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Usability and Acceptability in User Documentation

A Case Study on a Power Plant Manual

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UNIVERSITY OF VAASA**Faculty of Philosophy****Discipline:** English Studies**Author:** Oskar Kenttälä**Master's Thesis:** Usability and Acceptability in User Documentation:
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ABSTRACT

Tässä tutkimuksessa on ollut tavoitteena tutkia voimalaitoksen käyttöohjetta käyttäjän näkökulmasta. Ensisijaisena tavoitteena on ollut arvioida, ovatko käyttäjän odotukset täyttyneet käyttöohjeessa. Menetelmänä on käytetty käytettävyysteoriaa sekä siinä yleisesti käytettyä heuristista arviointia eli ammattilaisarviointia. Oletushypoteesina oli että käyttöohjeessa on pieniä käytettävyysvirheitä, mutta vakavia virheitä vain vähän tai ei yhtään. Perusteena tälle on se, että kohdemateriaali on vielä julkaisematon, varhainen suomenkielinen käännösversio englanninkielisestä ohjekirjasta. Koska alkuperäinen käyttöohje on lähes valmis, joskin myös julkaisematon, asiavirheitä on luultavasti vähän. Käännösversion ollessa vasta aikainen vedos on mahdollista, että käännöksestä löytyy käännösprosessiin liittyviä virheitä. Aineistona oli Wärtsilä-yhtiön englannista suomeen käännetty käyttöohje. Käyttöohje arvioitiin Jacob Nielsenin käytettävyysteorian ja Daniel Gouadecin käännöksen laadun teorian avulla. Käyttämällä Nielsenin ja Gouadecin teorioita yhdessä materiaali arvioitiin heuristisella arvioinnilla, jossa etsitään periaatelistan avulla kohdemateriaalista ominaisuuksia tai virheitä, jotka eivät ole periaatelistan arvojen mukaisia. Tutkimustulokset osoittivat, että käyttöohjeen käännöksen varhaisen vaiheen takia siitä löytyi lukuisia pienempiä virheitä, jotka kokonaisuutena tekivät käyttöohjeesta epätasaisen ja ei-hyväksyttävän. Ajoittain teksti oli erittäin sujuvaa ja helposti luettavaa, mutta joissakin osioissa teksti oli vaikeaselkoista ja siten vaikeasti luettavaa. Käyttöohjeen asiasisältö, eli tekniset ohjeet, turvallisuusmääräykset ja -ohjeet, olivat kuitenkin hyvät. Käyttöohjeessa oli myös runsaasti käyttöä edistäviä ominaisuuksia, jotka korostivat etenkin turvallisuusohjeita ja niiden tärkeyttä. Tämän lisäksi käyttöohjeesta löytyi yllättäen katastrofaalinen virhe, joka estää käyttöohjeen kyseisen version julkaisun. Käyttöohjeesta löytyi kääntämättä jäänyt turvallisuusmääräys, joka potentiaalisesti aiheuttaa hengenvaarallisen tilanteen. Kuitenkin, koska virhe liittyi etenkin käännökseen ja sen varhaiseen vaiheeseen, kyseistä virhettä ei ole englanninkielisessä käyttöohjeessa.

KEYWORDS: translation, usability, manual, heuristic evaluation

1 INTRODUCTION

Modern machines and electronics, ranging from phones to power plants, are complex equipment that require proper knowledge for effective use. Most often this knowledge is learned from manuals or guides that is associated with the product. Usually, manuals are designed to be easy to understand and use. However, instructions for expert use can be more complex in content as well as in form, as experts have deeper understanding of the machinery and they usually use the equipment in more complex ways. Finnish Law (Suomen Laki 30.1.2004/75) also often requires instructions for general use and safety. The usability of this type of user documentation is becoming more important, as global trade is increasing yearly and misunderstandings due to faulty manuals can become expensive. Manuals can be made correct and informative at a relatively low cost compared to the cost of accidents due to faulty instructions.

Documentation in general is important for any business; companies create documentation for their own use and for their customers. Different types of documentation, including manuals, guides and other documentation that is specifically designed to work as a channel between a product and the user of the product, should be clear and accurate. However, creating good documentation is expensive and time consuming. Good documentation enables the avoidance of certain problems altogether, as for instance, if an employee retires, he might take with him a lifetime of understanding of a product and if the documentation is not comprehensive enough, the cost of recreating this knowledge can be difficult. (Sorensen, 2009) While creating good documentation might become an expensive task, even basic guidelines on documentation provide positive results. Layout templates alone can reduce the time to create a document and enhance clarity. Similarly, a good understanding of basic requirements of documentation and knowledge of how to implement them in practice reduces costs in the future, although writing the documentation properly might take additional resources in the present.

Translating documentation creates a similar challenge for businesses. When a product is exported, it is generally required to be accompanied with the target country language user manual and other documentation, depending on the type of sale. Translations can become expensive for a business, even more so than the original instructions, as they need to be made in several different languages. Although a translated manual follows the same general rules as a non-translated manual, with being as clear and concise as possible (Herman 1993: 11-21), the difficulty in translating user documentation is the vocabulary used in the manual. Technical products have specialized terminology which does not always translate well between languages. For instance, a DVD-player's button "Play" has been translated into "Toista/Repeat"¹ in Finnish. While "Toista" does translate well the technical action of this function, by stating the repeating of a video, it does not transfer well the action that refers to initiating video or simply "playing". This type of translation difficulty is commonplace with complex technical products that are created for the general consumer markets. With highly specialized products for expert users, such as power plants, the terminology is even more important to be correct, thus translations of this terminology must either be in standardized forms or in otherwise correct and acceptable form. However, experts often also know, and are expected to know, the English equivalent of a term.

Usability theory is a new theory that has its roots in Communication Studies. In Translation Studies, Usability is first recently becoming a more recognized theory although several other theories have used aspects of the Usability theory. For instance, in Vermeer's (2000) Skopos theory the reader's expectations in correlation to the translation outcome is an important theme. Jakob Nielsen (1993) presented the basics of Usability as its own theory as a way to study and evaluate computer user interface systems. Nielsen's theory, which is the most well known and most referred to in Usability studies, is based on studying **Learnability**, **Efficiency of Use**, **Memorability**, **Few and Noncatastrophic Errors** and **Subjective Satisfaction** in a computer system. This categorizing has noted to be applicable elsewhere and it has been applied to other areas of study, as for example SueAnn Spencer (1996) and Jody Byrne (2006) have applied Nielsen's ideas to general documentation and translations. Hans Vermeer's

¹ All back translations have been done by the writer of the thesis, Oskar Kenttälä

(2000) Skopos theory has links with Usability as it emphasises the translator's responsibility to meet the expectations of the target audience. Usability is seen as a theory that links both Communication Studies and Translation Studies together, by studying the user's point of view in products, computer software and documents.

By joining aspects from Communication Studies and Translation Studies, Usability can form a common ground to study documentation and translations from the user's point of view. Usability as a subject focuses on how well a user uses a product to perform a task. (Kuutti 2003: 13) The difference in Communication Studies and Translation Studies is the focus of Usability: Communication Studies study the product itself along with any documentation associated with the product, while Translation Studies focus specifically on the documentation side of the product including is the documentation sufficient and are the translated documents acceptable. Thus, both of these fields study the same aspects and problems, but with a differing focus.

Usability is, however, not the ultimate solution to easy and cost-effective documentation. The largest problem of measuring usability is that it is based on individual experience. (Ovaska et al. 2005: 4) This problem is increased with translated versions of the user documentation as the translator might make a mistake or the language does not translate well between languages and is left ambiguous. This is of course always not the case, but as usability is a subject specific measurement, an experience, and the results may vary greatly between different users.

My aim in this thesis is to study usability in a manual translated from English to Finnish. The manual is a general handbook for a large power plant project, and it is intended to be used by the operational personnel of the power plant. The translation itself is an early draft, while the English source text manual is nearly completed. To explore the usability of Wärtsilä's, a multinational company based in Finland, translated power plant manual, I have used the heuristic evaluation process with the principles of usability presented by Jacob Nielsen (2005) and combined it with translation quality principles presented by Daniel Gouadec (2010). Both have outlined the criteria for

evaluating the usability of documentation and translation quality respectively. The heuristic evaluation process is applied in this thesis with the principles, presented by Nielsen and Goaudec, to search the material for aspects and problems that do not condone to the principles. Once a usability problem has been discovered based on the heuristic evaluation, the problem is categorized and rated based on a five-tier rating system. The rating system ranks problems from a low-ranking cosmetic error (0-1) to a high-ranking catastrophic error (4). A cosmetic error can be so minor that it does not even need to be corrected for the manual or product to be released, while a catastrophic error prevents release. My hypothesis is that as the translated manual is in an early draft phase and the source text is almost complete, there are a number of lower level errors, ranging from 0 to 2 that affect mainly the translation process, while the higher level errors, serious level 3 and catastrophic level 4 errors which affect the information itself, occur only in a few cases if at all. (See section 1.2 Method) The following sub-sections will discuss the material for this thesis in further detail and introduce the heuristic evaluation method.

1.1 Material

The material used in this thesis was a draft translation from English into Finnish of a power plant manual provided by Wärtsilä Power Plants. Wärtsilä is officially a trilingual company and thus all material is produced in their three official languages: English, Finnish and Swedish. English is the primary language and, therefore, is often the source language for much of their documentation, although this can vary between countries. All documentation is expected to be available in all three languages, especially in Finland. The manual itself has been created by Wärtsilä for one of their power plant projects. It is designed to be a reference guide and handbook to support the power plant personnel in operating the plant. The English source text was in the late stages of development and includes all necessary information needed by the power plant personnel to use the power plant, including all necessary safety information. The manual also contains basic technical information of the machinery, but as the manual is

designed to cover operations and work as a support and safety guide for the personnel, the technical details are limited. Also, classified information present in the manual has been removed from the manual by Wärtsilä. This is a minor modification specifically created for this thesis and the manual has not been otherwise altered. While this classified information might affect the usability of the manual as a whole, this information will be left out and be considered as not affecting the results of this study.

The translation of the manual has been outsourced and was created by Citec, a company specializing in technical design and documentation. The translation has been done by several people working as a team. The translation was a draft and was in a much earlier stage of production compared to the source text. The source text was in its final stages of production and thus both the source text and the translated manual contain all of the relevant information required to be used as a power plant manual, including safety information and technical information. Before the translated manual will be published, it will go through several check-ups and revisions before it is delivered as a part of the power plant, much like the source text.

The manual is in a suitable phase to be evaluated for Usability as problems concerning Usability can still be addressed and corrected. While the source text and the translation might have similar Usability problems, they must both be treated as separate documents for the usability evaluation. The Usability of the source text is not evaluated in this thesis.

In this thesis I have divided the text in the material according to SecureDOC (2004) model into product description; security and safety; getting started; operation; troubleshooting; and maintenance and service sections. I have modified the division model of SecureDOC to better describe the model in the translated manual. I have selected the general information section, which in the manual combine product information and operation into a whole. More importantly, I have focused on safety information, which is presented in two ways in the manual: first there is a separate safety section in the manual that presents general safety procedures and rules of the

power plant and secondly, safety issues are dealt with throughout the manual, pointing out important safety regulations and features in each section respectively. The reason for choosing these categories is their importance to the workers and operation of the power plant. For a worker, it is necessary to understand the operation of the power plant so that accidents can be avoided, but it is also important to have all the necessary safety information clear during daily operations.

1.2 Method

In this thesis, I used as a method the heuristic evaluation process by Jakob Nielsen. Heuristic evaluation, or expert analysis, is described by Nielsen (1994) as an intuitive tool to evaluate and assess the usability and quality of computer software, although the heuristic evaluation can similarly be used to evaluate other products or subjects, such as documentation (Tytti Suojanen et al. 2012: 96). The idea of heuristic evaluation is to use a list of principles to evaluate a target material and then to locate aspects in the material that do not agree with these rules. As a set of rules I used a combination of Jakob Nielsen's principles of usability and Daniel Gouadec's principles of translation quality. The list includes:

1. Learnability - Accessibility
2. Efficiency of Use – Effective and Ergonomic
3. Memorability - Meaningfulness
4. Few and Noncatastrophic Errors - Accuracy
5. Subjective Satisfaction – Compliancy.

