CULTURAL DIFFERENCES IN TECHNICAL INSTRUCTIONS:

A Cross-cultural Comparison of the Use of Differently Structured Manual

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Table of Content

Abstract

Purpose: Research shows that technical writers from Chinese and western cultures structure documents in different ways. In this research, we conducted an experiment to find out whether there were differences when users from different cultures use differently structured technical instructions.

Method: A 2x2 experiment was conducted to test how those differences found by prior researcher influenced users' performances and preferences. The independent variables are participants from different cultural background (Chinese and Western) and manuals designed based on different cultural structure (Chinese and Western); and the dependent variables are performance of a designed task as well as judgment of the software and manual. 80 participants were asked to use SDL Trados Studio 2014 with the designed manuals of different structures, and their performances were recorded. Then they filled out a questionnaire to indicate their opinions about the software and manual.

Results: No significant differences were found in performance and preferences when participants from different cultural background use instructions structured in different ways. This might be due to the fact that users did not often use manuals and the structure elements found were not as important as expected.

Conclusion: Based on this study, for future researches, more structural elements can be found and analyzed, participants less influenced by other culture can be recruited, and manuals that users are more dependent on should be designed.

Keywords: Western and Chinese culture, user instructions, structure

1 Introduction

With the development of information technology and globalization, the idea of a “Global Village” (Darity, 2008) raised by Marshall McLuhan has become the reality. The world is getting smaller and smaller, and products are made for international markets, no longer just for one country. Therefore, the role of cultural differences becomes increasingly important.

Cultural differences are so important that they influence almost every industry. Among them, Chinese and Western cultural differences may have the greatest impact because Chinese and western cultures are the “most distant from one another and probably influenced one another the least” (Nisbett, Peng, Choi, & Norenzayan, 2001, p. 4). So this study focuses on cultural differences between the Chinese and the western world.

Technical communication is undoubtedly influenced by the difference between Chinese and western cultures. Many issues in technical communication are caused by cultural differences. For example, some western technical communicators think that the quality of documents from Asian countries is "very poor", and those documents are difficult to understand (Barnum & Philip, 2001).

This may be due to the immaturity of this profession in those Asian countries. According to Yoshihiro Otsuka (as cited in Barnum & Philip, 2001), there are small numbers of technical writers in Asian companies, and demands exceed supplies. Besides, few universities have technical communication programs, so they can neither provide enough potential practitioners nor develop guiding theories for the industry. Among those Asian countries, the situation in mainland China may be even more critical, there are no professional associations, which can provide trainings, meetings and industry information. However, there are chapters of the Society for Technical Communication (STC) in other Asian countries (Barnum & Philip, 2001).

On the other hand, it is also possible that the quality of user documentation is in fact adequate, but the criteria for good documentation are different because of cultural differences. If technical writers do not take the culture into consideration or they do not have a thorough understanding about the target culture, the documents they design may be hard for people in that culture to comprehend. Or if technical writers neglect the fact that a different culture leads to different criteria, a technical document with good quality produced in China may fail in American or other western countries because standards differ.

Many experts have stressed the importance of cultural differences in technical communication. Ding (2011) gave lectures at two universities in China and tried to give suggestions to the curricula in the aspect of Chinese unique culture. Huining (2010) mentions that to understand technical communication instruction in non-western countries, one has to pay close attention to the impacts of local cultural,

educational, political, and economic contexts on technical communication practices. Ulijn and St.Amant (2000) argue that if professional communicators want to achieve effective intercultural communication, they first need to figure out how cultural factors can affect professional interactions. More specifically, Huatong (as cited in Barnum & Li, 2006) points out that “cultural factors play an important role in determining the acceptability and usability of an information product ” (p.163).

There are some theories that may help the technical communicator get more understanding of the culture, such as the iceberg model proposed by French and Bell (1979), the five cultural dimensions put forward by Hofstede (2010), and the distinction between high and low context cultures developed by Hall (1976). To some extent, they can be helpful to understand the importance and differences of culture. But they do not explain phenomena about cultural differences in technical communication or help to immediately draw conclusions about technical documentation. For example, how do users use technology? Do Chinese people use technology in the same way as the western people? Do they have preference regarding the design of documents? Do they work more effectively when instructions are given in the different way? How can users be best instructed to use technology?

In this study, the theoretical framework provides a summary of assumptions of earlier studies about cultural differences between Chinese and western world in technical documentation, especially in the aspect of structure. The experimental part investigates to what extent the preferences of Chinese and western users reflect the assumptions about cultural differences with respect to the structure of instructional documentation. This research may help technical communicators better understand the cultural differences and the influence on users’ behavior and perception of manuals.

2 Literature Review

2.1 Technical Communication in China

Technical communication as a new career has developed rapidly in China. Many large multinational companies such as Ericsson, Cisco Systems, Motorola, Alcatel-Lucent, and Nokia Siemens Networks have set up specialized departments to develop technical documentation. Meanwhile, local Chinese companies, such as Huawei Technologies, Haier Group, and Lenovo Group Ltd., are expanding abroad, so they need to sell the products as well as documentation to the foreign customers.

The market for technical communication is big in China. Besides, Chinese culture has greatly influenced the East Asian cultural sphere, such as Japan, Korean, and Vietnam(D. D. Ding, 2003). Therefore, it is worthwhile to focus on the current status of technical communication in China.

Firstly, the education of technical communication in Chinese universities is in its early

stage. In 1997, a delegation of 12 western technical communicators visited China, and found that technical communication was at the earliest stages, had not been developed as a separate profession or academic discipline, and China was hungry for technical communicators and technical communication teachers (Tegtmeier & Thompson, 1999).

Ding and Jablonski (2001) also describe the growing needs for general user documentation. Besides, they discover some problems in the technical writing class: teachers focus on terms and expressions instead of rhetorical issues, such as audience, purpose, information selection, and page layout, which may cause the readers confused by the documents.

Besides those western professors, more and more Chinese scholars get interested in how technical communication can be developed in China. Some researchers (such as Han, 2010; Duan & Gu, 2005; Hu, 2004) suggest to integrate technical communication into English for Specific Purposes (ESP) at Chinese. Wang and Wang (2011) as well as Miao and Gao (2011) argue that technical writing was strongly related to scientific translation in China. What is more, Miao and Gao (2010) as well as Wang and Wang (2011) put forward that technical writing could be develped as one program under Master of Translation and Interpretation (MTI). Beside, more and more universities have offered courses related to technical communication, including some top universities, such as Peking University and Nankai University.

However, Duan and Gu (2005) pointed out that despite efforts made by those western technical communicators, they did not produce effective or long-lasting results. In addition, what Chinese scholars have done is still in the phase of exploration and attempt, with only few articles and books published, and most technical communicators do not have a related educational background. Therefore, “technical communication has yet to become a mature discipline in China” (H. Ding, 2010, p.5).

Secondly, the industry of technical communication in China needs to be improved. D. D. Ding, (2003) argued that China has a long history of Technical Writing, and he took *Yi Jing* as an example. *Yijing* is translated as *A Book of Changes* and it is a book of “oracles and divination” (D. D. Ding, 2003,p.3). D. D. Ding, (2003) thinks *Yijing* is a technical instruction manual because the book is designed to help people perform specific tasks, which is the definition of technical instructions. However, the technical writing to support technology and economy in China just emerged, no more than 20 years (Barnum & Li, 2006), and it is at the beginning of development.

As mentioned above, the education of technical communication in China is fledging, so there are few practitioners who have received systematic education related to technical communication. In addition, because of the “a traditional separation between the humanities and sciences in China” (Duan & Gu 2005, p.5), some technical communicators graduate from an English major, knowing little about technology, or graduate from engineering major, with poor English. Besides, only few

researchers conducted studies to provide useful theories to guide practices in this industry.

