Model reference sets for assembly parts automatically. This allows the pre-NX3 behavior of Model reference sets to be maintained. To follow NX Assembly Modeling best practices this option should be set.

Spanish translation: Si esta opción no está activada, los conjuntos de referencia Modelo creados recientemente no tendrán la propiedad de agregar automáticamente los componentes nuevos y no se intentará conservar automáticamente los conjuntos de referencia Modelo correspondientes a las piezas para ensamble.

Local reviser's correction: Si esta opción no está activada, los conjuntos de referencia Modelo creados recientemente no tendrán la propiedad de agregar automáticamente los componentes nuevos y no se intentará conservar automáticamente los conjuntos de referencia Modelo correspondientes a las piezas para ensamble. Esto permite conservar el comportamiento anterior a NX3 de los conjuntos de referencia Modelo. Se deberá activar para seguir los usos recomendados en Modelado de ensambles de NX.

Type of error: Translation – omission

Researcher's comment: This is a necessary intervention since the last two sentences were missing from the translation.

Correction accepted by in-house translator.

**Example 26**

English segment: Fit distance

Spanish translation: Distancia de ajuste

Local reviser's correction: Ajustar la distancia

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The Spanish translation was wrong. The term 'Fit' is used as a verb in this context as opposed to a noun. The correct translation would be: Fit (the) distance.

Correction accepted by in-house translator.

**Example 27**

English segment: Ship water line cannot be less than Z minimum.

Spanish translation: La línea de agua del barco no puede ser menor que el valor mínimo Z.

Local reviser's correction: La línea de flotación del barco no puede ser menor que el valor mínimo Z.

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention. The technical term water line was not translated according to the English-Spanish glossary.

Correction accepted by in-house translator.

**Example 28**

English segment: Please check the default setting for Standard Part Framework spreadsheet rule file at File->Utilities->Custom Default->Ship Design->Standard Part Framework.

Spanish translation: Seleccione el ajuste predeterminado correspondiente al archivo de reglas de hojas de cálculo de la estructura de soporte de piezas estándar en Archivo->Utilidades->Valor predeterminado personalizado->Diseño naval->Estructura de soporte de la pieza estándar.

Local reviser's correction: Seleccione el ajuste predeterminado correspondiente al archivo de reglas de hojas de cálculo del marco de trabajo de piezas estándar en Archivo->Utilidades->Valor predeterminado personalizado->Diseño naval->Marco de trabajo de la pieza estándar.

Type of error: Translation – inconsistency

Researcher's comment: This is a necessary intervention for consistency purposes regarding the technical terminology. The translation for Framework is *Marco de trabajo*.

Correction accepted by in-house translator.

**Example 29**

English segment: LOCAL RETURN PT - %C *RETURN MOVE - %C *null *null *null *FREQUENCY - %I *RESEQUENCE OUTPUT *

Spanish translation: PUNTO DE RETORNO LOCAL - %C *MOVIMIENTO DE RETORNO - %C *nulo *nulo *nulo *FRECUENCIA - %I *REORDENAR LA SALIDA *

Local reviser's correction: PUNTO DE RETORNO LOCAL - %C *MOVIMIENTO DE RETORNO - %C *nulo *nulo *nulo *FRECUENCIA - %I *RESECUENCIAR LA SALIDA *

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention since the English verb Resequence has been translated as Reorder.

Correction accepted by in-house translator.

**Example 30**

English segment: Element %i -- ply %i. Unable to calculate %U[%U] ply **strength ratio**. Unknown error.

Spanish translation: Elemento %i – lámina %i. No se puede calcular [%U] coeficiente de fuerza con la lámina. Error desconocido.

Local reviser's correction: Spanish translation: Elemento %i – lámina %i. No se puede calcular %U[%U] relación de fuerza con la lámina. Error desconocido.

Type of error: Localization – missing placeholder

Researcher's comment: This is a necessary intervention. The translation for strength ratio is *relación de fuerza*.

Correction accepted by in-house translator.

**Example 31**

English segment: The material must be isotropic, have formability properties, and have a forming limit curve.

Spanish translation: El material debe ser isótropo, tener propiedades de formabilidad, y tener una curva límite de formabilidad.