The first part in this list, namely Learnability, Efficiency of Use, Memorability, Few and Noncatastrophic Errors and Subjective Satisfaction are by Nielsen (1993: 26), while the second parts in the list, Accessibility, Effective and Ergonomic, Meaningfulness, Accuracy and Compliancy are then from Gouadec. (2010: 8) According to Nielsen, these are the key factors of usability, while Gouadec discusses quality in translations. As an example of these principles, Nielsen (1993:27) discusses layout and interactivity

in computer systems using the concept of Learnability, Goaudec (2012: 9) discusses exactly the same things about translation quality with Accessibility: interactivity, learnability and layout. Suojanen (2010: 109) states that Gouadec defines a successful translation exactly in the same way Nielsen defines good usability, without ever mentioning the word usability at all. Thus these principles can be combined and used to evaluate translations in a same way computer software is evaluated.

The principles contain more accurately Learnability - Accessibility with layout, interactivity and other visual factors; Efficiency of Use - Ergonomic and Effective contain textual forms and writing; Memorability – Meaningfulness refers to consistency and correctness of information; Few and Noncatastrophic Errors – Accuracy concentrate on all types of writing errors, form errors and other errors that affect usability, including non-translated sections; and finally, Subjective Satisfaction – Compliancy evaluates the document to the requirements of the task as well as any norms connected to the task, including language norms and the task providers norms. Once a problem affecting usability has been discovered, according to these rules, the problem is to be evaluated with a five-tier evaluation scale. (Nielsen 2005) The scale for error evaluation is:

0. The error is not a usability error.
1. The error is a cosmetic error. Corrected if time.
2. The error is a slight usability error. Hinders usability, to be corrected
3. The error is a notable usability error. Severely hinders usability, must be corrected.
4. The error is a catastrophic usability error. Problem must be corrected, product cannot be sold.

A level 0 error is usually an error that some of the experts have thought out to be a possible usability problem, but is seen to be some other type of problem or not a problem at all. Level 1 errors are minor problems that affect usability only cosmetically and do not need to be corrected if found in minor amounts. Level 2 errors are problems that affect usability and should be corrected before publication or next round of

analysis. Level 3 errors are errors that notably affect the usability of a manual and must be corrected. The last and most severe form of errors are the level 4 errors and they potentially cause malfunctions or injuries, if used in the way described and for that reason they are called catastrophic errors.

Traditionally, heuristic evaluation has been used in iterative product development, where unfinished products, for example computer systems, are tested for usability errors several times by a group of 3-5 persons, with varying expertise in the subject area. Any discovered deficiencies are corrected before the next set of tests is done. Usually the most severe usability problems are found quickly and effectively, although all of the problems might never be found, as a single evaluator usually discovers approximately 35% of the usability problems. (Kuutti 2003: 47) Once problems have been found and evaluated, a report is created listing all the problems discovered. However, it is good to mention positive aspects and aspects that worked exceptionally well in the material as well. The largest benefit of the heuristic evaluation is that the most severe problems are found easily while the process itself is cheap and intuitive. The largest drawbacks are, however, the lack of eventual user feedback and an unsuitable list of rules that might make the process inaccurate, even misleading (Nielsen 2005).

This method is a pragmatic way of analyzing documentation and thus the material I received from Wärtsilä, a manual for a power plant project, is a suitable target for the analysis. As the material is still unfinished, the results of this analysis and thesis will benefit the quality of the manual by improving the usability. I began applying the method to the material by reading through the material and highlighting any errors I considered contradicting against the principles of usability. After the initial read, I began searching for any errors with the list of principles as a reference point. At this point I added all of the errors found to a spreadsheet where I marked the error, the location of the error, type of error and an estimated initial severity of the error. Once I thought I found all of the errors, I compiled a list of all the errors and began analyzing the errors more in depth and writing a report, which is partly the fourth chapter of this thesis. While writing the report I analyzed the results of the material and made

conclusions on whether the material would be satisfactory according to the list of principles in general, or in other words, would the user be comfortable using the material. Finally, I made conclusions and about the material, which can be found in chapter five of this thesis.

The following chapters discuss the translation of manuals and Wärtsilä as a company and a global operator.

1.3 Wärtsilä as a World Wide Operator

Wärtsilä is a Finnish corporation that works globally in the marine and energy markets. With almost 19 000 employees in 70 countries around the world, Wärtsilä is one of the best known maritime and power solution providers in the world (Wärtsilä 2012). In marine business, Wärtsilä provides a large array of services and solutions for individual ships and shipyards. Wärtsilä provides maintenance services, propulsion systems, designs and entire lifecycle packages from construction to operation maintenance. Wärtsilä is so notable in the marine business that every third ship is powered and every second is maintained by Wärtsilä. (The Maritime Executive) On the power plant market, Wärtsilä specializes in distributed power generation, or more accurately on-site –type power generation solutions, and flexible power generation. Wärtsilä has constructed fossil fuel based power plants with up to 500 MW electric power output. While focusing on the lower end of power plant output, Wärtsilä is known for the reliability and flexibility of their power plant designs.

As a global company, Wärtsilä has a significant presence in China, India and Central-Europe, but it also has representation in the Americas, Africa and Australia. Its official inter-company language is, therefore, English, with Finnish and Swedish coming as close seconds. Most of the documentation is created into English then translated to Finnish and Swedish, although locally this varies, and for example in Finland, a source text might be in Finnish which is then translated into English. All documentation is

required to be available in English. The material for this thesis is one of the documents originally created in English and which is then translated into Finnish.

2 JAKOB NIELSEN'S USABILITY

The theory section in this thesis is based on two different theoretical points of view. This first section deals with Jakob Nielsen and his principles of Usability and the information standpoint to Usability. The second theoretical section discusses about Daniel Gouadec's Translation quality in industry which on the other hand offers a translation and documentation based viewpoint to Usability. Together these will form the theoretical framework for this thesis and offer the tools to analyze the material.

2.1 Background and Basics of Usability

Usability theory is unusual and special in the sense that it combines translation theory, linguistic theory and several different information technology related topics, including information design, into a greater whole. The theory itself is rather new, especially compared to older, more established, theories like Equivalence theory in translation studies. Usability has been applied to a variety of subjects outside the original computer system design and user interface design evaluation, including layout design on web pages. In documentation it is a completely new idea, although the document's user, the reader, has been an important aspect in a variety of translation theories, including the Skopos theory where the expectations of the reader are a key aspect in the acceptability of the translation. However, most often the reader has been seen in documentation more of a passive receiver whose expectations are guessed and anticipated. In Usability, the user takes an active role, such as in the user-document –relation where the user is seen as the center of activity, while the center theme is how to improve the users experience with documentation.

Jakob Nielsen's *Usability Engineering* (1993) is considered to be the base for Usability theory and it is designed for user-interfaces and computer software. Nielsen (1993: 25) emphasizes in his theory that a product is as good, or as bad, as the intended user's ability to use the product. This same principle can be extended beyond the product itself and be applied to documentation or other aspects that forward the use of the product.

Nielsen (1993: 26) also states that the usability is not a simple, one dimensional property, but it is a multi-layered feature that requires correct implementation and design. Nielsen states that a system should be as easy to learn as possible, as efficient to use as possible, after it has been learned it should be easy to re-memorize after some time has passed, it should have no visible or critical errors and finally, it should be satisfying to use in the task it has been created for (Nielsen 1993: 26).

While Nielsen did not originally plan his Usability principles to be used outside computer software design, these ideals have shown to work well for other products as well as documentation. Jenny Preece et al. (1993) for instance have applied these same principles in general product development and state that when creating a product, the supposed users of the product must be known, what are the expected tasks of the product, what kind of environment will the product be used in; and above all else, what are the limitations of the product and the user, which might affect the usability of the product. (Preece et al. 1993, 15) She also notes that a good product is a safe, effective, efficient and enjoyable tool to be used in the task it was designed to be used. What is noteworthy on Preece's ideas, are that they are designed for products like tools or electronics and not computer systems, although, these ideas also work with documentation. Aspects like target audience, correct working of the product, troubleshooting for the product and warnings are important to be displayed visibly and clearly in a product manual.

A final point of view about Usability to consider is the ISO 9241-standard or otherwise *Ergonomics of human-system interaction*. The 9241-standard is International Organization for Standardization's multi-part standard that covers a wide variety of human-computer interaction ergonomics, including software ergonomics, human system interaction processes. What is of special interest in the ISO-9241 is Part 11, Guidance of Usability and it states that usability is evaluated with how effectively a user can use a product to complete a task, how efficient the procedure was and how satisfied the user was with doing the task and with the end result (ISO 2010). The problem with the ISO-9241 is that it is a vast collection of standards and Part 11 is ambiguous on how this

usability is achieved. While the standard gives a general perspective on usability, it does not give actual information on how usability should be done.

When considering all these views on usability, a conclusion can be drawn that usability is not only something that can be added to a document, like a stamp, but it is a highly detailed feature of a document that requires time, thought and design.

2.2 Information Design and Usability

In documentation side, information design is the central aspect that Nielsen's theory of Usability represents in documentation. One of the most accurate definitions for Information design is from the International Institute for Information Design which states that "Information design is the defining, planning, and shaping of the contents of a message and the environments in which it is presented, with the intention to satisfy the information needs of the intended recipients." (IIID 2012) This combined with Schriver's (1997: 11) thought of how good and usable document begins with good information design, design that makes reading and using the documentation in correlation with the subject at hand appealing and easy. These two thoughts combined accurately presents the basis that a good documentation transfers a message easily, accurately and acceptably to the reader. It also suggests, that writing alone does not make a good document and external aspects like form, design and format are equally important than the written text.

User documentation is designed to convey information to the user efficiently and accurately. Thus it benefits from short sentences, simple structure and familiar words which are easy and fast to read. While simplicity makes the documents easier to read, it is not perhaps the most important aspect that makes a document easy to use. Pikulski (2002: 1) argues that the most important factor of a good, easy to read document is the interactivity of a document. He states this more accurately with: "the level of ease or difficulty with which text material can be understood by a particular reader who is reading that text for a specific purpose." (Pikulski 2002: 1) This suggests that the same

written material can be understood by different readers in different ways and previous experiences with the subject make the reader understand a text more efficiently. A good example for this interactivity, which Pikulski (2002: 2) uses as well, is a technical report on tidal erosion that can be very informative and easy to read for a coastal engineer, while it is most likely incomprehensible for someone who has no previous expertise from tidal erosion. This suggests that a text can be either easy or difficult to read, based on how well you understand the subject at hand, despite how it is written.

Creating simple writing with easy forms and short sentences is always not so straightforward. In specialized professional fields, such as technology, words can be comprised of only a few letters like LAN, WAN and IP. Creating intelligible, short and simple sentences with this type of terminology is demanding, although this might not be a negative aspect for a document. Hans Vermeer (2000) states, in the Skopos - translation theory, that texts should be free of all unnecessary words and jargon, but they should also take into account the expectations of the reader. Thus it would be important that specialized terminology is present, even in significant amounts, to increase the interactivity and acceptability of a document for a specialized reader. Technical documentation along with other types of specialist documentation is required to have a certain level of complex specialist terminology for it to be acceptable. This emphasizes Pikulski's (2002:1) thought about interactivity: users with different levels of expertise have varying expectations to the document and these expectations should be met. As a result, documentation which is intended for non-expert use, need to be designed differently than those intended for expert use.