Moreover, H. Ding (2010) argues that the quality of Chinese instructions produced is unsatisfactory, not to mention the English instructions. What is worse, although practical writing has developed a lot with many associations formed and journals launched, there is no professional association parallel to STC or an equivalent journal to *Technical Communication* in mainland China (Barnum & Li, 2006). Practitioners have no access to formal trainings or meetings. Finally, managers, practitioners, or the audience pay insufficient attention to technical communication, and no comprehensive industry standard exists to rule the industry. Therefore, “no specialized profession of technical communication exists” (H. Ding, 2010, p.4).

2.2 Cultural Theories

As mentioned above, western people may find the technical documentation produced in China hard to understand because the profession of technical communication is undeveloped in China and the quality maybe not good; besides, cultural differences can also cause the incomprehension. Thus, this chapter introduces some cultural theories that can help to understand the differences between Chinese and western cultural.

French and Bell proposed the Iceberg Model in 1979 (as cited in Ulijn & StAmant, 2000). According to the Iceberg Model, a culture is made up of two primary parts: “a visible top that represents the facts, the technology, the price, the rationale behind things, the brain, the written contract of a negation in an explicit way and “an invisible bottom of emotions, the human relations, the unspoken and unconscious rules of behavior in an implicit way”(Ulijn & St.Amant, 2000, p. 221). The Iceberg Model shows that there are some invisible and underlying reasons for people’s behaviors and preferences, and those reasons are related to the culture. It can be deduced that a user’s behavior when using technical documentation is related to culture, and the behavior influenced by culture is much more complex and unobvious. However, just knowing that it is related to culture is not enough, the model does not discuss cultural differences, and it is too general and specific reasons cannot be concluded from it, for example, why do people from different cultural backgrounds have different preferences for manuals?

Furthermore, Hall (1976) classified cultures into high context and low context cultures. Hall (1976) suggest that “high context cultures find the majority of the information in the physical context or internalized in the person, while very little is in the coded, explicit, transmitted part of the message, whereas low context cultures are the opposite” (p.91). Also, Hall (1976) point out that German, and Americans are toward the lower end of the scale. China, the processor of a great and complex culture, is on the high-context end of the scale (p.91).This theory is more helpful to understand cross culture than the iceberg model, and can be applied in technical

communication. For example, writers should provide detailed and direct information in low context countries, and fewer messages are required in high context countries. However, this theory does not take into consideration other aspects of culture, which may also give rise to different behaviors and preferences of users.

Hofstede (2010) conducted a worldwide survey about cultural differences. He collected data about cultural values from 100,000 employees in IBM around the world, 50 countries and 3 regions included. Instead of simply classifying culture into two parts, he distinguished four dimensions to differentiate and rate different cultures, which are individualism-collectivism, uncertainty avoidance, power distance, and masculinity-femininity (Hofstede, Hofstede, 2010). This model helps us understand the differences between two cultures in four dimensions, and present more views than the high/low context theory. However, it is static and too simple. A cultural is more complicated and dynamic than four dimensions can describe. Furthermore, when it comes to the differences in technical communication, those dimensions are too broad to be applied. For example, how technical documents should be like in a high power distance country such as China; should the style be more official and authoritative? Or whether documents designed for culture of high uncertainty avoidance should be more direct and specific?

Those theories describe the importance of culture, differences between countries, and the phenomenon in societies. But the steps seem to be pretty big if it comes to describe the differences regarding technical communication. Therefore, research should be done to study the cultural differences reflected in technical communication, and help writers provide manuals with better usability and users conduct task with less efforts.

2.3 Cultural Differences in Technical Documentation

Many studies have been done on the cultural differences between western counties and China in the technical communication. Eight papers were found and analyzed that are targeted at cultural differences between Chinese and western countries in technical writing.

2.3.1 Summary of Differences

Differences could be mainly classified into five categories: structure, style, visual design, user behavior, and content.

Style is the tone of writing, about how to present specific document elements, and also the rules of writing. Differences regarding style found from the literature are shown in Table 12 in the Appendix 3 Cultural Differences (Style, Visual Design, User Behavior, and Content,). In general, Chinese technical writers prefer authoritative/official writing, literature writing, as well as less direct and less specific writing.

Visual design in this research refers to the way how to handle all elements related to tables, figures, and layout. Differences regarding visual design found from the literature are shown in Table 13 in the Appendix. In sum, compared with western manuals, there are less page design elements and more pictures in Chinese documents. Besides, the relationship of texts and visuals relationship is elaborative in Chinese instructions and redundant in western. Finally, the target audience of Chinese manuals is professionals, and in the western world the target audience is general mass.

Differences regarding user behavior found from the literature are shown in Table 14 in the Appendix. Researchers found that Chinese people had a better understanding of pictures than westerners, the purpose of learning is more pragmatic, and the learning method is more dependent on relationship.

Content in this research means what should be presented and what should not (shown in Table 15).Barnum and Li (2006) found that traditional characters were used in Chinese manuals because some parts of China are still using the traditional Chinese character instead of the simplified one.

Structure is about the organization and clustering of the document, such as headings, introductions, orders, paragraphs, and links. Chinese writers were found to arrange documents in more holistic and covert way and follow nature order.

This study is focused on structural differences. First because structure is important. It is hard for readers to understand the contents without proper structure. Besides, it is easier to manipulate in experiment than style and pictures. What is more, there is more evidence in the literature for structural differences than for other differences, such as content.

2.3.2 Differences in Structure

Differences regarding structure found from the literature are shown in Table 1.

The table consists of four columns, namely, “General”, “Differences”, “Sources”, and “Researches”. The meanings of each column are as follows:

- “General” is the general differences.
- “Differences” lists the findings referred in those selected papers.
- “Source” shows the references.
- “Researches” displays various methods each finding is based on. Figure 1 shows the structure of research methods. There are four types of research methods, which are informal research method, content analysis, experiment, and evaluation. Informal researches are those findings based on personal experiences and thoughts, which are analytical; while studies based on the analysis on documents and users, are empirical research, much more formal.

In those empirical researches, content analysis is the method used in analyzing documents, and experiments as well as evaluation are used to conduct on users.