Local reviser's correction: El material debe ser isotrópico, tener propiedades de formabilidad, y tener una curva límite de formabilidad.

Type of error: Lexical – wrong lexical item

Researcher's comment: This is a necessary intervention. Isotrópico is the adjective pertaining to an isotropo.

Correction accepted by in-house translator.

**Example 32**

English segment: Dependency between the module and some peer modules will not allow un-nesting. Delete dependencies to allow un-nesting.¶

Spanish translation: La dependencia entre el módulo y algunos módulos peer no permitirá la desanidación. Elimine las dependencias para permitir la desanidación.¶

Local reviser's correction: La dependencia entre el módulo y algunos módulos homólogos no permitirá la desanidación. Elimine las dependencias para permitir la desanidación.¶

Type of error: Translation – wrong lexical item

Researcher's comment: This is a necessary intervention. The local reviser translated peer as *homólogo*.

Correction accepted by in-house translator.

**Example 33**

English segment: This step allows you to select wiper system type and parameters to define the wiper system, or select wiped area curves directly.

Spanish translation: Este paso le permite seleccionar el tipo de sistema del limpiaparabrisas y los parámetros para definir el mecanismo o seleccionar directamente las curvas del área limpiada por la escobilla.

Local reviser's correction: Este paso le permite seleccionar el tipo de mecanismo del limpiaparabrisas y los parámetros para definir el mecanismo o seleccionar directamente las curvas del área limpiada por la escobilla.

Type of error: Lexical – wrong lexical item

Researcher's comment: This is not a necessary intervention. However, *mecanismo* is a more appropriate translation for system in this context.

Correction accepted by in-house translator.

**Example 34**

English segment: Pattern Count Suffix

Spanish translation: Sufijo del recuento de patrones

Local reviser's correction: Sufijo de recuento de patrones

Type of error: Syntactic – inadequate preposition

Researcher's comment: This is an unnecessary intervention. Deleting the Spanish article *la* (the) does not change the meaning of the final phrase. The translation sounds more fluent than the corrected version. Local revisers are always paying attention to the character restriction in text strings.

Correction rejected by in-house translator.

**Example 35**

English segment: Response Simulation Details View

Spanish translation: Vista de los detalles de simulació de respuesta

Local reviser's correction: Vista de los detalles de simulació**n** de respuesta

Type of error: Spelling – omission

Researcher's comment: This is a necessary intervention The letter n was missing in the Spanish term simulación.

Correction accepted by in-house translator.

**Example 36**

English segment: CAM Rotor: Adding bodies to database

Spanish translation: Rotor de la leva: Agregando cuerpos a la base de datos

Local reviser's correction: Rotor de la leva: agregando cuerpos a la base de datos

Type of error: Typographic – capitalization

Researcher's comment: This is necessary intervention. In Spanish the first word after a colon starts with a lower case, except for proper nouns. One of the two spaces after the Spanish word *agregando* was deleted. The English noun 'cam' should have been spelled Cam, since CAM is an acronym used in this application and stands for Computer Assisted Manufacturing.

Correction accepted by in-house translator.

**Example 37**

English segment: Measure point

Spanish translation: Punto de medida

Local reviser's correction: Medir el punto

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The English term 'measure' is a verb in this case as opposed to a noun. Therefore, the correct translation is 'Measure (the) point'.

Correction accepted by in-house translator.

**Example 38**

English segment: Define a ground wide point

Spanish translation: Definir un punto base ancho

Local reviser's correction: Definir un punto de anchura a tierra

Type of error: Translation – nonsense

Researcher's comment: This is a necessary intervention. The Spanish translation was a word for word translation and was wrong. The back translation would have read: Define a wide base point.

Correction accepted by in-house translator.

**Example 39**

English segment: The specified cross section and offset method result in a failed or inaccurate chamfer. An accurate result can be obtained if the cross section is 'Symmetric' or Asymmetric', and the offset method is 'Offset Faces and Trim'.

Spanish translation: La sección transversal especificada y el método de descentramiento resultan en un chaflán con fallas o no exacto. Se puede obtener un resultado exacto si la sección transversal es 'Simétrica o Asimétrica' y el método de descentramiento es Caras desplazadas y recorte.