The second key aspect of documentation is the form and appearance of the documentation. Similarly to terminology and the level of technical detail, the appearance of different types of documentation needs to match the situation. Nykänen (2002: 10-14) argues that professional documentation does not need to be specifically appealing, as long as the information is relayed accurately and consistently. User documentation for non-experts, however, while being informative and instructive, is created specifically to be attractive to the customer and to be a part of the entire

product's experience (AACGlobal 2008). Thus in user documentation, the external appeal is much more important than it is in professional documentation. In many occasions this increased appeal is achieved with images, layout design and other artistic means that are specifically designed to be appealing for the customer. Sizes and placement of different objects like fonts, graphics and empty spaces should be carefully planned. Layouts, text use, pictures and background need to form a sensible whole, regardless of what the specific outcome is. Also, objects that somehow are connected to each other should be placed in the same boundaries, brought together closer or, for example, be presented in shapes or sizes that resemble one another so their connection is made clear.

From the perspective of Usability, pictures and visual layout is just as important as the composition and message of the written text. In certain cases, it is even more important, as in general, pictures ease the understanding of abstract, physical and technical subjects. Without pictures it is exceptionally difficult to accurately understand and picture real world applications and their composition (Velasco 2012). With a simple picture which illustrates even the basic form and size of an object, the reader can more easily understand the correct concepts, attributes and relation to other similar objects or ideas. On the other hand, uninformative pictures, bad layout design or pictures in a poor setting can affect the readability of a document severely. Below an example:



Figure 1. Example of a confusing layout (Samara 2008)

The example on Figure 1 is an artificially created example from a website designer's collection (Samara 2008). This example is specifically designed to show how a unfitting visual layout or text to background relationship can make a document either difficult to read or completely un-readable. Walker (2001) also comments this by stating that the user interprets the information on the documentation not only from what is written but equally based on the visual aspects of the document, like graphical typography and layout devices. A complicated and colorful layout or design can severely distract the user and reduce the usability of the document.

While pictures are effective in expressing real-world relations of objects, they might equally well confuse the reader. The most important factor in form and layout is necessity and balance. Wild color combinations and abnormal forms with ambiguous connections to the object or text confuse and distract the reader. It should be kept in mind that while typographical aspects and objects are powerful, they should have a specific and carefully thought use in a manual (Schriver 1997: 315-358). The visual appearance may not interfere with the purpose of the documentation by making it distracting or otherwise difficult to read. Schriver (1997: 315-358) elaborates this by stating that all components in a page interact with one another and this interaction should be taken into careful consideration. The document must have enough appearance function to attract the reader and make it pleasant to read, but it must also have enough illustrations to fit the needs of the subject. All of these factors in mind, the importance of sufficient and correct information design in documentation is very important. While the text in the documentation is the body of a document, with poor layout design, bad illustrations and incorrect form, even a well written text can be unreadable and uninformative.

Eventually, to achieve a usable manual, all solutions that forward the understanding, readability and usability of a manual are recommended. Even unorthodox solutions, such as using animal pictures, can be used as long as the end result helps understand the product, makes the manual more pleasing and forwards the use of the product. Thus the importance of information design is unquestionable, as with only small layout features,

colors, placement, pictures and other measures help understand the written text, but only if the text itself is equally made easy to read without long, complex sentences, and unnecessary jargon. Documentation for professionals differs slightly in this manner, as the written form can be more complex and difficult, but similarly a clear and concise use of form make the use of this, more complex form of documentation, easier and more instructive.

2.3 Measuring Usability - Heuristic Evaluation

Heuristic evaluation, or expert analysis, is a quality control method described by Nielsen (1994: 152-158), as a way for experts to evaluate and assess the usability of user interfaces and systems. Heuristic evaluation is traditionally used in iterative product development, where a product is evaluated several times during the development phase to discover possible flaws, usability issues and problems. After these problems are discovered, they are then corrected in the next round of development. Heuristic evaluation is based on a set of rules, or principles that is used to evaluate the target material with. The list is used to locate aspects in the material that do not condone with the rules. The list of rules can be either created specifically for a task or a ready-made set of rules that, for instance Nielsen (1994: 152-158) has created, can be used as a basis for the evaluation. Once a list is chosen or created, the document is assessed if the product is compliant with these rules.

Heuristic evaluation is based on a set of ground rules used to evaluate something, be that a program, document or user-interface. Nielsen (1994: 152-158) states that heuristic evaluation is quick, cost effective and intuitive system, that can be used at any phase of product development. Although, he adds that while a heuristic evaluation can be done at any time during the product development, a usability test based on user feedback should be done in the end of the product development to verify the end result. Especially, as the heuristic evaluation process does not take into consideration user feedback (Nielsen 1994: 152-158). Early heuristics were complicated and large set of rules that were

designed to search for several specific aspects of a product and thus were difficult to implement. Lighter heuristics, like the so called Nielsen's list (1994) have taken place subsequently. The list contains ten basic points about computer system development and has been generally used as a basis for modern heuristic evaluation lists in other subjects, including heuristic evaluation lists for documentation usability testing. These ten points are:

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Helping users recognize, diagnose, and recover from errors
10. Help and documentation (Nielsen 1994)

This list is derived from Nielsen's basics of Usability (Learnability; Efficiency of Use; Memorability; Few and Noncatastrophic Errors; and Subjective Satisfaction) and has several key aspects . While Suojanen et al. (2012: 96) states that this method can be used to assess quality and usability on documentation, applying this particular list to documentation is impractical as it looks for aspects that have very little to do with documentation use. Evaluating documentation needs a different list of rules specifically designed to documentation. One such list can be found for instance by Purho (2010), but unfortunately, Purho's list is designed for finished documentation in mind, and is not sufficient for evaluating smaller sections or a specific aspect of a manual.

While the list of rules is the tool to be used in the heuristic evaluation, it also needs an efficient way to report the findings. The general use of a heuristic evaluation process is recommended for a group of 3-5 persons, with varying expertise of the subject area, as

it is estimated that a single evaluator discovers 35% of the usability problems. (Kuutti 2003: 47). In some cases the experts make the heuristic evaluation rule list according to their own experiences, but once a list of rules is created, the group assess the target object and makes notes according to the list of rules. Once an issue is discovered in a product it is classified by its severity. After all issues have been categorized and evaluated, a report is created containing all errors with the rule which it breaks and evaluation level (Kuutti 2003: 48–49). Korvenranta (2005: 115) suggests, that even when there is little time to perform the evaluation, is worth doing as the most severe usability problems are usually found and can be repaired accordingly. It should be mentioned, that the heuristic evaluation process does not mention how these problems should be repaired, only that the problems exist.

In this thesis, I am using the basic categorization of usability by Jakob Nielsen (1993) combined with translation quality categorization by Daniel Gouadec (2010) as a list of rules for a heuristic evaluation rule list. This list includes Learnability – Accessibility, Efficiency of Use – Effective and Ergonomic, Memorability – Meaningfulness, Few and Noncatastrophic Errors – Accuracy and Subjective Satisfaction – Compliancy. Although, Gouadec never intended his quality categorizations to be used for usability studies, Suojanen (2012) suggests it can be used as such, as Gouadec discusses and uses the quality factors of translation in a similar way usability is applied generally. I also use only the basics of usability, instead of a ready-made list of rules, as these basics work more effectively in evaluating an unfinished and translated manual. All problems, once found are then assessed according the five stage scale to conclude the severity of the error. More information about Gouadec's principles on translation quality can be found in Chapter 3 of this thesis

3 DANIEL GOAUDEC'S ACCEPTABILITY OF TRANSLATIONS

This second section of the theory concentrates on Daniel Goaudec's theory and principles on translation quality and acceptability in industry and translation industry. Gouadec's theory will work as a crossover from general Usability theory into administering Usability as a theory to translations and documentation in general. This section will thus concentrate on translations, user documentation requirements and Gouadec's theory concerning translation quality and acceptability.

3.1 Acceptability and Quality in Translation Industry

Usability is historically based on computer user-interfaces and computer programs than on documentation. This is similarly evident on Nielsen's aspects of usability as he mentions in several occasions how a "system", referring to computer programs, should be constructed to be usable. He does not discuss about documentation, or any other subject, as a target of Usability although other theorists, like SueAnn Spencer (1996: 73-77), began using Nielsen's Usability towards documentation. Nielsen's ideas have been noted to correlate exceptionally well towards documentation usability, although with minor modifications, and as such Nielsen's work is generally considered as a base for usability studies.

When considering documentation with Usability, a completely new set of challenges arises. Janice Redish analyzes how and what kind of information readers find and use in documentation. She categorizes the use of documents into four different categories: (Redish 1993: 1)

1. Readers decide how much attention to pay to a document
2. Readers use documents as tools
3. Readers actively interpret what they read
4. Readers interpret documents in light of their own knowledge and expectations

Redish (1993: 1) points out how manuals and other user documentation are not used often before a problem arises. She also notes that when a user reads a manual it is not so much about passive learning, but more about active interaction between the user, manual and product in question. (Redish 1993: 19) This goes hand in hand with the user's goal to find information effectively, accurately and quickly for the problem at hand, similar to how Nielsen describes the use and requirements of computer systems. Also, Redish's four categories are similar to Nielsen's original list of five requirements for usability: efficiency, learnability, memorability, few and non-catastrophic errors and satisfaction.

In translation side, Usability is a slightly different subject compared to documentation in general. Translations have always been target oriented and purpose driven, specifically when the usability in the source text is mimicked in the translation, making it easier to assess the target audience's requirements. Tytti Suojanen (2012: 103) et al. point out this aspect of Usability and states that in translation industry, you do not discuss about Usability, but you discuss about quality and this discussion is similar to the discussion computer system designers have with computer system usability. Jody Byrne (2006: 177-178) states that Usability and technical translations have several interconnections with one another and they take almost exactly the same point of view to both of these problems. Thus when programmers discuss the usability of a product, translators discuss the quality of a translation and they both discuss about the same problem, although in a completely different form.

Daniel Gouadec (2010) discusses more in-depth of documentation, translations and translation industry and -profession as a whole in his book *Translation as a Profession*. Gouadec discusses about quality in translations and quality control mechanisms as they contain style guides, accurate specifications and translation memories. He also has a specific point of view about professional translators being a part of an industrial infrastructure, similarly to a technical communicator or a programmer. Suojanen (2012: 103-107) notes that although Gouadec (2010) does not mention the word "usability" in connection with translations, he does mention "quality" in several hundred occasions,

pointing out that while Gouadec does not talk directly about Usability, he talks about Usability through quality in translations. Gouadec mentions five basic quality control methods a translator should do for any task: (Gouadec 2010: 74)

1. Material quality checks, i.e. checking that everything that had to be translated has in fact been translated,
2. Language, style and register quality checks: checking that anything related to language style and register is (1) correct, (2) homogeneous and (3) in compliance with all applicable specifications.
3. Technical-factual-semantic quality checks: checking that all the factual information, data, or logical or chronological sequences are adequate and comply with all applicable specifications.
4. Transfer quality checks: checking that all the relevant and significant elements in the source document are present in the translation (with allowance for the necessary adaptations) and that the translation complies with (i) professional standards, (ii) the work provider's specifications and (iii) any specific constraints related to end user needs and requirements.
5. Homogeneity and consistency checks: checking that the style, terminology, phraseology and register are perfectly homogeneous. This is particularly essential when dealing with material translated by several different translators.

This list of quality checks has a task specification centric point of view, where it is assumed that all particular details are provided by the task provider. Suojanen et al. (2012: 108) discusses this specification centrality of the quality control aspects and mention that this list presents an idea where the overall results are measured by the user's requirements but also what is usable for the task's provider. Interestingly, many of the checks discussed by Gouadec relate strongly toward Usability related factors presented by Nielsen, such as consistency of terminology, technical details and accuracy. Gouadec (2010: 6) mentions a list of quality aspects in a translation: Accuracy, Meaningfulness, Accessible, Effective and Ergonomic and Compliancy. This list incidentally shares several similarities with Nielsen's list of Usability, although with

different names. The similarity is so great that it could be said that Goudec has drawn inspiration from Nielsen's list, as for instance, Goudec (2010) mentions similar things in his list of quality, including Accuracy containing much what Learnability contains. Suojanen (2010: 109) confirms this note by stating that Goudec defines a successful translation exactly in the same way Nielsen defines successful Usability, without Goudec ever mentioning the word Usability at all. Thus it can be concluded, that quality is very synonymous to Usability in translations and looking for Usability factors in a translation is at the same time, quality control for the translation.