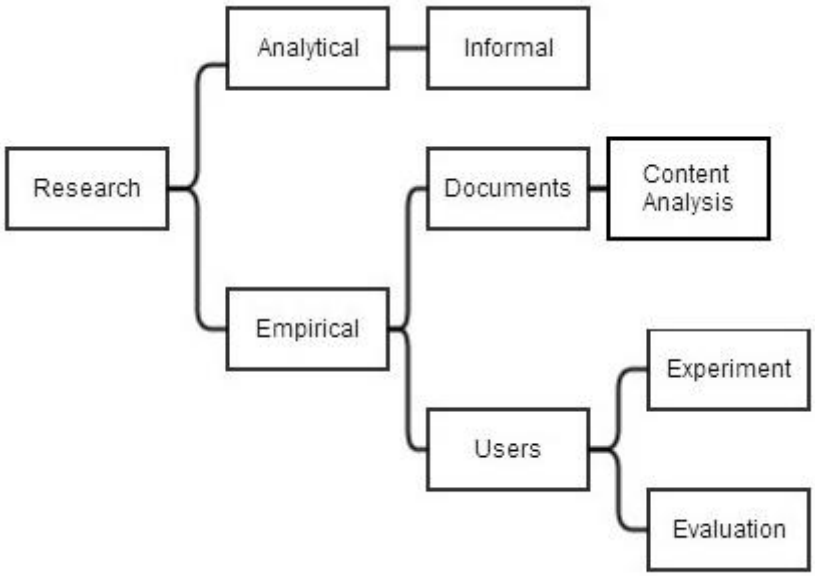

Figure 1 Research Method

Table 1

Structural Differences

General	Differences	Sources	Type of Study
Holistic structure in Chinese culture	Relations between parts are stressed in Chinese culture.	(D. D. Ding, 2003)	Content Analysis
	Rational/synthetic structure in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	More contextual information in Chinese culture.	(Q. Wang, 2000)	Content Analysis
	Chinese: structure based on entire interrelation. German: structures are individually and separately designed.	(Y. Wang & Wang, 2009)	Content Analysis
Yihe-prominent structure in Chinese culture	Structures less specifically defined in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
		(Y. Wang & Wang, 2009)	Content Analysis
	Fewer structure elements in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	Headings less common in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	Lack of topic sentences in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
Natural order in Chinese culture	Chinese: general to concrete German: concrete to general	(Y. Wang & Wang, 2009)	Content Analysis
	Chinese: inductive order American: deductive order	(Barnum & Li, 2006)	Content Analysis
	Chinese: spiral organizational pattern American: inverted pyramid organizational pattern	(Barnum & Li, 2006)	Content Analysis
	Enhance understanding by rhetorical: basic to advance; familiar to unfamiliar in Chinese culture.	(Q. Wang, 2000)	Content Analysis
	More chronological order in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	Structures based on the chronology of operations activities in Chinese culture.	(Y. Wang & Wang, 2009)	Content Analysis

Holistic Structure

Nisbett, Peng, Choi, and Norenzayan (2001) find that cognitive processes of East Asians are more holistic, and people relate individuals to the entire field; while that of westerners is more analytic, and western people focus on individual objects.

The differences of thinking influence the way to structure documents. Holistic thinking patterns focuses on the context, and relationships between the object and the outside environment while analytic thinking patterns separate the object from its context, focus on attributes of the object. (Y. Wang & Wang, 2009, p. 47).

Y. Wang and Wang (2009) mentioned that to explain a system, Chinese writers arranged the structure “on the basis of an entire interrelation or context” (p.7), and Germans individually and separately structure the system as individual elements. D. D. Ding (2003) also find that Chinese writers stress relations between parts in instructions.

Besides, Wang (2000) says that a new idea is presented with more contextual information because of the holistic and relational thinking patterns, while the Americans tend to be direct.

This is consistent with the holistic view of Chinese philosophy, "the nature and man unites as one". On the other side, in the western philosophy, people emphasize more on the individual in the entity. Many natural scientists in the western countries suggest that things in the nature should be divided into different parts, and studied are conducted to the individuals.

This can also been seen in the difference between Chinese and western medicine as well as paintings. A doctor of traditional Chinese medicine diagnose the illness based on the whole organic and the relationship between the body and the external environment (Barnum & Li, 2006), while western doctors focus on the infected or wrong part. And in Chinese painting, it is preferred to go beyond the restraints of structure and present a flowing spirit in the painting, while western paintings emphasize focal respective, layouts, shapes, and details (F. Guo, 2006).

Yihe-Prominent Structure

Barnum and Li (2006) find that the structures of Chinese documents are less specifically defined, and contain less structural elements (such as topic sentences and headings). They attribute the differences to the cultural expectation, reader responsibility, that readers are expected to read every word to understand potentially important items, while the American documents design the structures well because it is the responsibility of the writer to understand the needs of readers (Barnum & Li, 2006). Some Chinese scholars also realized this difference, for example, Zhang (1994b) claims that the core and center of writing in Chinese is the author, but in English is the reader.

Besides the reason of reader and writer responsibilites, Y. Wang and Wang (2009)

aruge that the different requirements of structure might be caused by the type of culture. Technical documents in a low-context culture are required to be more finely structured than those in high-contect culture (Y. Wang & Wang, 2009).

In addition, differences in strucuture may also be caused by different organizational principles in China and western countries, *yihe* and *xinghe*.

It is widely acknowledged in Chinese translation circles that Chinese is a *yihe*-prominent language and English is a *xinghe*-prominent language, which is the most important distinction between Chinese and English (Li, 2011; Liu, 2006; Shen, 2003; Juquan Wang, 2007; T. Wang, 2010).

What is *xinghe* and *yihe*? The *Linguistics Volume of Large Dictionary* defines *yihe* as "The language unit is combined by meaning, without any specific requirements in forms." (Xia, p.109). Liu (2006) defined *yihe* as "the way to connect words and sentences by meanings and logics, but not linguistic forms (including lexical and morphological means)" (p.74). For example. It rained; the plane was cancelled; I failed to visit Italy; and defines *xinghe* as "the way to connect words and sentences by linguistic forms" (p.74). For example, it rained, and the plane was cancelled. So I failed to visit Italy. Lian (1993) agrees with this definition, and he gives some further explanation, "Formal cohesion is the key way to connect sentences in English, while semantic coherence is the focus of connecting sentences in Chinese" (p.46). They both point out that overt signs are used in English writing and covert meanings are used in Chinese documents.

There have always been debates over the translations about *yihe* and *xinghe*. Most people translate them to hypotaxis and parataxis (such as Lian, 1993 and Liu, 2006). However, Li (2011) argues that the original meanings of hypotaxis and parataxis are "arrange under" and "arrange side by side", and "refer to the arrangement and connection of sentence elements with regard to coordination and subordination" (p.190). Oxford Dictionary defines hypotaxis as "The subordination of one clause to another" ("Hypotaxis," 2014) and parataxis as "The placing of clauses or phrases one after another, without words to indicate coordination or subordination" ("Parataxis," 2014) . Halliday et al. (2014) extend the relation of clauses to bigger structure, and they point out "parataxis is the linking of elements of equal status, and hypotaxis is the binding of elements of unequal status"(p.384). The meanings of *yihe* and *xinghe* are more about forms and meanings, than subornation and coordination, so hypotaxis and parataxis are similar to *yihe* and *xinghe* in some ways, but cannot be equivalent translations.

Therefore, the Chinese pinyin *xinghe* and *yihe* would be used in this research, but not hypotaxis and parataxis. In this research, *yihe* refers to that structure is formed by meaning, while *xinghe* means constructions that are linked by the use of conjunctions.

As Table 1 shows, In English documents, *xinghe* is mostly used. Forms and formats

are used to strucutre the sentences, such as clear connections between every part and topic sentences. “The German textbooks and service manuals were more finely and detailed structured than the Chinese ones” (Y. Wang & Wang, 2009, p.9).

In Chinese documents, *yihe* is the principle of organizaiton. It is acceptable that there is no top sentences or distinct clues, only if the meaning of each part is consistent and reflects the topic. Also, there are less elements that show the structure. Chinese writers have adapted the habit “no paragraph, no punctuation” in documents for thousands of years. People break the paragraphs and sentences by their own way of understanding. Not until the New Culture Movement (around the time of the May 4th Movement in 1919) did the use of paragraphs and punctuations to segment an article spread.

Yihe structure is also influenced by holistic thinking style. Chinese pay more attention to the smooth and consistent of the whole document, so distinct structure elements such as headings, conjunctions, or punctuations might break the harmony of the overall. For instance, “Chinese technical writers may eschew headings as disrupting the flow of the whole. (Barnum & Li, 2006, p. 152)”

Nevertheless, Chinese people have explored the document structure for thousands of years and the most famous writing pattern is “eight-legged essay”, designed by Wang Anshi. Strucuture, numbers of sentences, rhetoric means and other elements are strictly defined. This rigid and artificial structure was used for imperial examinations for nearly 1000 years, was criticized severly in the late times, and abandoned 100 years ago. This may cause the preference for a flexible structure in the modern times. Besides, the influence of western culture is so large that many writers start to arrange the documents in more *xinghe* way.