Local reviser's correction: La sección transversal especificada y el método de offset resultan en un chaflán con fallos o no exacto. Se puede obtener un resultado exacto si la sección transversal es 'simétrica o asimétrica' y el método de descentramiento es 'Caras desplazadas y Recorte'.

Type of error: Lexical – loanword and wrong lexical item

Researcher's comment: This is an unnecessary intervention. The local reviser replaced the Spanish translation *descentramiento* with the English term 'offset' in the first sentence. Secondly, the Spanish femenine term *fallas* (failures) was changed to the masculine *fallos*, since this is the preferred term in Spain to refer to defects.

Corrections rejected by in-house translator.

**Example 40**

English segment: This option determines whether or not the graphics window is configured to support Full Scene Antialiasing. When this check box is turned on, Full Scene Antialiasing is unavailable.

Spanish translation: Esta opción determina si se configurará la ventana de gráficos para admitir el Antiescalonamiento completo de la vista. Al activar esta casilla de selección, el Antiescalonamiento completo de vista no estará disponible.

Local reviser's correction: Spanish translation: Esta opción determina si se configurará la ventana de gráficos para admitir el Antiescalonamiento de la vista completa. Al activar esta casilla de selección, el Antiescalonamiento completo de vista no estará disponible.

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The English adjective 'full' qualifyies the noun 'scene' as opposed to 'antialiasing'. The back translation would have read: Scene Full Antialiasing, which is incorrect.

Correction accepted by in-house translator.

**Example 41**

English segment: Conic - Hilite - By Faces

Spanish translation: Cónica - Hilite- por caras

Local reviser's correction: Cónica - resalte - por caras

Type of error: Translation – nonsense

Researcher's comment: This is a necessary intervention. The verb 'Hilite' *(resaltar)* in Spanish) was not translated. In computing, "the spelling 'hilite' is more common due to often being natively used by objects and languages" (Wiktionary).

Correction accepted by in-house translator.

**Example 42**

English segment: Invalid scale entered.¶ Scale must be greater than zero and less than 10,000.¶ Please re-enter.

Spanish translation: La escala introducida no es válida.¶ La escala debe ser mayor que cero pero menor que 10,000.¶ Vuelva a introducirla.

Local reviser's correction: Spanish translation: La escala introducida no es válida.¶ La escala debe ser mayor que cero pero menor que 10.000.¶ Vuelva a introducirla.

Type of error: Typographic – numbers

Researcher's comment: This is a very sensitive issue. The use of commas or periods to separate decimals depends on the country. According to *the Academia Real Española,* decimal places are separated by periods, however, in Spain, the comma is used instead.

Since this software application is also used in Latin American countries, where they use a period to separate decimals, it is recommended to follow the English rule consistently.

Correction rejected by in-house translator.

**Example 43**

English segment: Bottom radius of the End Mill. Default is 5mm

Spanish translation: Radio inferior de la espiga universal. El valor predeterminado es 5 mm.

Local reviser's correction: Radio inferior de la espiga universal. El valor predeterminado es 5mm.

Type of error: Typographic – numbers

Researcher's comment: This is an unnecessary intervention. In Spanish a space should be left between the number and the measure of unit.

Correction rejected by in-house translator.

**Example 44**

English segment: Map Transverse frames

Spanish translation: Mapear los cuadros transversales

Local reviser's correction: Mapear las cuadernas transversals

Type of error: Translation – inconsistency

Researcher's comment: This is a necessary intervention. This is a specific module intended for shipbuilding. Therefore, 'transverse frames' should be translated as *cuadernas transversales*.

Correction accepted by in-house translator.

**Example 45**

English segment: Source eid

Spanish translation: eid fuente

Local reviser's correction: None

Type of error: Lexical – non-pluralization of acronyms

Researcher's comment: The purpose of this example is to indicate that the acronym should be spelled EID, which stands for Element Identification, instead of eid.

Failed intervention.

**Example 46**

English segment: Support Kerbesos authentication

Spanish translation: Admitir la autenticación de Kerbesos

Local reviser's correction: None

Type of error: Spelling – wrong product name

Researcher's comment: There is a typo in the brand name 'Kerberos' in the English segment. The name of the company is Kerberos. The local reviser missed this correction.

Failed intervention.