3.2 Requirements of User Documentation

User documentation, including manuals, is a type of documentation that is specifically designed to work as a channel between a product and the user of the product. The writer of user documentation is simply an external mediator who attempts to convey the information between the user and the subject into an understandable form (Stratton 1996: 40-41). This is a difficult task for the writer as an understanding of the key concepts of the subject and how to write them into an understandable form should be clear. Also, the writer must know who the target audience is and understand the requirements of the target audience. Questions such as "how professional is the reader", "which country is the reader from", "what are the expectations of the reader" need to be clear to the writer before starting to create the document. Translating technical manuals have the same challenges, but the writer must not only have understanding of the source and target languages, but also of the technology the manual describes.

Technical documentation is a varied area of specified literature that includes technical blueprints, efficiency reports, simulation reports and technical manuals. Technical user documentation, such as manuals, guides and other documents which are directly connected to a technical product have generally similar requirements and expectations to that of non-technical user documentation: the content must be accurate, concise, easy to read and informative. While there are no official standards for the content in manuals,

the law does specify that all necessary safety- and health related information must be present in the manual of a product. (Suomen Laki 30.1.2004/75) This includes all installation-, maintenance- and use and storage related information. Beyond the health and safety questions, the regulations and recommendations are few, although according to the Finnish law, information conveyed to the customer must be presented in an understandable form (Laki kulutustavaroiden ja kuluttajapalvelusten turvallisuudesta 30.1.2004/75 5§). What this understandable form is in actuality can vary, but it is important that user documentation is acceptable and useful for the customer.

TCEurope and the European Union compiled in 2004 a list of recommendations for the content and features of user documentation called SecureDOC (2004) which has since been used as a basic guideline for creating manuals. According to SecureDOC, a manual must contain at least the following sections: product description; a separate security section; getting started; operation; troubleshooting; and a maintenance- and service section (SecureDOC 2004). With these the basic operation of the product should be made clear and for many products it is sufficient. However, it is recommended that more complex products also have sections for spare parts and accessories; packaging; transport and storage; and recycling and disposal (SecureDOC 2004). Technical manuals follow these same recommendations. While all manuals usually have terminology that is specific to the product, the main difference with technical manuals, compared to non-technical manuals, is that the terminology is often more specialized and presented in larger quantity. This is even more emphasized if the technical manual is designed for expert users. The SecureDOC (2004) guidelines thus suggest that all terminology used in a manual should be defined in a separate section and used clearly and consistently throughout the manual, especially if the documentation is a technical manual designed for non-experts.

3.3 Translating Technical Documentation and User Documentation

The practice of translating and translation studies go hand in hand with each other since as long as there has been translation, there has been the question “what is a good translation”. To answer this question, a large array of different kinds of theories has been developed over time. While these theories have a varying approach on solving this question, they all consider the same basic aspects: “Who”, “Why”, “What” and “How”. (Williams 2002: 16-17) The idea of “Who” is a two-fold question: the question of who translates is good to consider to both the side who wants to translate something and the side that is translating. However, it is even more important to think about who you are translating to. This has an added importance in technical documentation as the terminology changes depending on if the translation is aimed at professionals or non-professionals. Professionals, who are familiar with the specialized vocabulary, require that the document contain correct terminology to be acceptable. Non-experts, however, do not require specialized terminology and large quantities might even make a document confusing and unusable.

The questions “Why” and “What” are in technical translations well answered by Jody Byrne (2006: 11) with “to represent new technology to new audiences”. While this is a slightly ambiguous statement for a very large selection of literature in general, it dictates that technical translations, and thus technical documentation in general, have a very specific purpose and that the content of this literature is in fact more important than the written form itself. Annegret Zimmermann (2000) discusses this as well, by stating that technical translations are not done by simply changing the text from language to another, but it requires and contains:

1. complete understanding of the text (sometimes this is not as trivial as it sounds; it can include intensive research).
2. some terminology work (i.e. accumulating the correct German vocabulary).
3. checking the original text for inconsistencies, errors, etc (and of course informing the client so that the original might be corrected).

4. adapting the safety information for local regulations.
5. adapting the documentation to the German target group. (The training of laboratory personnel [my target group] differs quite distinctly even between the UK and Germany, both members of the EU. This includes adding or removing text. Of course, any changes are discussed with the client.)
6. if necessary, adding update information.
7. writing the German version in easy-to-understand German (or, put it like this: by using controlled language).
8. adapting the layout to the default German version used by the client.
(Zimmermann 2000)

While Zimmerman discusses about German translations, she points out that translating technical documentation is more about rewriting it into a new and acceptable form, instead of simply changing the language in the document. Considering these together, a conclusion can be made that translating technical documentation is equally about creating a new document, than simply translating a document.

The last question, “How”, is best stated by Mark Herman (1993: 11-21) with *Clarity, Concision and Correctness* where he claims that technical translations, along with all technical documentation, should follow clarity of concept, be as concise as possible and the technology and the language should be correct. He admits that concision might not always be possible, especially with technical translations, as usually employers dislike investing in editing a finished document, but he also adds that a concise document makes it easier to follow and understand the technology behind the text. Herman (1993: 11-21) emphasises the clarity and correctness of a translation to the point that if there is something wrong with the source text, either in the language or otherwise, the translator should rectify it if at all possible. Herman (1993: 11-21) finally makes a point that the text should be as easy to read and as easy to approach as possible, but also clear in the fashion that the document is not filled with difficult jargon that makes no sense to the reader. In technical translations, however, the amount of specialized vocabulary, or jargon, can be extensive, especially in highly professionalized documentation. Deciding

what an acceptable amount of terminology is and what kind of terminology is used in a technical translation can be difficult. Wrong usage of terminology can similarly have adverse effects to the quality of the translation.

Another important aspect of technical terminology is the consistency of use. This is important in non-expert user documentation, where the terminology might not be familiar to the reader. According to Henry Widowsson (1997: 16) using several types of terminology not only confuses the reader about the subject, but also reduces the acceptability and usability of a document. Widowsson (1997:16) also states that the consistent use of terminology is especially important in documentation designed to be helpful and informative and a sudden change in terminology reduces the information value. Using different terms for a single meaning might make a document confusing and difficult to follow, especially in documentation designed for non-experts. End-user documentation which is designed for non-professionals requires, or at least is recommended to have, a list of terminology used in the documentation. Creating a list of terminology in documentation for expert use might similarly be beneficial for the document, although experts are expected to know the terminology.

When translating specialized terminology, the greatest difficulty is finding the correct equivalent in the target language. While keeping the text clear and concise is important, it is equally important to keep the terminology correct. Faulty terminology not only breaks the flow of the text, but it also makes the text unacceptable for professionals who have high standards and expect correct use of terminology. To achieve acceptable results, it might be necessary to modify the terminology, as terminology does not always translate well between languages. This is especially a problem with new technology which does not have standardized terminology in either the source language or the target language. Radegundis Stolze (1999: 38) states that terminology does not always mean the same thing in other languages. She states that two different terms in different languages can

- a) mean the same thing

- b) term A can be wider than B, although B contains all the aspects of A
- c) term A or term B can be completely absent from the other language
- d) terms A and B are only partly equivalent, with both or only the other having aspects and meaning the other is lacking completely or is only partly present

As accuracy of the technical details is the most important aspect of technical documentation, the importance of correct terminology and correctly translated terminology is something that needs to be considered carefully. Especially if the document is designed for high level professionals, it requires special accuracy and correctness in the use of terminology.

The relationship between technical translation and technical communication is close, as the tasks, goals and requirements of technical translation and communication are similar. According to Byrne (2006: 17) the difference between technical translation and technical communication is only minor, especially when a technical translator is expected to understand the subject well enough to find technical flaws in the source material. Suojanen (2003: 159) similarly points out that both technical communicators and translator have to use the cultural background, established norms and established style to create an acceptable document, although, they use it differently. She also adds that both technical communicators and translators have to use a varying set of extra material to achieve their goal. While there are similarities between a technical translator and a technical communicator, the task itself is still different. Thus it is unfounded to demand translational skills from a technical communicator and vice versa, although, it is beneficial for a technical translator to possess technical communication skills as they notably help the understanding of the subject at hand.

The key difference between a translator and a technical translator is the relationship between a non-technical text and the translator, and the relationship between a technical translator and the technical document being translated. For example, a translator of a novel has no chances to affect the source text being translated, while a technical translator has and is expected to review the source text. Byrne (2006:17) points out that

this is not only expected from a technical translator, it is almost required, as the translator works as a last line of defence towards factual errors in the document. There is a negative side to this as well, as while technical communicators usually have a greater access to the object or product at hand, technical translators usually have it to a lesser degree and might be subjugated to the knowledge given from external sources and the source being translated. (Byrne 2006, 17).

While there are differences, technical translations are much like any other translation, generally technical translations have a more specific audience, with higher expectations. While technical documentation contains a wide area of different types of documentation, usually the type of documentation discloses the purpose: user documentation is designed to be clearer, while reports and similar documentation for professionals are much more technical and can contain more terminology. This technicality of language is also the largest difference a technical translation has to a non-technical translation. The language in technical translations is demanding and is most likely not encountered anywhere else but in the translated document and in other similar documentation (Yli-Jokipii 2004: 85) Overall, technical translations can be argued to be more demanding than regular translations, but on the other hand, they are much more restricted and regulated by necessity. In technical translations there is very little room for artistic writing style or experimentation as accuracy and correctness of the document are the most important aspects of the document.

3.4 Translation Specific Aspects

The largest difference between Nielsen's list of usability aspects and Gouadec's list of successful translation is Translator's loyalty. While this has very little to do with discovering the usability of a document, it is relevant for translators themselves and to the company employing them. Gouadec (2010: 8) discusses many different factors that affect the translation and employer relationship. These include the importance of compatibleness of the translation as per the best interests of the company; cultural

contexts which must be correct in the translation so no misunderstandings follow; the company's value system must be taken into account so the translation is not outright rejected; the purpose of the translation must be achieved correctly according to the company's requirements; the rhetorical, stylistic and language stereotypes of the company must be considered for the translation to be acceptable and not to be considered alien or unacceptable and finally, the translator must produce a cost-effective and efficient translation for the company's use (Gouadec 2010: 8).

These aspects are especially important for the translator himself and to his work and they are important to the overall value of the translation to the company. However, they do not affect the Usability of a document directly and many of these translation task specific aspects could be considered to be a part of the Compliancy of a document as they fulfill the external factor described in the Compliancy section. These translation specific aspects are difficult to implement or discover as the actual cost specific details are completely unknown and, eventually, irrelevant for the study. Thus I shall not implement them to be a part of the study and any areas that might affect these translation specific aspects, I shall consider to be a part of Compliancy.

4 RESULTS OF HEURISTIC EVALUATION

The aim of this thesis is to evaluate Usability in a draft of a translated manual from English into Finnish. My hypothesis is that because the material, a translated manual, is in an early draft phase, there are several lower level errors that affect Usability to be found throughout the material, ranging from 0 to 2, while the higher level errors, serious level 3 and catastrophic errors level 4, are only presented in a few cases or not at all. The method of the analysis is the heuristic evaluation, with Jakob Nielsen's (1993) categorizes of usability combined with Daniel Gouadec's (2010) categorization of translation quality used as a rules list. All problems discovered will be then evaluated with the five tier evaluation scale. I shall also make direct observations of important aspects of the manual, including layout, and written style.