Although Chinese is a *yihe*-prominent language, it does not mean that *xinghe* cannot be found in Chinese documentation. Moreover, Chinese culture has been influence by the western culture since China's reform and opening up. So it is better to say that Chinese documents are *yihe* dominated and *xinghe* mixed. And English documents are *xinghe* dominated and *yihe* mixed.

Natural Order

China is known as the nation of etiquette. Since Zhou Gong applied *The Rites of Zhou* as the way to rule people more than 3,000 years ago, Chinese people have been strongly affected by etiquette and ceremonies, just as much as how religion influences the western people. The core of *The Rites of Zhou* is Jing Tian Fa Zu, which means to study and apply natural laws with fear and seriousness.

Fan (2000) states that the relationship to nature is one of 8 important Chinese culture values, and essential concepts. Tao, fatalism and harmony in Chinese culture all are related to the value. Therefore, Chinese people worship the nature, and would like to follow the natural process of how things happen. So the order of structure of articles is inductive, chronological and gradual, which are parallel to the practical

experience and cognition.

Wang (2000) analyzes the manuals for science and small household electronic appliances, and finds that the manuals are arranged from basic to advanced, and familiar to unfamiliar. While American manuals are focused on specific task.

Both Barnum and Li (2006) as well as Wang and Wang (2009) find inductive order in Chinese documents. As Barnum and Li (2006) claim, because of synthetic/integral/ relational thinking patterns, Chinese show preference for inductive order, which leads to the spiral organizational pattern: qi-cheng-zhuan-he (introduction-development-transition-conclusion). Because of analytical thinking patterns, Americans show preference for deductive order, which leads to inverted pyramid organizational pattern: view first, opening paragraphs-middle-conclusion. Inductive order makes the structure spiral.

Wang and Wang (2009) find that in the Chinese textbooks, an engine fuel injection system is described starting from the general information, whereas the German textbooks start from the concrete system. Similarly, Wang and Wang (2009) also discover that Chinese people search information from general to concrete, while half the German participants searched in the sequence from concrete to general.

Besides, Wang and Wang (2009) find that “Chinese service manuals was from the chronology of the operations activities that users should carry out, such as maintenance, disassembling, checking, assembling, and adjustment” (p.44), because of high context (indirect, digressive). “The German textbooks and service manuals were more finely structured with greater detail than the Chinese ones” (p.44), because of low context (direct, linear discourse). This finding is also supported by Barnum and Li (2006), and they think Chinese documents follow chronological order, starting with the introduction and ending with conclusions and suggestions.

Conclusion

In general, the Chinese technical documents are less explicitly structured while the western ones are more finely and detailedly structured. But it does not mean that Chinese document do not have structure. Instead, the structure of Chinese documents are covert while of western documents are overt. Therefore, English documents use obvious structure elements to connect every individual part, such as connection words, headings, and topic sentences. On the other side, Chinese writers arrange documents in a more holistic and hidden way, with a topic interspersed in the documents and every part interrelated to each other. Besides, chronological and inductive order is used to show the relationship between two parts instead of structure elements used in English documents.

2.3.3 Research Question

Structure plays an important part in technical documentation. Designing the structure is an essential step before starting writing. Once the structure is fixed, few changes will be made, and it is costly to change the structure in the process of writing manuals. Besides, clear structure can help readers have a better understanding of the topic and save more time.

However, writer's methods of structuring documents and readers' ways of perceiving the structure vary from culture to culture. The structure of a manual seems reasonable to readers in one culture, but may be confusing to people from the other cultures. Therefore, it's vital to find out the structural differences caused by different cultures.

Many studies have been done to analyze the structural differences between Chinese and western cultures. The analysis in section 2.3.2 shows that structure is convert and holistic, and follows the nature order in Chinese manuals, while overt and partly, and no nature order preference in western manuals. However, all research methods of those studies are content analysis (see Table 1

Structur). They just found how the writers structured the manual, but few experiments were conducted to test the behavior of the users. Do the users from different cultures act according to their findings? So studies are needed to examine whether those findings can be applied to users. Based on it, the research question is:

To what extent do the preferences of China and Western users reflect the assumptions about culture differences with respect to the structure of instructional documentation?

3 Methodology

3.1 Experimental Design

Based on major differences of structure found by prior researchers, an experiment was conducted to test how those differences influence users' performances and preferences. It is a 2x2 experiment, with two independent variables and two dependent variables. The independent variables are cultural background of participants (Chinese and westerners) and structural design of manuals (Chinese and western); and the dependent variables are performance of a designed task as well as judgment of the software and manual.

Participants were asked to finish a task (create a translation memory) in SDL Trados Studio 2014 with a given manual.

As Table 2 shows, there were four versions of manual were used in the experiment.

Table 2

Manuals

Culture Background	Chinese	English
Chinese	CC	EC
Western	CE	EE

The official Trados user manuals were re-designed based on what prior researchers have found about the structural differences between Chinese and western technical instructions. Two versions were designed, an English manual based on English culture (EE), and a Chinese manual based on Chinese culture (CC).

To eliminate the influence of different language levels. Chinese participants used manuals in Chinese, and participants from the western culture used the manual in English. Therefore, EE was translated into a Chinese manual based on English culture (CE), and CC was translated into an English manual based on Chinese culture (EC).

3.2 Artifact

Trados Studio 2014 was selected as the software participants used. Trados is a popular computer-aided translation tool, which is well designed and easy to get with a free 30-day trial version; besides, it provides English and Chinese interface languages, and can be switched easily. The most important is that only professional translators use this tool, and for people outside the translation field, they have no idea of computer aided translation tool, not to say Trados. Therefore, most peoples' prior knowledge of the software is at the same level.

There are official manuals of Trados in different language. The manual was designed in English by western technical communicators, and localized into other languages. The manuals used in the experiment are designed based on the official manuals.

3.3 Manipulations

First column of Table 3 shows major differences in the aspect of structure found by researches, and second column shows how those differences are manipulated in the manual.

Table 3

Cultural Differences (Structure)

Differences	Variables	Chinese Culture	Western Culture
Structures less specifically defined in Chinese culture	Conjunctions	Less conjunctions	More conjunctions
Fewer structure elements in Chinese culture	● Table of contents ● Lists ● Abbreviations ● Glossary ● Header ● Footer	● No table of contents ● Less lists ● No abbreviation list ● No glossary ● No header ● No footer	● Table of contents ● More lists ● An abbreviation section ● A glossary section ● Header (company logo) ● Footer (page number)
Headings less common in Chinese culture	Sub-headings	No sub-headings	Sub headings
Inductive vs. deductive	Document elements order	Arguments->conclusion	Conclusion->argument
Lack of topic sentences in Chinese culture	Position of topic sentences (Combined with the inductive and deductive structure)	Placed at the end of the paragraph	Placed at the beginning of the paragraph
General vs. concrete	Document elements order	General to concrete	Concrete to general
Implicit vs explicit	Description detail extent of the operation	Do not describe every required action, and more briefly. No explanation of the document conventions.	Describe actions step by step with numeric lists. There is a section to describe the document conventions.

During the design process, a certificated trainer of SDL Trados reviewed the manuals to make sure there were no mistakes related to the knowledge and operation of Trados. A professional translator reviewed and edited the re-designed (EE and CC) and translated versions (CE and EC) to make sure that they are completely equivalent and that there are no mistakes related to language use.

Designed Manual Examples

The figures below show some examples of the manipulations structure in the designed manuals.