**Example 47**

English segment: …are not in conflict each other

Spanish translation: …no están en conflicto entre ellos

Local reviser's correction: …no estén en conflicto entre ellas

Type of error: Syntactic – inadequate verb tense

Researcher's comment: This is a necessary intervention. This segment is part of another segment. 1) The Spanish verb *están* should be replaced with estén, which is conjugated in the present tense in the subjunctive mode. The subjunctive mode is used after certain expressions and verbs as in this case (to make sure, as explained next). 2) Since we do not know "what is in conflict with each other", the translator used a masculine form (entre ellos). These segments are known as 'composite strings'. Sometimes developers divide segments across multiple strings. A composite string is a sentence represented in two separate text strings. Developers should avoid using composite strings and present translators with full sentences. If the two segments had been presented as one sentence (Make sure the Mesh Mating conditions are not in conflict each other), it would be very likely that no corrections would have been necessary.

Corrections accepted.

**Example 48**

English segment: Not enough area at point of penetration for stock. ¶ The sketch origin is outside of the sketch, please specify the origin for the sketch.

Spanish translation: Área insuficiente en el punto de la penetración de la demasía. ¶ El origen del bosquejo se encuentra fuera del mismo, especifique el origen del croquis.

Local reviser's correction: Área insuficiente en el punto de la penetración de la demasía. ¶ El origen del bosquejo se encuentra fuera del mismo, especifique el origen del bosquejo.

Type of error: Pragmatic – other pragmatic (regional variance)

Researcher's comment: This is a typical situation where the English term 'sketch' is translated as *bosquejo* in Spain but as *croquis* in Latin American countries. The company internal glossary indicates that the English 'sketch' is translated as *croquis*.

Correction rejected by in-house translator.

**Example 49**

English segment: View sectioning

Spanish translation: Seccionamiento de la vista

Local reviser's correction: Seccionando vistas

Type of error: Lexical – lexical coherence (microtextual)

Researcher's comment: This is an unnecessary intervention. The English term 'sectioning' is a noun in this context. The back translation would have read: Sectioning the views. The Spanish translation is fine.

Correction rejected by in-house translator.

**Example 50**

English segment: Display part

Spanish translation: Visualizar la pieza

Local reviser's correction: Pieza de visualización

Type of error: Translation – opposite sense

Researcher's comment: This is a necessary intervention. The English term 'display' is a verb in this context.

Correction accepted by in-house translator.

**Example 51**

English text: Time Zone

Spanish translation: Huso horario

Local reviser's correction: Zona horaria

Type of error: Lexical – false friends

Researcher's comment: This intervention is unnecessary. The Spanish translation is correct. *Zona horaria* is a literal translation, instead.

Correction rejected by in-house translator.

**Example 52**

English text: FSC communication can be enabled to use proxies.

Spanish translation: Se puede activar la comunicación con FSC para usar los servidores intermediarios.

Local reviser's correction: Se puede activar la comunicación con FSC para usar los servidores proxy.

Type of error: Lexical – loanword

Researcher's comment: This is a necessary intervention for consistency purposes. Local revisers' preference is to leave some IT terms untranslated, as in this case, 'servidor proxy'.

Correction accepted by in-house translator.

**Example 53**

English segment: Change Order

Spanish translation: Orden de cambio

Local reviser's correction: Cambiar la orden

Type of error: Undecided

Researcher's comment: This is a tricky segment. Both the translation and the revised translation are valid. The position of this particular segment in the UI application will determine which one is the valid option. Therefore, we will categorize this intervention as "unclear". Only during the testing stage we will be able to decide which translation is the correct one for this particular situation.

**Example 54**

English segment: Master-sub

Spanish translation: Subprograma de actividades maestro

Local reviser's correction: Maestro-sub

Type of error: Translation – wrong sense

Researcher's comment: This is a necessary intervention. The local reviser has chosen a more literal translation to be on the safe side.

Correction accepted by in-house translator.

**Example 55**

English segment: Machine Parts Library

Spanish translation: Biblioteca de piezas de maquinaria

Local reviser's correction: Biblioteca de Piezas de Maquinaria

Type of error: Typographic - capitalization

Researcher's comment: This is an unnecessary intervention is unnecessary. In Spanish there is no need to capitalize the first letter in every word of a phrase or sentence. This is a direct transfer from the English rules of style (Serrano and Howard 2003: 80).