4.1 Results of the Heuristic Evaluation

The following section presents the report of the heuristic analysis of the material as seen in Table 1. The report presents the outline of the problems, short explanation of the problems, error types, severity value and the location of the problem. The results of a heuristic evaluation are usually presented in a table and are accompanied by a written report that explains the general findings of the evaluator.

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
Warning-Electricity	Non-translated text	Accuracy	4	p. 8
Warning-Electricity	Non-translated text	Accuracy	4	p. 9
..mitä järjestelmä voi sisältää..	Vague	Meaningful	2	p. 10
..avaamista, jotta vältetään nesteen läikkyminen.	Bad written form	Ergonomic	1	p. 10
... on voimaa. Paineilmajärjestelmän paine on korkea.	Bad written form	Ergonomic	0	p. 10
Jotta vältetään henkilövahingot, laitoksessa..	Bad written form	Ergonomic	1	p. 10

...sisältää laitoksen sekä apulaitteistojen käyttöpanelit...	Missing punctuation mark	Meaningful	1	p.12
Moottorin parametreja seurataan.	Vague	Meaningful	2	p.19
Säädin aloittaa polttoöljyn syötön...	Vague	Meaningful	1	p. 19
..sisäisissä voiteluöljypiireissä, kun moottori alkaa pyöriä.	Bad written form	Ergonomic	1	p. 21
Pinnan taso (p.21) <-> pinnantaso (p.19)	Terminology inconsistency	Accuracy	1	p. 19, 21
automaattisesti, kun moottori on käynnistynyt.	Bad written form	Ergonomic	1	p. 21
"Käynnistys" & "Käyttö" -paragraphs p.21	Odd written form	Ergonomic	0	p. 21
"Käynnistys" & "Käyttö" -paragraphs p.21	Phasing problem	Meaningful	1	p.21
"Käynnistys" & "Käyttö" -paragraphs p.25	Paragraph repeated	Compliance	0	p. 25
...korkealämpöveden esilämmitin ja pumppu...	Missing punctuation mark	Meaningful	1	p.28
...vettä jäähdytyspiireissä, kun moottorin nopeus kiihtyy.	Bad written form	Ergonomic	1	p. 28
LT-esilämmitin <-> matalalämpövesijärjestelmä	Term incons. in paragraph	Accuracy	2	p. 28
Painetta imuilmasuodattimen yli seurataan.	Vague	Meaningful	2	p. 31
"Käynnistys" & "Käyttö" -paragraphs p.31	Paragraph repeated	Compliance	1	p. 31
Valmiustila kesällä, ulkoilma... (Larger font only subheading)	Vague subheading marker	Acces./Compl.	2	Several
Rinnakkaiskäyttö (Bolded subheading)	Incons. use of subh. Marker	Accur./Compl.	2	Several
HT esilämmityksen, LT esilämmityksen	Terminology inconsistency	Accuracy	2	p. 51
DC, MV, LV <-> rest of the manual	Overall term. Incons.	Accuracy	2	Several
Use of bolded safety steps	Layout inconsist.	Acces./Compl.	1	Several
Älä käytä pumppua kuivana, jotta se ei vahingoitu.	Bad written form	Ergonomic	0	p. 68
pienellä viipeellä	Word error	Meaningful	1	p. 76
Katso kohta osa x.x.x	Bad written form	Meaningful	1	Several
täyttö- ja ilmausohjetta <-> Katso kohta osa 7.6.1	Missing chapter refer.	Accessibility	2	p. 88
syöttö katkaistaan Yksikköjen virransyöttö	Missing punct.mark	Meaningful	1	p. 95
Toimet pysäytettäessä kone huoltoa varten määräytyvät	Bad written form	Ergonomic	1	p. 97
täyttö-öljymäärien	Word error	Meaningful	1	p. 99
Jotta voidaan varmistaa paineilmajärjestelmän...	Bad written form	Ergonomic	1	p. 100
polttoaineenlähde	Word error	Meaningful	1	p. 103
, jotta voidaan varmistaa niiden toiminta tulipalontilanteessa.	Bad written form	Ergonomic	1	p. 109
Hot boxien	Terminology inconsistency	Accuracy	1	p. 111

Table 1. Results of the heuristic evaluation in a report form

The report shows that the most numerous errors are found in Memorability – Meaningfulness, error type category and Efficiency of Use – Effective and Ergonomic, with 12 and 11 errors respectively. The rest of the categories have fewer issues in them, Learnability – Accessibility only three errors, Few and Noncatastrophic Errors - Accuracy eight errors and Subjective Satisfaction – Compliancy two errors, although, there are three more errors that overlap with Compliancy. It should be noted that some of these errors could be found in several locations, but only one instance has been added to the report. This one instance is enough to note the problem in the manual and mark it for correction. The ratings given for the errors are subjective as there were no other evaluators.

This error occurrence division is what can be expected to be found in a manual, since Meaningful and Ergonomy deal with textual factors and confusing or vague sentences, terminology or written forms, they would also be the ones with most problems. The most common error type present in the manual were cases of badly written text that broke the fluency of the text, including problems with interference, where English writing practices get mixed with Finnish writing practices. Also, there were some cases of vague writing, where the eventual message was lost or ambiguous. On Accuracy, there were only a few more notable inconsistencies, although the most severe error in the manual was found in this category. The Compliancy of the manual was mostly well upheld, with only a few inconsistencies including the repetition of a paragraph. The last error type category, Accessibility was good and effective throughout the manual.

While the amount of errors present was in total only 37, excluding the repeated problems of some in some cases, more errors are certainly present as the focus of the analysis was in how well the message was relayed to the reader. Terminology and writing related issues were not investigated as small typing errors are usually not a major problem for the usability and understandability of a manual. (Suojanen 2012:

111) Also, severe typing errors distort the intended message and thus lead to a more severe error type altogether. In terminology I concentrated more on inconsistencies than on the terminology itself. It is important that the terminology is used concisely, than if the terminology is in its standardized form.

The following sections discuss each error type separately in further detail. Such factors as what kinds of errors were found in the category, why it is an error and what explains to the severity of the error are specifically discussed and explained in detail.

4.2 Learnability – Accessibility

In this section I will present the theoretical factors relating to Learnability and Accessibility, henceforth Accessibility, and analyze them in the material. Accessibility is analyzed in this thesis first due to Nielsen (1993: 26) stating the starting point of Usability is Learnability as a computer system should be easy to learn, so the user can start working with it as soon as possible. Learnability as such does not describe or function well with documentation, although a document can be learned and memorized, it cannot be learned similarly to computer software due to interactivity constraints. However, you can learn how to use a product through user documentation and thus Learnability in documentation would be the ease of understanding a document, the ease of reading and the content in the documentation should be easy to find. . Gouadec (2010: 7) uses the term Accessibility in his aspects of translation quality factors. While Learnability and Accessibility are different in their terminological meaning, Gouadec does describe Accessibility being the ease of understanding which makes the document more easy to use in the way of form and non-textual factors.

Accessibility thus specifically concentrates on external factors and information design of the manual, including layout, visual effects, use of pictures, placement of text, placement of important information but it also studies the interactivity of the text or how easy it is to find information in a text. Thus problems that would affect Accessibility would be for instance a confusing layout that makes reading difficult,

pictures or color formats that are un-instructive or problems in the indices. Unnecessary use of pictures would be considered a problem, since while pictures can explain abstract ideas efficiently they might take the focus away from the text itself. As a conclusion, anything that affects external factors of the manual are considered problems in Learnability – Accessibility, e.g. an index with incorrect page number

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
täyttö- ja ilmausohjetta <-> Katso kohta <i>osa 7.6.1</i>	Missing chapter refer.	Accessibility	2	p. 88
Valmiustila kesällä, ulkoilma... (Larger font only subheading)	Vague subheading marker	Acces./Compl.	2	Several
Use of bolded safety steps	Layout inconsist.	Acces./Compl.	1	Several

Table 2. Results of Learnability - Accessibility

While considered important and central by Nielsen, in the material, there was only one notable problem that would affect Accessibility and two that partly overlapped with the Compliancy of the text. The only problem directly connected to Accessibility was a missing chapter reference, found on page 88, which is pointing to an earlier chapter. Normally, when pointing to another chapter in the manual, it had the marking “See section part x.x.x” (Katso kohta *osa x.x.x*) but in this instance, the reference to the earlier chapter is missing. In the severity ranking, this would represent a level 2 error. While this is only a minor index reference problem, important navigation information is missing. Also as this navigation information is normally used throughout the rest of the manual, it is also against the established standards of the manual.

The two other problems concerning Accessibility partly overlap with Compliancy. Both of the problems are related to subheading style. The first of the problems refers to the visibility of the subheading as the subheadings were simply texts with larger font. An example of this type of subheading can be found in section 5.2.1.3 of the manual. This is vague and inaccurate use subheading style to mark a subchapter and I would suggest making the subheadings more noticeable to make the division more clear to improve

clarity for instance by bolding subheadings. As this problem was seen in several places, this problem is ranked as 2.

The second problem concerning the subheadings is the use of bolded subheadings which were thus different from the other subheadings. For example, the entire chapter 7 has bolded subheadings, not only a larger font that is present elsewhere. This problem is an inconsistency in the use of established standards but it is also an inconsistency in the use of the layout compared to the non-bolded subheadings mentioned above. Thus it affects both Complyancy and Accuracy and ranks as a 2nd level problem. Only one of the styles, bolded subheadings or larger font subheadings, should be used as the use of subheadings need to be unanimous throughout the manual.

Overall, Accessibility was an exceptionally positive aspect in the manual. Much of the layout was designed to be used easily and effectively and as per the terms of usability, the external factors were excellent. Of course, there were some problems in this as well, but they were rather minor. As a large corporation with much history, this type of effective layout design is expected, especially since Wärtsilä deals with potentially dangerous technology. Thus there is a special need for efficient information design that furthers the use of their products.

4.3 Efficiency of Use – Effective and Ergonomic

In the following section I will discuss the theoretical background relating to Efficiency of Use – Effective and Ergonomic, henceforth Ergonomy, and analyze the material according to these factors. Ergonomy is the second major aspect of Usability. Nielsen (1993: 26) states that the use of a computer system must be as productive as possible, after the user has learned to use it efficiently. While similar in context and form, user documentation efficiency is different from user interface efficiency. For a manual to be efficient, the information desired should be easy to find, easy to read and should not be in a complicated form. Gouadec (2010: 7) uses similarly this same measurement to describe translations, although he calls Efficiency of Use as Effective and Ergonomic.

This means that effectiveness and ergonomics is measured with how the message of the document is relayed to the reader along with how the document fulfills its intended purpose. In the case of user documentation, how the manual relays information about a product.

All kinds of aspects that make the text more difficult to read, including strange or erroneously written sentences, typing errors and other text relating factors are considered problems relating to Ergonomics. All errors relating to the text itself, which do not affect the understandability of the text or the accuracy of the message, are considered Ergonomics related problems. However, effectiveness and ergonomics is related to the target audience in what kind of requirements they have from the document: user documentation should be easier to read with less terminology and professional document should be more complex with more terminology. Although difficult to measure, an ergonomic document should have easy sentence structures and written form while still retaining an acceptable amount of specialized terminology for the target audience, while also fulfilling any standards and requirements, including linguistic requirements and company standards.