1. Subheadings

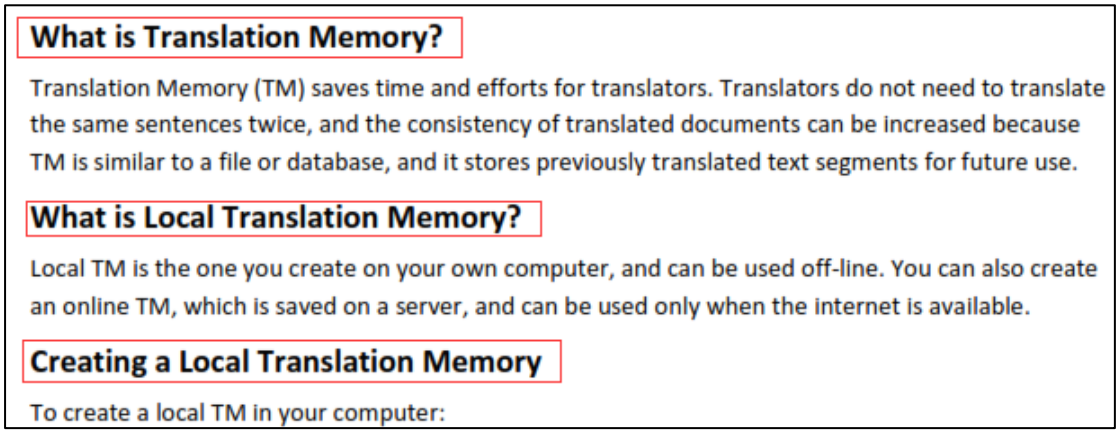

Figure 2 Western Culture (Subheadings)

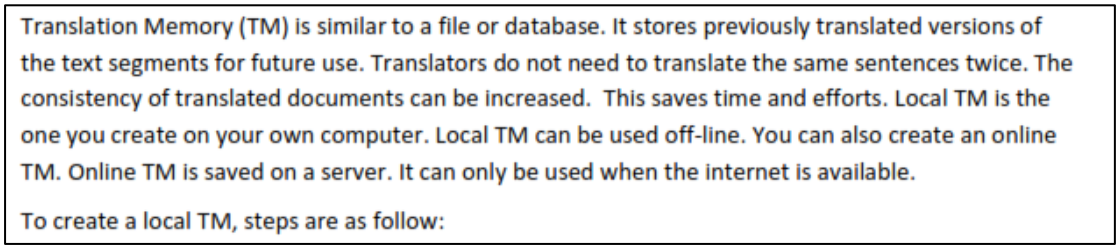

Figure 3 Chinese Culture (No Subheadings)

2. Inductive vs. Deductive

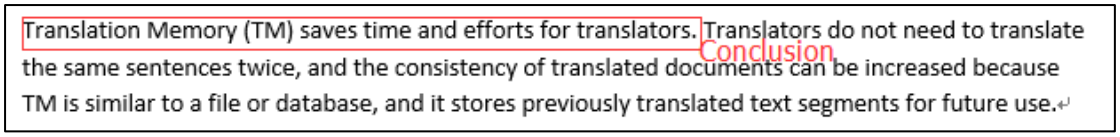

Figure 4 Western Culture: Deductive (Conclusion -> Argument)

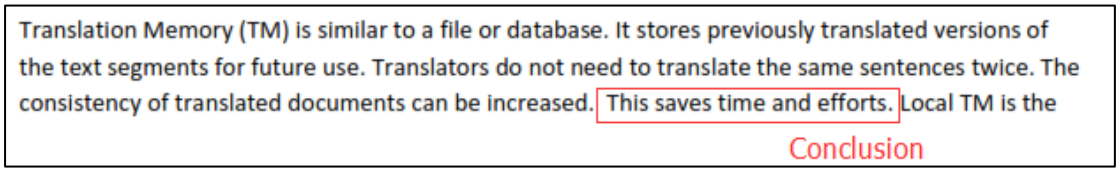

Figure 5 Chinese Culture: Inductive (Argument->Conclusion)

3. Implicit vs Explicit

1) To add a customized untranslatable element to the **Variable List**:
   a) In the **Resource**s section, double-click on **Variable** List. The **Variables** dialog box displays.
   b) Double-click on the first line and type in the variable name, for example, "Google" .
   c) Click **OK** to close the dialog box.

Figure 6 Western Culture (Explicit with Lists)

identifies it as untranslatable element. The operation is: In the **Resource** section, double click **Variable List**; then in **Variables** dialog popped up, type in the variable name, for example "Google"; finally click **OK**.

Figure 7 Chinese Culture (Implicit without Lists)

4. General vs. Concrete

SDL Trados Studio is one of the most popular computer-aided translation (CAT) tools in the world, which is used by over 200,000 translation professionals worldwide. Besides translation function, you can use SDL Trados Studio to manage translation projects and terminologies. SDL Trados

CAT tools reduce the workload for translators because translators do not need to translate what they have translated based on two functions of CAT tools: memory and search. CAT tools compare what is being translated with previously translated texts, and give suggestions according to different match ratios. CAT tools are different from Machine Translation (MT) tools. MT tools (e.g. Google Translation) do the translation for people. However, CAT tools are semiautomatic. CAT tools do not replace translators, and just assist the translation process. CAT->MT

CAT tools came into existence because globalization has increased the demand for multilingual documentation, and the translation companies need to copy with larger volumes of translation with shorter time. Global Environment

Figure 8 Western Culture (Concrete to General)

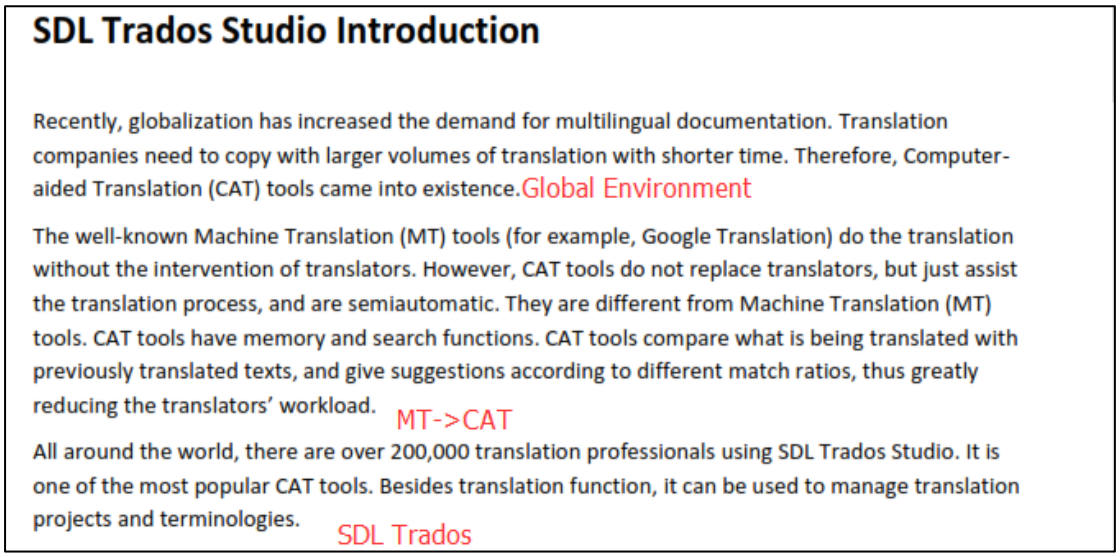

Figure 9 Chinese Culture (General to Concrete)

3.4 Instrument

Direct observation was used to collect data about users' performance.

Performance includes effectiveness, efficiency, and users' knowledge of manual. Success rates of tasks were used to measure effectiveness. There are 7 sub tasks, and for each small task, the success rate was recorded. Besides, time consumed for the task was counted to be a measurement for efficiency. The maximum time for the 7 sub tasks is 25 minutes. The attempts users tried to created translation memories was also used to measure efficiency. It can be easily figured out by the number of translation memories the user has created. Finally, users' knowledge was measured by the correctness of knowledge and the number of the Don't Know answers.

Judgment of the software and the manual was measured by a questionnaire. The questionnaire was checked by a translator to achieve complete equivalence.