Correction rejected by in-house translator.

**Example 56**

English segment: Template: A template is a document that provides default settings for text, formats, geometry, dimensions, units of measurement, and styles that are used to produce a new document. Select either English or Metric.

Spanish translation: Plantilla: Es un documento que proporciona parámetros predeterminados para texto, formatos, geometría, cotas, unidades de medición y estilos usados para producir un documento nuevo. Seleccione Anglosajón o Métrico.

Local reviser's correction: Plantilla: Es un documento que proporciona parámetros predeterminados para texto, formatos, geometría, cotas, unidades de medición y estilos usados para producir un documento nuevo. Seleccione Inglés o Métrico.

Types of error: Typographic – capitalization and Terminology – wrong lexical items

Researcher's comment: We found three issues in this paragraph. Firstly, in Spanish there is no need to begin a word with a capital letter after a colon, unless it is a proper noun or in other few exceptions. Therefore, "*Es un documento*" should have been corrected to read "*es un documento*". Secondly, the name of the metric system in Spanish is '*sistema métrico decimal*'. And thirdly, the translation of English system into Spanish is '*sistema anglosajón'*. To summarize, one correction is missing and the other two are incorrect.

Two corrections are rejected and one is missing.

**Example 57**

English segment: Source geometry

Spanish translation: Geometría de origen

Local reviser's correction: Geometría fuente

Type of error: Terminology – wrong lexical item

Researcher's comment: This is a necessary intervention since the English term is source is translated into Spanish as *fuente* instead of 'origin'.

Correction accepted by in-house translator.

**Example 58**

English segment: Realize Shape.

Spanish translation: Esculpir formas.

Local reviser's correction: Realize Shape

Type of error: Localization – untranslatable term

Researcher's comment: This is a necessary intervention since the translation was wrong. 'Realize Shape' is a set of tools to maintain control over industrial design intent throughout the development process.

Correction accepted by in-house translator.

**Example 59**

English text: Type ID to search:

Spanish translation: Escribir Id para buscar:

Local reviser's correction: Escribir Id a buscar.

Type of error: Syntactic – inadequate preposition

Researcher's comment: This is an unnecessary intervention. The Spanish translation is correct. '*Para buscar'* is an adverbial phrase meaning for a certain purpose (You write an ID in order to do something). Therefore, the right preposition is *para* instead of *a*.

Correction rejected by in-house translator.

**Example 60**

English segment: Check out

Spanish translation: Desproteger

Local reviser's correction: Desprotección

Type of error: We have left this as 'unclear' or 'undecided'. This can only be determined during the testing period of the software product.

Researcher's comment: This is a tricky segment. Both the translation and the revised translation are valid. The position of this particular segment in the UI application will determine which one is the valid option. Is the English phrase 'check out' a verb or a noun? Therefore, we will categorize this intervention as "unclear". Only during the testing stage we will be able to decide which translation is the correct one for this particular situation.

# Appendix I - Software problem report sample

## Instructions

- Entries marked with an asterisk (*) are required
- Enter in *Synopsis*, a brief summary of the problem
- Enter *Workaround* (or Fix) if known
- In *How to Repeat*, enter information to help reproduce bug. You may paste any test data, error messages, etc.
- You will receive a confirmation email at the address you specify

Problem Report sample

**Initiator's Name***

| | |
|---|---|
| Company* | Email* |
| Date* | Phone number |
| Select Application/Tool* (drop down menu) | Select Platform* (drop-down menu) |
| Select Software Version* (drop down menu) | Select Severity* (drop-down menu) |
| Select Defect* (drop down menu) | Change Request |
| Select Type* (drop down menu) | Server site |
| Select Internet Browser* (drop down menu) | Release, phase or build |
| Select Priority* (drop down menu) | User sort field |
| Select State* (drop down menu) | Urgency (drop down menu) |
| Select Problem Type* (drop down menu) | Category (drop down menu) |
| Select Plug-in* (drop down menu) | Duplicate PR |
| Synopsis* | Description* |
| Workaround: | How to repeat: |

Source: Center for Software Engineering