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
..avaamista, jotta vältetään nesteen läikkyminen.	Bad written form	Ergonomic	1	p. 10
... on voimaa. Paineilmajärjestelmän paine on korkea.	Bad written form	Ergonomic	0	p. 10
Jotta vältetään henkilövahingot, laitoksessa..	Bad written form	Ergonomic	1	p. 10
..sisäisissä voiteluöljypiireissä, kun moottori alkaa pyöriä.	Bad written form	Ergonomic	1	p. 21
automaattisesti, kun moottori on käynnistynyt.	Bad written form	Ergonomic	1	p. 21
"Käynnistys" & "Käyttö" -paragraphs p.21	Odd written form	Ergonomic	0	p. 21
...vettä jäähdytyspiireissä, kun moottorin nopeus kiihtyy.	Bad written form	Ergonomic	1	p. 28
Älä käytä pumppua kuivana, jotta se ei vahingoitu.	Bad written form	Ergonomic	0	p. 68
Toimet pysäytettäessä kone huoltoon varten määrättyvät	Bad written form	Ergonomic	1	p. 97
Jotta voidaan varmistaa paineilmajärjestelmän...	Bad written form	Ergonomic	1	p. 100

, jotta voidaan varmistaa niiden toiminta tulipalontilanteessa.	Bad written form	Ergonomic	1	p. 109
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Table 3. Results of Efficiency if Use – Effective and Ergonomic

This error category had more problems in the manual. This is somewhat expectable as the translation is an early draft and thus translation related difficulties, such as language not translating well between languages, are present. Most of the problems found in this category are badly written sentences. These sentences are not confusing the information relayed to the reader, but are otherwise awkwardly written and break the readability of the text. These include errors such as “Jotta vältetään henkilövahingot, laitoksessa työskenneltäessä on käytettävä suojavaatteita. / To avoid personnel damage, protective clothing must be worn in the facility” (Wärtsilä 2012, 12) and ”Moottorikäyttöiset korkea- ja matalalämpöiset jäähdytysvesipumput alkavat kierrättää vettä jäähdytyspiireissä, kun moottorin nopeus kiihtyy. / Engine-powered high- and low temperature cooling pumps start to cycle water when the engines accelerates” (Wärtsilä 2012, 28). Most of the ergonomic errors present in the manual are very similar to these two. The problem with these sentences is that they are constructed inadequately and express interference between English and Finnish. While they are understandable and readable, they break the flow of the text and as such create rank 1 cosmetic usability errors.

There are several of these rank 1 errors throughout the manual and while they are not alone a notable problem, they are so numerous that they in fact express a greater problem as a whole to the manual. While the manual is generally exceptionally well written, with sufficient, relatively simple and well flowing text, there are several sections that are written with unnecessarily complex or incorrect structure. There is also another problem present in the manual where large sections of the language in the text is “clogged”, where the text has a short sentence after another. In English this is acceptable, even recommended, but in Finnish it is recommended to combine sentences together to create larger wholes. An example would be “ Pidä mielessä, että paineilmassa on voimaa. Paineilmajärjestelmän paine on hyvin korkea. / Keep in mind

the power of pneumatic air. The pneumatic pressure is very high” (Wärtsilä 2012, 12) these two sentences could be combined into a single, more readable sentence. While this is also a minor issue on its own and would rank as a 0, the problem is so common that it represents a greater problem for the manual as a whole.

Overall, most of the text was ergonomic with well written forms with relatively short sentence structure. Unfortunately, there is an issue with consistency in general, as while most sections are well written, some sections are not. This inconsistency could perhaps best be explained with several translators working in different sections, eventually creating an unbalanced result. This is somewhat expectable in an early translation draft, but as this analysis is specifically created to analyze the manual as it is, in its current unfinished state, it is good to mention this inconsistency now, so it can be addressed in further versions.

4.4 Memorability – Meaningfulness

The third section I will present in this thesis is Memorability – Meaningfulness, henceforth Meaningful. Meaningful is the second part of textual factors that concentrates on the understandability of the text. Nielsen (1993: 26) describes Memorability with a situation where an irregular user returns to use a program, after some time not using it, and he does not need to learn everything again. User documentation is designed to help the use of a product and the different phases describing the operation. The user documentation supporting the product can be considered equally memorable if it after a long time helps memorize the use of the product. Gouadec (2010: 6-7) discusses about Meaningfulness much in the same way as Nielsen discusses Memorability: Gouadec argues that it is more important for a text to be meaningful, instead of memorable, because a document or translation must be meaningful for the target audience, even if the concept varies.

While these two concepts are not mutually exclusive or inclusive in documentation, a document can be either meaningful, memorable or both. Unfortunately, both of these

concepts are difficult to measure accurately, as both memorability and meaningfulness is very subjective. A document can be very easy to read and memorize for one person and completely incomprehensible to another. Thus measuring Meaningfulness is difficult but as a general rule, when the text is clear, concise and accurate in its message, the text is as Meaningful as possible. Meaningfulness is measured in this thesis by pointing out any words or sentences with vague information and erroneous written forms that are confusing to the user.

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
...sisältää laitoksen sekä apulaitteistojen käyttöpaneelit...	Missing punctuation mark	Meaningful	1	p.12
Moottorin parametreja seurataan.	Vague	Meaningful	2	p.19
Säädin aloittaa polttoöljyn syötön...	Vague	Meaningful	1	p. 19
..mitä järjestelmä voi sisältää..	Vague	Meaningful	2	p. 10
"Käynnistys" & "Käyttö" -paragraphs p.21	Phasing problem	Meaningful	1	p.21
...korkealämpöveden esilämmitin ja pumppu...	Missing punctuation mark	Meaningful	1	p.28
Painetta imuilmasuodattimen yli seurataan.	Vague	Meaningful	2	p. 31
pienellä viipeellä	Word error	Meaningful	1	p. 76
Katso kohta osa x.x.x	Bad written form	Meaningful	1	Several
syöttö katkaistaan Yksikköjen virransyöttö	Missing punct.mark	Meaningful	1	p. 95
täyttö-öljymäärien	Word error	Meaningful	1	p. 99

Table 4. Results of Memorability - Meaningfulness

As table 4 above displays, this category had the most problems in the manual, although most of the problems were minor. Much like the Efficiency of Use – Effective and Ergonomic category is similarly expected to have slightly more errors. This is due to the early stage of the translation as even a small error in the translation can change the entire meaning of a sentence. A good example of this can be found in the manual with “Valvontahuone sisältää laitoksen sekä apulaitteistojen käyttöpaneelit ja sähkökaapit. / The control room contains the facility’s and auxiliary equipment’s control panels and electrical boxes” (Wärtsilä 2012, 12). A comma is missing from the sentence. The correct form would be: ”Valvontahuone sisältää laitoksen, sekä apulaitteistojen

käyttöpaneelit ja sähkökaapit / The control room contains the facility's and auxiliary equipment's control panels and electrical boxes". Note that the English back-translated version does not have this issue as it is related to Finnish writing standards. This is a minor error, only ranking as level 1, but it makes the sentence slightly confusing and thus affects the readability. The example does also show how a small punctuation marker can make a difference in understandability.

Other situations where a missing punctuation mark made a sentence less understandable were found in two other instances, although with more accurate proofreading, more might be found. The first of these two other instances was: "Kun moottori käynnistetään, korkealämpöveden esilämmitin ja pumppu pysähtyvät. / When the engine is started, high-temperature water pre-heater and pump stops" (Wärtsilä 2012, 28) This is exactly the same issue than the one mentioned earlier, with the comma missing, although this error is due to interference from English to Finnish. The second error was: "Polttoaineen ja paineilman syöttö katkaistaan Yksikköjen virransyöttö katkaistaan ja yksiköt irrotetaan ohjausjärjestelmästä. / Fuel and pneumatic feeds are cut The power feed of the units is cut and the units are removed from the control system" (Wärtsilä 2012, 95) In this case the sentence is missing a full stop. Both of these errors are ranked as level 1 and are not particularly serious, although they do affect the understandability of the sentences and affect readability as well.

Another similar type of Meaningfulness error present was erroneously written words or word forms. There was three to be found. The least problematic of these errors was "pienellä viipeellä / slight telay" (Wärtsilä 2012, 76) which is a simple misspelled word. The second two were "täyttö-öljymäärien / oil fil levels" and "polttoaineenlähde / fuelsource" (Wärtsilä 2012, 99-103) which are wrongly written words. Both of these are wrongly combined Finnish words, as they should be "täyttö-öljyn määrien / levels of fil oil" and "polttoaineen lähde / fuel source" respectively. Again, these are minor problems and were not found in large numbers. Overall, both of these errors with false word forms and missing punctuation marks did not create any notable patterns. There were a few present, but they were not found in any alarming numbers.

Another completely different type of Meaningfulness error found in the manual was the vagueness of some written forms. This problem was somewhat more severe as they could be found throughout the manual with varying severity. Some of these problems were minor, where the writing simply left the instructions ambiguous, including “Säädin aloittaa polttoöljyn syötön moottoriin moottorin kuorman mukaan. / The controller begins the fuel feed into the engine according to the engine’s load” (Wärtsilä 2012, 19) which ranks as a level 1 error. The sentence is understandable but it is left ambiguous if the control switch begins feeding oil into the engine or if it adjusts the feeding of the oil. There were other similar, but more severe problems as well, including a level 2 problem in a safety instruction: “Selvitä ennen prosessilaitteiden purkamista tai avaamista, mitä järjestelmä voi sisältää / Find out before disassembling or opening process equipment what they might contain” (Wärtsilä 2012, 12) This refers to machinery disassembly and it states that before opening the machinery, whoever is doing the disassembly, should figure out what the machinery *might* contain. I would argue that there should be exact knowledge of what is contained in the machinery to avoid injuries and accidents. I ranked this to be a level 2 problem, although it could be a level 3 problem as well.

There were also two other level 2 problems present in the manual and both of them were present twice in different instances. These problems were “Moottorin parametrejä seurataan. / The engine’s parameters are followed.” (Wärtsilä 2012, 19) and “Painetta imuilmasuodattimen yli seurataan. / Pressure over the suction air filter is monitored.” (Wärtsilä 2012, 31) Both of the errors were found twice in the same page in different paragraphs. The error in these statements is that engine parameters and pressure is monitored, but this is left unnecessarily vague, especially with the word “seurataan/followed or monitored”. This could mean a number of things including the parameters are monitored somewhere else, are monitored by somebody somewhere or monitored by the user. As the choice of word “seurataan” is rather unfitting here as it could be understood as “followed” as well. This is not a severe usability error, but it is more than a simple cosmetic error and thus should be corrected with a more decisive form or word.

The last single type of problem affecting the Meaningfulness category is a full paragraph found in page 21 of the manual which details the startup of the engine.

Moottorikäyttöinen voiteluöljypumppu aloittaa paineen kasvattamisen sisäisissä voiteluöljypiireissä, kun moottori alkaa pyöriä. Automaattisuodatin ja keskipakosuodatin kasvattavat pyörimisnopeuttaan moottorin nopeuden suhteen.

Termostaattiohjattu termomekaaninen kolmitieventtiili alkaa ohjata voiteluöljyn lämpötilaa itsenäisesti.

Kampikammion tuuletus alkaa. Öljysumun pisaroitin alkaa puhdistaa tuuletuskaasuja.

Esivoitelupumppu pysähtyy automaattisesti, kun moottori on käynnistynyt. (Wärtsilä 2012, 21) /

Engine-operated lubricant pump begins the pressure buildup in internal lubricant circuits, when the engine starts spinning. The automatic filter and the centrifugal filter increase their rotation speed according to the engines speed.

The thermostat controlled thermo-mechanic triple way valve begins to direct temperature of the lubricant oil autonomously.

The crank chamber ventilation begins. Oil mist mister begins to purify the ventilation gases.

Pre-lubrication pump stops automatically, when the engine has started.

First of all, this section has a minor, rank 0 Ergonomy problem along with the problem related to Meaningfulness. The entire paragraph is written in a in a complex and vague form, although it is correct and understandable. The problem in Meaningfulness is here related to the form this paragraph is constructed, as it describes how the engine powers up in phases. These phases are difficult to discern from the rest of the text and are left vague, even confusing. This error is minor, a rank 1, but the paragraph should be re-ordered and clarified.

Overall, the Meaningfulness of the manual was acceptable. There were several types of errors present in different levels of severity, but as a whole they did not present a significant problem for the manual. Most of the vague writing could be described as an oversight from the translator's part and even if they do affect the usability, the eventual impact of them is minor. Similarly, the erroneous word forms and punctuation mark errors were rather few and low in impact. It should also be mentioned that in a manual of 130 pages long, there is bound to be a few typing errors.