After the task, participants were asked to fill in a questionnaire. The questionnaire consisted of three parts. The First part was intended to measure the usability and Usefulness of Trados. The second part was designed to measure to what extent the user understand and memorize the manual. The third part was to see the users' judgment about the usability, language, structure, and layout of the manual.

The first part has 18 questions, all are five-level Likert items, from strongly agree to strongly disagree.

- Question 1 to question 12 were used to measure the usability of Trados
    - 1-8: are revised based on Software Usability Scale (SUS). SUS is reliable and robust scale that can quickly and easily to measure the usability of many products and services (Bangor, Kortum, & Miller, 2008; Bangor, Staff, Kortum,

& Miller, 2009; Lewis & Sauro, 2009). Moreover, (Bangor et al., 2008) suggest to change “cumbersome” with “awkward” because some non-native English speakers don’t understand the word. An example is as follows:

I found Trados unnecessarily complex.

- 9-12: are more questions about how satisfied users are when they use Trados with the given manual and the learnability of Trados. An example is as follows:

I could learn to work with Trados quickly.

- Question 13 to question 18 are used to measure the Usefulness of Trados, which is how useful they think Trados is for translators. An example is as follows:

I think Trados is a useful tool for translators.

The second part of the questionnaire (19-27) is made of nine statements about the knowledge of Trados, including the description and operation of the software. Participants should judge whether those statements are true or false, or don’t know based on the memory of reading manuals. An example is as follows:

Trados is a kind of computer-aided translation tool.

The last part is to know users’ appreciation for the manual. Five-level Likert is used, from strongly agree to strongly disagree.

- 28-35: Usability of the manual. An example is as follows:

I am satisfied with this manual.

- 36-39: Language of the manual. An example is as follows:

The language of the manual is clear.

- 40-48: Structure and navigation of the manual. An example is as follows:

The structure of the manual is confusing.

- 49-52: Layout of the manual. An example is as follows:

The manual looks crowded and busy.

In sum, success rate and minutes show the performance of the users when they are using different manuals. Questionnaire can help to measure the usability of Trados with the influence of manual, how users understand the manual and task, and their judgment about the manual.

3.4.1 Scale Construction

Data collected from the questionnaire were first processed as follows:

- All negative questions were recorded.
- A new variable “Task correct” was created to count the number of finished tasks.
- For software judgments, there new variables were created.
  - “Usability general”: the general usability measurements, such as satisfaction and efficiency.
  - “Usability complex”: how difficult the software is.
  - “Usefulness”: how useful the software is.
- For knowledge part of the questionnaire, the values of all answers were recorded. Two new variables were created
  - “Dont know”: count how many times the participants answered as don’t know in the knowledge questions.
  - “Knowledge correct”: count the amount of correct answers.
- For manual judgments, three new variable were created.
  - “Manual language”: opinions about the language use of the manual.
  - “Manual structure”: opinions about the structure of the manual.
  - “Manual usability”: opinions about the usability of the manual.

3.4.1.1 Trados Variables

Factor analysis was done with varimax rotation, and it is in the Appendix 1. There are mainly 3 factors: Usability complex (3 items, Cronbach's Alpha: .62), Usability general (9 items, Cronbach's Alpha: .90), and USEFULLNESS (6 items, Cronbach's Alpha: .87). All the three scales are acceptable.

3.4.1.2 Manual Variables

Factor analysis of the questions about the manual was done with varimax rotation, and it is in the

Appendix 2. As Table 10 shows, there are 6 factors. Those factors that seem to be overlapped by each other were deleted, and then there are 3 factors shown in Table 11.

Those three factors are: Manual language (3 items, Cronbach's Alpha: .73). Manual structure (5 items, Cronbach's Alpha: .86), and Manual usability (5 items, Cronbach's Alpha: .90). All the three new scales are reliable.

3.4.1.3 Reliability of knowledge questions.

Knowledge about Trados are not very reliable (9 items, Cronbach's Alpha: .529), and it seems that nothing can done to increase the reliability.

3.4.1.4 Reliability of tasks

Tasks that users need to perform are reliable (7 items, Cronbach's Alpha: .748).

3.5 Participants

40 students from western culture and 40 Chinese students at the University of Twente were recruited. Among the western participants, 18 are from Dutch, 12 from German; 3 from France, 2 from Albania, 2 from Spain, 1 from America, 1 from Italy and I from Slovakia. None of those participants have been to China. All Chinese participants are from the mainland of China. All the participants have not heard or used Trados before.

For western participants, all can read and communicate in English.

As Table 4 shows, participants of different genders, ages and from different study background (T: technical background; NT: non-technical background) were assigned randomly into 4 groups.

Table 4

Participants Distributions

	Chinese Participants Chinese Structure	Chinese Participants Western Structure	Western Participants Western Structure	Western Participants Chinese Structure
Female	10	10	10	10
Male	10	10	10	10
Technical	10	10	10	10
Non-technical	10	10	10	10

3.5.1 Groups Comparability Analysis

In the four groups, variables about the participant's background are age, gender, and study background. The following sections discuss to what extend those groups are comparable.

Table 5

Participant Background Variables

	Chinese Participants Chinese Structure	Chinese Participants Western Structure	Western Participants Western Structure	Western Participants Chinese Structure
Age (Mean (Std. Deviation))	22.65 (1.51)	23.20 (2.04)	22.45 (3.09)	22.30 (2.99)

Age differences were tested by using UNIANOVA. There are no differences for nationality: F (1, 76) =.968, p=.328. There are no differences for cultural versions: F (1, 76) =.392, p=.533. Also there is no interaction effect between culture and nationality: F (1, 76) =.800, p=.128.

In conclusion, those groups are comparable when it comes to the relevant background characteristics.

3.6 Procedures

The experiment was conducted in a quiet room.

Before the start of the experiment, the researcher briefly introduced the experiment. Then the users were asked to turn off their communication devices and sign a self-consent form. Each participant was given a piece of paper about task description. They had 1-5 minutes to read and understand the task. When they understood what they should do, a manual would be handed to them and the researcher started recording time.

During the process, the researcher could not communicate with the participant except emergence cases happen. And the researcher stopped counting the time when the users finished the task or the time exceeded 25 minutes. As soon as the participant finished the task, he/she was asked to fill in a questionnaire. If they wanted to know more about the experiment, they could leave their email addresses.

After each experiment, the translation memory participant had created would be stored in different groups. Besides, all the records in Trados would be deleted to make sure the user interface was in its original status.

4 Results

This section gives out the experiment results. Differences in user's performance, appreciation of the software, appreciation of the manual, and some observations are described orderly.

4.1 Differences in Task Performance

Table 6 shows the mean score and standard deviation of task performance among the four groups.

Table 6

Differences in Task Performance

	Chinese Participants Chinese Structure	Chinese Participants Western Structure	Western Participants Western Structure	Western Participants Chinese Structure
Effectiveness: Task correct	5.35 (1.46)	5.7 (1.89)	6.15 (1.23)	5.5 (1.99)
Efficiency: Time taken*	11.23 (4.83)	13.00 (5.44)	13.15 (4.56)	12.75 (6.56))
Efficiency: Attempts	1.25 (.55)	1.50 (.76)	1.15 (.37)	1.05 (.22)
Knowledge: Correct Answers	6.95 (1.54)	6.45 (1.96)	6.25 (1.59)	6.15 (1.73)
Knowledge: Don't Know Answers	1.05 (1.10)	1.90 (1.71)	2.15 (1.66)	2.25 (1.48)

Note. The data are displayed in mean (std. deviation). "Task correct" measured the number of finished correct tasks. "Time taken" measured how many minutes the users used to finish the tasks. "Attempts" measures how many times users tried to do the task. "Correct answers" measured how many answers were answers about the knowledge of the manual and software. "Don't Know Answers" measured how many answers were asked in Don't know by users.