4.5 Few and Noncatastrophic Errors – Accuracy

This section discusses the theoretical background of Few and Noncatastrophic Errors – Accuracy, henceforth Accuracy, and present the findings in the material. Accuracy mainly deals with the consistency and use of terminology, layout and form. Nielsen (1993: 26) describes his concept of few and non-catastrophic errors by stating that a program should have a “level of errors” which does not affect the user’s performance with the program. In computer programs, this means, that if an error occurs, it does not affect the use of the program; a catastrophic error that interferes or ends the use of the program does not occur. Gouadec (2010: 6-8) describes errors in documentation and translation in a similar fashion, although he calls it Accuracy and concentrates more on consistency. Gouadec (201:6-8) adds that perfect Accuracy is impossible in translations; a “zero-defect” can never be achieved as all concepts do not translate perfectly between languages.

In documentation, Accuracy deals with the inconsistencies found in the text and the correct use of terminology. There should not be aspects, or errors, that either affects the usability of the document negatively or the product the document describes. Signs, symbols and text should be correct and used concisely, accurately and consistently. Factual, technologic and semantic subjects of a translation are especially important to keep as correct as possible. While this section is perhaps the most straightforward to assess and investigate, it is difficult to discover technical inaccuracies in technical documentation. Inaccurate and incorrect use of terminology and inaccurate sentences are however easier to find. Finally, this category also contains other factors that affect the accurate relaying of information, such as an un-translated section of text.

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
Warning-Electricity	Non-translated text	Accuracy	4	p. 8
Warning-Electricity	Non-translated text	Accuracy	4	p. 9
Pinnan taso (p.21) <-> pinnantaso (p.19)	Terminology inconsistency	Accuracy	1	p. 19, 21
LT-esilämmitin <->	Term incons. in	Accuracy	2	p. 28

matalalämpövesijärjestelmä	paragraph			
HT esilämmityksen, LT esilämmityksen	Terminology inconsistency	Accuracy	2	p. 51
DC, MV, LV <-> rest of the manual	Overall term. Incons.	Accuracy	2	Several
Hot boxien	Terminology inconsistency	Accuracy	1	p. 111
Rinnakkaiskäyttö (Bolded subheading)	Incons. use of subh. Marker	Accur./Compl.	2	Several

Table 5. Results of Few and Noncatastrophic Errors – Accuracy

This category did not have many errors in it, as mostly the terminology was used consistently and effectively in the manual, but unfortunately this category contained the most severe errors as well. The first accuracy related issue in the manual was minor, as the word “pinnantaso / level of the surface” was used inaccurately with “pinnan taso / surface level”. This only ranks as a level 1 error that requires only a cosmetic change. The reason for this error is that the English source word “surface level” can be translated into Finnish in two ways and both “pinnantaso / level of the surface” and “pinnan taso / surface level” are technically correct forms to be used, but only one should be used due to consistency.

Another similar inconsistency was found later in the manual, although it relates to the consistent use of terminology. The word “matalalämpövesijärjestelmä / low temperature water system” is used along with “LT-esilämmitin / LT pre-heater”, in the same paragraph. LT refers to the words Low Temperature or in Finnish “matalalämpö”. While LT is a very common term in power technology and is often used to represent the term “Low temperature”, the problem here is the consistent use of the term. Similarly to the earlier error example, only the abbreviation or the unabbreviated version of the word should be used. Also, as the abbreviation and the unabbreviated version were used in the same paragraph, this error ranks as a level 2 error as it is much more confusing to mix terminology in the same paragraph. This also looks unprofessional. This same inconsistent use of terminology was found later on as well, with HT, or High Temperature.

Much in correlation with the previous abbreviation inconsistency, there was another inconsistency that affected a much larger area of the manual. The problem was found in the abbreviated terminology DC (Direct Current), MV (Medium Voltage), LV (Low Voltage) and a few other similar extremely basic abbreviated terminologies in power technology. These terms are so common and basic inside power technology that they are not required to be explained as such and are expected to be understood by the reader. The problem they express is twofold. First of all, these terms are used inconsistently as they are combined with other words in their abbreviated form, such as “MV-väylä / MV-lane”, but are also used in their unabbreviated form, i.e. “keskijännitekisko / medium voltage rail”. The second problem is related to the general use of abbreviations throughout the manual, as most of the terminology used in the manual is unabbreviated. Thus, terminology used in their abbreviated form contrasts to the rest of the terminology in the manual, even if the use of this basic abbreviated terminology is completely acceptable. This error is ranked as level 1 as it is more of cosmetic error than anything severe that would affect the understandability or readability, but a consistent whole should be created where either only abbreviated terminology or unabbreviated terminology is used.

Finally, there was one more error to be found in the manual, and incidentally, the first and worst error to be found. This error was not about the inconsistent use of terminology, but inconsistent use of language as one of the safety information boxes had an un-translated heading. Apparently this error is in the template of the manual, as there are two instances where the safety box “Warning – Electricity” is found and both of them have their title un-translated, while the text inside is translated. While this is most likely an oversight from the translator’s part, I would argue that this is an extremely severe, level 4 catastrophic error that disqualifies the translated draft from being published in this form. The reason for this is that the problem is found in a critical safety information box, specifically the safety information box that informs of life-threatening electricity. This information must be accurate and correct for it to be safe. While the danger it expresses is most likely understood by anyone looking at the warning and the text under the title is translated, this type of error should not be present

in a publication of this level and importance, especially as the information points to a potentially life-threatening warning. It is possible that the text is left on purpose untranslated to “Warning – Electricity”, but I would argue that this type of information must be translated for maximum understandability, visibility and clarity. Thus, this version of the translated draft should not be published. The original source does not obviously have this problem as it is intended to be in English, so as such it is not a fatal error for the manual itself, only this draft version of the translation.

Overall, despite the level 4 error in the safety information box, the Accuracy of the manual was good. There were only a few cases where the terminology was inconsistent and even then the errors were minor. Also, the error with the use of abbreviated terminology, DC, MV, LT etc., is minor, since the terminology is acceptable. Otherwise the terminology was used effectively and consistently which is especially important in a handbook styled manual that needs to be clear and easy to read.

4.6 Subjective Satisfaction – Compliancy

The last section to be discussed in this thesis is Subjective Satisfaction – Compliancy, henceforth Compliancy. According to Nielsen’s (1993: 26) Subjective satisfaction in a computer system is that the system must be pleasant to use and the users must be subjectively satisfied about the system when using it. Measuring subjective satisfaction is problematic, since what is acceptable for some, might be unacceptable to others and thus subjective satisfaction is connected to the whole outcome of the system. Gouadec (2010: 6-8) takes a different type of approach to subjective satisfaction as he instead takes into account the translated text’s Compliancy toward the company that requested the translation. He explains that a text is compliant when:

- target communities’ linguistic and cultural standards and usages

- rules and regulations: the objects, devices or processes referred to in the translation may for instance be subject to specific national laws or regulations, which the translator must take into account,
 - official standards concerning terminology or technicalities,
 - physical limitations: the number of characters may be limited, for instance.
 - functional constraints: a translated Web site must, for instance, remain accessible, all the links must be active and the site must be easy to navigate.
- (Gouadec 2010: 7)

In other words, aspects that affect compliancy are established norms of writing for the target culture or audience. While different from Nielsen's idea of Subjective Satisfaction, Compliancy does measure the satisfaction of the eventual results, although, from a completely different viewpoint: Subjective Satisfaction measures the user's acceptability of the results while Compliancy measures the task provider's acceptability toward the results.

This category is twofold, as Compliancy mainly deals with external aspects of the manual including compliancy towards company norms, traditions and regulation and official standards of terminology and technology. Compliancy assess if the manual is acceptable for the company and its intended users. Subjective satisfaction on the other hand concentrates more on the user's satisfaction toward the manual and cannot be easily assessed or simply seen as a single error in the manual, but is more of an overall feeling based on the results and effectiveness of the manual. Thus, Compliancy assesses satisfaction, but it measures it in correlation of the linguistic satisfaction measurements the target audience has as well as the quality requirements of the company.

Error text	Type	Error type (5 categories)	Severity (0-4)	Location
"Käynnistys" & "Käyttö" -paragraphs p.25	Paragraph repeated	Compliancy	0	p. 25
"Käynnistys" & "Käyttö" -paragraphs p.31	Paragraph repeated	Compliancy	1	p. 31

Table 6. Results of Subjective Satisfaction - Compliancy

As Table 6 above shows, most of the errors in this section were minor and few. Overall, the manual is well made according to Wärtsilä's own norms and regulations. There were a few situations where there was some ambiguity, including the use of subheadings that partly overlapped with Accessibility (discussed in Chapter 4.2.1). There only problem that affected Compiancy alone was a few paragraphs that were content-wise entirely identical to each other and had only different headings, "Käynnistys / Startup" and "Käyttö / Operation". These paragraphs could be combined or otherwise made more efficient in the manual. Also, there were several empty pages throughout the manual that could be omitted. Otherwise, there was little to mention in correlation with Compiancy. This is not surprising, as a company like Wärtsilä has long standing regulations and guidelines that note the use of writing and thus there is rarely any need or chance to deviate from the regulations, although, some inconsistencies are bound to occur.

In terms of Subjective Satisfaction, I would argue that the manual is not satisfactory. While the manual is easy and pleasant to use with a remarkably well thought and executed layout and index system, assisting the interactivity of the manual, with acceptable terminology and content, the manuals biggest drawback is in its unstable translation work. While most of the text is well thought, easy to read even with the multitude of terminology, there are large sections that are badly written, with strange, clogged sentence structures and slightly deviating use of terminology. This problem was noted in the Efficiency of Use – Effective and Ergonomic section of the analysis and it perhaps the worst problem the manual has. The level 4 catastrophic error in the electrical safety information box is much less severe in this sense, as while it does bar this version of the translated manual from being published, correcting the problem can be done in less than a minute by simply translating the section of the layout. Correcting the Ergonomy problem is much more difficult as it would require notable rewrites in several sections of the manual. This combined with the multitude of small problems in Meaningfulness, the several problems of vague text forms, missing punctuation marks

and so forth, eventually makes the translation of the manual adequate at best and unacceptable at worst. While the manual has all of the required information to use the product in question, the manual is less than perfect in correlation with the user's requirements of such a high level product and I doubt it fulfills Wärtsilä's own quality standards at its current form.

5 CONCLUSIONS

The purpose of this thesis was to evaluate the usability of a translated user document. The intention was to utilize Jacob Nielsen's (1994) principles of usability and Daniel Gouadec's (2010) translation quality with the heuristic evaluation, or expert evaluation, process to evaluate and assess usability in a translated power plant manual. Two categories were chosen from the manual to represent the thesis material, general information, including product detail information and operation, and safety information. To analyze the material, five different error categories were studied in the heuristic evaluation: Learnability – Accessibility, Efficiency of Use – Effective and Ergonomic, Memorability – Meaningfulness, Few and Noncatastrophic Errors - Accuracy and Subjective Satisfaction – Compliancy. Errors found in these categories were then ranked according to their severity from 0 to 4, with 0 being no error, and 4 being a catastrophic error, denying the publication of the manual. Most errors could be found in the Memorability – Meaningfulness category (12 errors), while Efficiency of Use – Effective and Ergonomic came second (11 errors). The rest of the three error categories had much less errors, although it should be mentioned that there was a catastrophic error present in the manual in the Noncatastrophic Errors – Accuracy category, which would effectively disqualify this version of the translated manual from being published, although this error does not affect the original source.

The results of the heuristic evaluation showed that while the translated manual was sufficient for its purpose to relay the necessary product information, operational instructions and safety instructions, it was not acceptable. The manual had several aspects that furthered the use of the manual, including extensive indexes, clear and effective layout, highlighted safety information and efficient use of terminology, but unfortunately, much of the writing was otherwise very unstable. Also, one of the safety information boxes which warned about dangerous electricity was left un-translated. This error, a potentially lethal warning, has in all practice denied the publication of this version of the translated manual, as a manual of this importance and use, may not have a translation error of this magnitude present in it.