When it comes to the number of task correct, there is no effect of nationality: F (1, 76) =.644, p=.425. There is no effect of cultural version: F (1, 76) =1.79, p=.185. And also there is no interaction effects between cultural and nationality: F (1, 76) =.161. p=.689.

When it comes to the time participants used to finish the task, there is no effect of nationality: F (1, 76) =.481, p=.490; no effect of cultural version: F (1, 76) =.811, p=.371; and no effect between cultural and nationality: F (1, 76) =.324, p=.571.

When it comes to the times users tried to complete the tasks, there is a significant effect of nationality: F (1, 76) =5.677, p=.020. Chinese people made more attempts than westerners. However, there is no effect of cultural version: F (1, 76) =2.30, p=.134; and no effect between cultural and nationality: F (1, 76) =.422, p=.518.

When it comes to how many knowledge questions were answered correctly by the participants, there is no effect of nationality: F (1, 76) =1.71, p=.195; no effect of cultural version: F (1, 76) =.274, p=.602; and no effect between cultural and nationality: F (1, 76) =.616, p=.435. The mean score of group who used the manual designed based on their own culture is a little bit higher than the group who used the manual based on the other culture.

If participants' answers are DON'T KNOW, it means that users don't read or understand the manual well. There is a significant effect of nationality: F (1, 76) =4.617, p=.035; There were more DON'T KNOW answers among western participants than in Chinese. This may be caused by the reason that English is not the native language for the western people, which lower the average level of the readability. However, there is no effect of cultural version: F (1, 76) =1.235, p=.270; and no effect between cultural and nationality: F (1, 76) =1.982, p=.163. The mean score of the group who used the manual designed on other culture is bit higher than the group used the version based on their own culture.

4.2 Differences in Appreciation of Trados

Table 7 shows the mean score and standard deviation of user's perception of Trados among the four groups. The data are displayed in mean (std. deviation).

Table 7

Differences in Appreciation of Trados

	Chinese Participants Chinese Structure	Chinese Participants Western Structure	Western Participants Western Structure	Western Participants Chinese Structure
Usefulness	3.82 (.42)	3.53 (.58)	3.83 (.49)	3.68 (.84)
Usability general	3.58 (.64)	3.30 (.65)	3.50 (.56)	3.28 (.92)
Usability complex	3.20 (.68)	3.30 (.68)	3.82 (.54)	3.87 (.75)

Note: The data are displayed in mean (std. deviation). Scores were measured on a five-point scale (1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). "Usefulness" measured how useful the software was. "Usability general" measured general usability measurements, such as satisfaction and efficiency. "Usability complex" measured how difficult the software was.

When it comes to the Usefulness of Trados, there is no effect of nationality: F (1, 76) =.381, p=.530; no effect of cultural version: F (1, 76) =.309, p=.580; and no effect between cultural and nationality: F (1, 76) =2.576, p=.113. The mean score of the group who used the manual designed based on their own culture is a little bit higher than the group who used the manual based on the other culture.

When it comes to the general usability perception of Trados, there is no effect of

nationality: F (1, 76) =.091, p=.763; no effect of cultural version: F (1, 76) =.031, p=.862; and no effect between cultural and nationality: F (1, 76) =2.412, p=.125. The mean score of the group who used the manual designed based on their own culture is a little bit higher than the group who used the manual based on the other culture.

When it comes to the questions about the complexity of Trados (kind of usability), there is a significant effect of nationality: F (1, 76) =15.735, p<.001. Western users found it more difficult to use and learn Trados. However, there is no significant effect of cultural version: F (1, 76) =.028, p=.867; and no effect between cultural and nationality: F (1, 76) =.253, p=.617.

4.3 Differences in Appreciation of Manual

Table 8 shows the mean score and standard deviation of user's perception of user manual among the four groups. The data are displayed in mean (std. deviation)

Table 8

Differences in Appreciation of Manual

	Chinese Participants Chinese Structure	Chinese Participants Western Structure	Western Participants Western Structure	Western Participants Chinese Structure
Manual language	4.03 (.56)	3.92 (.80)	3.87 (.60)	3.68 (.70)
Manual structure	3.61 (.71)	3.75 (.69)	3.86 (.66)	3.66 (.95)
Manual usability	3.62 (.74)	3.68 (.54)	4.01 (.67)	3.56 (.95)

Note: The data are displayed in mean (std. deviation). Scores were measured on a five-point scale (1= strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). "Manual language" measured users' judgments about the language use of the manual. "Manual structure" measured users' opinions about the structure of the manual. "Manual usability" measured opinions about the usability of the manual.

When it comes to the language use in the manual, there is no effect of nationality: F (1, 76) =1.781, p=.186; no effect of cultural version: F (1, 76) =.049, p=.825; and no effect between cultural and nationality: F (1, 76) =1.002, p=.320. The mean score of the group who used the manual designed based on their own culture is a little bit higher than the group who used the manual based on the other culture.

When it comes to the structure of the user manual, there is no effect of nationality: F (1, 76) =.221, p=.640; no effect of cultural version: F (1, 76) =.997, p=.321; and no effect between cultural and nationality: F (1, 76) =.032, p=.861. However, the mean scores of manual designed in western culture are higher.

When it comes to the usaibility, there is no effect of nationality: F (1, 76) =.771,

p=.383; no effect of cultural version: F (1, 76) =2.575, p=.113; and no effect between cultural and nationality: F (1, 76) =1.541, p=.218. However, the mean scores of manual designed in western culture are higher.

4.4 Observations

During the experiment, there were other findings observed.

When given a new software, most participants, both Chinese and westerners, would like to explore the software to learn. They tried to finish the task based on their prior knowledge about software, and only used the manual only when the task was beyond their previous knowledge or tried many times by themselves but failed.

When in trouble, many users tried to use the embedded help manual in the software or found the results by Google because they thought they could immediately find the answers without the need to read much irrelevant information.

When using the printed manual, some users read the manual by using their fingers pointing to the paper word by word. This might because that people are adapted to the fragmentation of information, and find it impatient to focus and difficult to read long passages. Less impatience was also proved by the fact that users were reluctant to turn pages even if there were only 3 pages, and most people skipped the description part and read the steps or highlighted part directly.

Therefore, participants thought that to find what they need was quite important, and it can help them solve the problem with least efforts in the shortest time. So they put forward some suggestions about the printed help manual.

Firstly, information should be arranged based on task or even subtasks, and headings/subheadings exactly describe the topic of the steps.

Secondly, about those structural elements, they thought that table of content was a must, lists were helpful, more subheading were good, and glossary was less helpful.

Thirdly, key words should be emphasized in different ways or put in the index.

Finally, some participants said the manual was helpful only when it could help to solve problems. So they thought that the order of information (from most important to least important) should be trouble-shooting information, procedural information and conceptual information.

There is another interesting phenomenon. Chinese students regarded it more than an experiment. Many participants were curious about the other participants' performance, for example, how many participants had finished the task, what their ranks were, or what the shortest time is. And even when Chinese participants met with each other, they would like to compete with each other about the results. At the same time, no western students asked questions about other's performance.

Chinese people would like to compete with each other about whether they finished the task. Western students just treated it like an experiment.

In sum, participants would like to explore new things without manual. And they preferred online manual to printed one because it is easier to navigate. Task-based topics, structural elements, highlighted key words, and trouble shootings may help them search information on printed media. Specifically, Chinese participants cared more about the results and their performances than westerners.

5 Conclusion and Discussion

5.1 Main Findings

Only two significant differences were found. The first is that when finishing the task, Chinese people made more attempts than westerns. The second one is that when asked questions about the knowledge, western participants answered more Don't Know than Chines people.