A hypothesis was set in the beginning of this study, stating that as the translated manual is in an early draft phase, there are several lower level errors that affect usability throughout the material, ranging from 0 to 2, while the higher level errors, serious level 3 and catastrophic errors level 4, are only presented in a few cases or not at all. Consequently, the study results correlated well with the hypothesis, as there were a notable number of errors ranging from 0 to 2, but only one serious error, although, rather surprisingly, this single error was of the most severe category, level 4. Initially, it was not expected, that an error of this severity would be found in the manual. It should be noted, that the ratings given for the errors are subjective as there were no other evaluators analyzing the manual.

The report of the heuristic evaluation is available in chapter 4.1, detailing the different errors discovered in the evaluation. The detailed analyses of the material and report showed that most errors could be found in the Efficiency of Use – Effective and Ergonomic category, which specifically studies the ease of use of text and language in the manual. These errors would eventually be the main problem of the manual as well. Although, most of these errors ranked low in the ranking system, they expressed a greater problem in the manual. While most of the manual was exceptionally well written, several areas of the text were written sub-standardly: insufficient sentence structures and word forms were used that are unacceptable in a publication of this importance and purpose. From the Learnability – Accessibility point of view, which concentrates on form and layout, the manual was exceptionally effective, with only few errors. The Few and Noncatastrophic Errors - Accuracy category, which concentrates on consistency of terminology and text, also had only a few inconsistencies although this category contained the level 4 catastrophic error. The last category, Subjective Satisfaction – Compliancy, that evaluates external factors including company norms in the manual, had the least amount of errors as the manual conforms well to the company norms. As a conclusion, the translated draft of the manual provided by Wärtsilä is still unfinished, which was somewhat expected as well, but there was notable insight made on the shortcomings of the translated manual.

This study expressed also that as a tool to be used by industry, heuristic evaluation can quickly and efficiently point out the worst problems of usability present in a manual. Simple rules, which are designed to search for quality relating factors, can increase the quality of a document with little effort, although it is no ultimate solution to good documentation. Usability can be seen a strategic decision for a company that can create notable business benefits, ease the use of translations, reduce the risks of documentation related issues and above all else, reduce negative feedback and increase customer satisfaction. (Jokela 2010: 31) As the evaluation itself took approximately five hours total for a material of 130 pages, including the creation of the report, the results were the very least encouraging towards the usefulness of the heuristic evaluation method as a tool. Also I would argue that the most severe errors were found in this short time frame.

The largest shortcoming of this study was lack of expert knowledge in both power technology and the operation of a power plant. As I have limited knowledge of power technology and no knowledge of power plant operation, I would suggest as further study a heuristic evaluation of the same material by someone who has extensive knowledge of both power technology and power plant operation to gain further results and insight in the subject matter. Especially the correlation between real world and the power plant manual would be good to establish as well as the correctness of the terminology used. Similarly, it would be interesting to know the insight of someone who has been working with manuals and the heuristic evaluation process. Also, as I was using the basics of usability as a heuristic evaluation list, it would similarly be interesting to establish the effectiveness of some of the heuristic evaluation lists created by Nielsen (1994) or by Purho (2010) with the same material.

Eventually, it should be noted that this study was rather limited in scope as only one person did the heuristic evaluation. According to Nielsen (1994) one person is able to discover approximately 30% of the errors in one evaluation set. Still, this study provided insight and practical information on usability as an idea in industrial applications. Similarly, the study provided results from the heuristic evaluation process in an arguably authentic situation where the method is used to evaluate an unfinished

manual whose outcome can still be affected. While beneficial for the manual and able to provide good guidelines and insight to the quality of the manual and translation, the user's feedback is still perhaps the most important evaluator of any user documentation.

SOURCES

Primary:

Gouadec, Daniel (2010). Translation as a Profession, John Benjamins Publishing Company, U.S.A. Available at: <http://ymerleksi.wikispaces.com/file/view/Translation+as+a+Profession+-+Gouadec,+Daniel+%28John+Benjamins%29.pdf>

Nielsen, Jakob (1993). Usability Engineering, Morgan Kaufmann, USA

Nielsen, Jakob (1994). Enhancing the explanatory power of usability heuristics.

Proceedings of Human Factors in Computing Systems, ACM Press, 152–158.

Nielsen, Jakob (2005). Heuristic Evaluation <http://www.useit.com/papers/heuristic/>

Suojanen, Tytti, Kaisa Koskinen, Tiina Tuominen (2012). Käyttäjakeskeinen kääntäminen, University of Tampere, Finland, Available at: <http://tampub.uta.fi/handle/10024/66333>

Wärtsilä (2011). Plant Manual English Source, Wärtsilä, Finland

Wärtsilä (2011). Plant Manual Finnish translation, Wärtsilä & Citec, Finland

Secondary:

AACGlobal (2008). Good manual, better product, Available at: http://www8.aacglobal.com/en/content_files/pdf/AAC_Suunto_documentation_en.pdf

Byrne, Jody (2006). Technical Translation. Usability Strategies for Translating Technical Documentation, Springer

Google (2012). Google Translate, Available at: <http://translate.google.com/>

Herman, Mark, 1993, Technical Translation Style: Clarity, Concision, Correctness, American Translators Association Series: Scientific and Technical Translation, Edited by Marilyn Gaddis Rose, Vol. VI, John Benjamins Publishing Company, USA

International Institute for Information Design (2012). Definitions, Available at: <http://www.iiid.net/Definitions.aspx>

- ISO 9241 (2010). Ergonomics of human-system interaction, International Organization for Standardization, Switzerland
- Jokela, Timo (2010). Navigoi oikein käytettävyyden vesillä. Opas käytettävyysohjattuun vuorovaikutussuunnitteluun, Väylä-Yhtiöt Oy, Finland
- Kageura, Kyo, Béatrice Daille, Hiroshi Nakagawa , Lee-Feng Chien, 2004, Recent trends in computational terminology, Terminology, John Benjamins Publishing Company, Vol. 10 Issue 1, p1-21
- Korvenranta, Heli (2005). Asiantuntija-arvioinnit. Edited by Ovaska & Aula & Majaranta, 2005, 111–124 Available at <http://www.cs.uta.fi/usabsem/luvut/13-Koskinen.pdf>
- Kuutti, Wille (2003). Käytettävyys, suunnittelu ja arviointi, Helsinki, Finland, Talentum.
- Laki kulutustavaroiden ja kuluttajapalvelusten turvallisuudesta 30.1.2004/75
- Maritime Executive, The. Wärtsilä Joins Global Sustainable Shipping Initiative, a Taskforce to Shape the Future of Shipping, The Maritime Executive, U.S.A Available at: <http://www.maritime-executive.com/pressrelease/wartsila-joins-global-sustainable-shipping-initiative-taskforce-shape-future-shipping/>
- Nykänen, Olli (2002). Toimivaa tekstiä: opas tekniikasta kirjoittaville, Tekniikan Akateemisten Liitto, TEK
- Nyssönen, Heikki (1997). Principles of Accessibility and Design in English Texts: Research in Progress 2, Ed. p. 111-120, Publication of the Department of English University of Oulu, Finland
- Ovaska, Saira, Aula, Anne & Majaranta, Päivi (2005). Käytettävyystutkimuksen menetelmät, School of Information Sciences, University of Tampere, report B-2005-1, Available at: <http://www.cs.uta.fi/usabsem/osallistujat.html>
- Pikulski, John J. (2002). Readability, Houghton Mifflin,USA, Available at: <http://www.eduplace.com/state/author/pikulski.pdf>
- Preese, Jenny, Benyon, David, Davies, Gordon & Laurie Keller (1993). A Guide to Usability: Human Factors in Computing, Addison-Wesley, England
- Purho, Vesa (2000). Heuristic Inspections for Documentation – 10 Recommended Documentation Heuristics. Usability Interface, STC Usability SIG Newsletter, Vol 6, no 4, Available at: <http://www.stcsig.org/usability/newsletter/0004-docsheuristics.html>

- Redish, Janice C. (1993). Understanding Readers, Techniques for Technical Communicators., Edited by Barnum, Carol M. & Saul Carliner, U.S.A., New York, Macmillan, p. 15-41 Available at: http://courses.eserver.org/f02/tc501/readings/redish-understanding_reader.pdf
- Samara, Timothy (2008). 20 Design Reminders: #3 -- Speak with one visual voice, Pantagruel Design, Available at: <http://pantagruel.typepad.com/devnull/2008/05/20-design-rem-1.html>
- Schriver, Karen A. (1997). Dynamics in Document Design: Creating Text for Readers, John Wiley & Son's Inc, U.S.A
- SecureDOC –project (2004). SecureDOC, Commission of the European Union, Available at: http://docbox.etsi.org/STF/Archive/STF285_HF_MobileEservices/STF285%20Work%20area/UG/Inputs%20to%20consider/TCeuropa_Securedoc_1_Usable%20and%20safe%20operating%20manuals%20for%20consumer%20DKE-AK DFA_2004-01-01.pdf
- Sorensen, Mikis Seth (2009). The cost and benefits of documentation, Mikis's vent, Available at: <http://mikisseth.blogspot.fi/2009/06/cost-and-benefits-of-documentation.html>
- Spencer, SueAnn (1996), Use Self-Help to Improve Documentation Usability, Technical Communication, Vol 43: 1, 73-77
- Stratton, Charles R. (1996). Technical writing: What it is and what it isn't, Defining Technical Communications, Edited by Dan Jones, Society for Technical Communication, Inc, 39-42
- Stolze, Radegundis (1999), Die Fachübersetzung. Ein Einführung. Tübingen
- Suomen Laki 30.1.2004/75
- Suojanen, Tytti (2003). Onko käyttöohjeella toivoa?: tekninen viestintä erikoisalana, Alussa oli käännös, Edited by Oittinen, Riitta & Pirjo Mäkinen, Tampere University Press, Finland, p. 154-164
- Tuotevastuulaki 17.8.1990/694
- Työterveyslaitos (2010). Kognitiivinen ergonomia. Available at: http://www.ttl.fi/fi/ergonomia/kognitiivinen_ergonomia/sivut/default.aspx
- Velasco, V. Berba (2012). The Value of Adding Images to Technical Documentation, streetdictionary.com, Available at:

http://www.streetdirectory.com/travel_guide/10429/writing/the_value_of_adding_images_to_technical_documentation.html

Vermeer, Hans J. (2000). Skopos and Commission in Translation Action, The Translation Studies Reader, Edited by Lawrence Venuti, Routledge, USA & Canada

Walker, Sue (2000). Typography and language in everyday life. Prescriptions and practices, Pearson Educational Limited

Widowsson, Henry, G (1997). On the Accessibility Conditions of Textual Meaning, Principles of Accessibility and Design in English Texts: Research in Progress 2, Ed. Nyssönen, Heikki & Leena Kuure, p. 7-21, Publication of the Department of English University of Oulu, Finland

Williams, Jenny & Andrew Chesterman (2002). The Map: A Beginner's Guide to Doing Research in Translation Studies, StJerome Publishing, United Kingdom

Wärtsilä (2012). Wärtsilä corporation – Interim report January-September 2012, Wärtsilä, Finland, Available at: https://wartsila-reports.studio.crasman.fi/file/dl/i/d6d6QA/-SVYurK4wl_UHJI9qjQ_-w/InterimReportQ312.pdf

Yli-Jokipii, Hilka (2004). Tekniikan kieli tutkimuksen ja kääntämisen näkökulmasta, Kieli, teksti ja kääntäminen - Language, text and translation, Edited by Jorma Tommola, Turun Yliopisto, Englannin kielen kääntäminen ja tulkkaus, 81-93

Zimmermann, Annegret (2000). What a Technical Translator Can Do For You, Available at: <http://www.techwriter.de/tc-forum/topictr/tr03what.htm>