Those two may be explained by the politeness theory. The face concept comes from Chinese culture (Oetzel et al., 2001). Brown and Levinson (1978; 1987) divided faces into positive faces and negative faces. The positive face is the need to be liked by other people and negative face is the desire to act freely without the constraint of others. In general, Chinese people cared much more about face than western people (Oetzel et al., 2001). To be specifically, people from collective culture (Chinese) emphasized positive face while people from individual culture (western) value more about negative face (Gudykunst, Ting-Toomey, & Chua, 1988; Oetzel et al., 2001). So Chinese students tried their best to finish the task, and did not want to fail in front of the participant. For the same reason, when asked questions, they preferred to guess than admit they did not know they answers, just not to lose faces.

Except the differences mentioned above, no big differences are found between the manuals of Chinese and Western cultural. It may be caused by the following reasons:

Limitation of Structure Elements Founded

The first possible reason is the limitation of the structural differences found by prior researchers.

Firstly, those finding might be outdated. All culture differences between Chinese and west are found no less than 5 years ago. The world is developing so rapidly nowadays, so what they found 5 years ago might have changed.

Secondly, all the findings were based on comparisons of one or several documents. The number of technical documentation is far from enough.

No Cross-cultural Structure Differences

The second reason for the insignificance might be that users perform similar when using instructions. This is a piece of good news for the multinational corporation, because there is no need to change anything about structure during localization.

However, it is reckless to say there are no structural differences among cultures. Rather, it might be those structure elements found by prior researches do not seem to be so important. There might be other structural differences that might cause the different performances and preferences of users.

Little Time Spent on Manuals

The final possible reason for the insignificance might be that participants spent so little time reading the manual that the differences could hardly take effect. Most manipulations of structure were conducted in descriptions. But almost all the users skipped descriptions, and only read highlighted or steps, where only few manipulations there. So users would not notice the structure elements, the order of sentences, or the relationship of each part.

Users were impatient to read all the texts. In addition, users did not use the manual so often because they thought they could solve the problem with their prior knowledge. None of the participants has used the software before, but the operations and interface are similar, so many could create new translation memory by clicking New. There were 2 out of 7 tasks that users could not finish without the help of manual, maybe not enough.

User spent little time on the manuals might be also because the experiment condition was stressful. During the experiment, people felt pressured and just wanted to finish the task in the limited time. Some claimed that they would probably read the whole manual if it was not experiment.

5.2 Limitations and Future Research

There are some limitations about the number and background of participants.

First all the Chinese participants are students in the Netherlands. So they might know better about western culture than the average Chinese people. And also they might have been influenced or got used to the western culture. Therefore, in the future experiment, those Chinese people who live in China and have not been abroad could be recruited. They know less about western culture, so there will be less bias.

In addition, the participants did not use the manual. Users still relied on their previous experience, so they did not use the manual quite often. So in the future experiment, a software or hardware whose operations and concepts are both quite new to users can be selected, or more tasks that dependent on the manual could be designed, then users must use the manuals and differences might be found.

Finally, the experiment was conducted in an experiment room. The users might feel stressed when in experimental environment. So the future experiment can be done in the real environment, and the users may show different performance.

5.3 Conclusion

Many researches have shown that there are some structural differences between Chinese and English technical instructions. It seems that Chinese documents are arranged in less explicit and holistic way. In addition, the sequence of elements always follow the nature order.

Those differences mentioned above are discussed only on preferences of writers, but not directly talk about the performance and preference of users. Therefore, this research conducted an experiment to find the differences between Chinese and western users when they use documents designed in different cultures.

The experiment showed that no difference between users on task performance, understanding of the manual or the judgment of the manual.

In sum, it is learnt that on the one hand, the literature on culture differences does not seem to be confirmed in the user study. On the other hand, the insights we have about structuring manual in the western world don't seem significantly better than Chinese. It seems that the influence of culture in technical documentation is overstated.

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Appendix

Appendix 1 Trados Variables

Table 9

Trados Factors

	Component 1	Component 2	Component 3
2. I thought Trados was easy to use.	.788		
5. I imagine that most people would learn to use Trados very quickly.	.734		
6. I found that Trados was very awkward to use.	.730		
10. I am satisfied with Trados.	.723	.415	
9. It is pleasant to use Trados.	.681	.408	
8. I needed to learn a lot of things before I could get going with Trados.	.653		
7. I felt very confident using Trados.	.592		.490
11. I think Trados is a wonderful tool.	.555		
4. I thought there was too much inconsistency in Trados.	.456		
13. I think Trados is a useful tool for translators.		.818	
16. I think Trados helps translators to be effective.		.775	
15. I think Trados helps translators to be productive.		.768	
18. I think Trados makes translating documents easier to get done.		.743	
14. I think Trados meets the needs of translators.		.727	
17. I think Trados gives translators more control over their translation tasks.		.608	
1. I found Trados unnecessarily complex.		.414	.709
12. I could learn to work with Trados quickly.			.701
3. I thought that I would need the support of a technical person to be able to use Trados.			.550

Appendix 2 Manual Variables

Table 10

Manual Factors-1

	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
28. I am satisfied with this manual.	.856					
29. The manual is of good quality.	.830					
34. The information in the manual is appropriate for me.	.781					
32. The manual was helpful for conducting the task.	.721					
31. The manual is user friendly.	.661					
30. The manual is professionally designed.	.482					
46. I could easily find the information I need in the manual.		.750				
47. Navigation and search are easy in the manual.		.728				
48. I did not get lost in the manual.		.722				
43. The information is organized in a way that is easy to follow.		.681				
44. The organization of the manual enables quick retrieval.	.434	.610				
42. The content in the manual is organized in a logical way.		.571				
40. The structure of the manual is confusing.		.484	.458			
49. The text is legible in the manual.			.704			
45. The organization of the manual is consistent.			.700			
37. The writing in the manual flows smoothly and coherently.			.688			
39. The tone of the manual is appropriate.			.676			
46. The language of the manual is clear.	.448		.657			
41. Headings in the manual give good indications of the texts below them.				.723		

(continued)					
38. Sentences in the manual are complicated.		.644			
52. The length of sentences and paragraphs is reasonable.		.498			
51. The manual looks crowded and busy.			.720		
35. The manual contains useful examples.	.464		-.529		
50. The layout of the manual is attractive.	.482		.484		
33 .The manual is similar to those manuals I have used before.				.818	

Table 11

Manual Factors-2

	Component 1	Component 2	Component 3
28. I am satisfied with this manual.	.864		
29. The manual is of good quality.	.856		
34. The information in the manual is appropriate for me.	.763		
32. The manual was helpful for conducting the task.	.750		
31. The manual is user friendly.	.713		
47. Navigation and search are easy in the manual.		.838	
46. I could easily find the information I need in the manual.		.782	
44. The organization of the manual enables quick retrieval.	.435	.727	
43. The information is organized in a way that is easy to follow.		.687	
48. I did not get lost in the manual.		.618	.420
39. The tone of the manual is appropriate.			.772
37. The writing in the manual flows smoothly and coherently.			.726
36. The language of the manual is clear.	.496		.685

Appendix 3 Cultural Differences (Style, Visual Design, User Behavior, and Content,)

Table 12
Differences in Style

General	Differences	Sources	Type of Study
Authoritative/Official writing	Chinese: formal style American: conversational style.	(Barnum & Li, 2006)	Content Analysis
	Chinese: preference for military metaphor. American: preference for sports metaphors.	(Barnum & Li, 2006)	Content Analysis
	Chinese: preference for British English	(Barnum & Li, 2006)	Content Analysis
	Chinese: long paragraphs	(Barnum & Li, 2006)	Content Analysis
	Chinese: scant description of safety issues	(Barnum & Li, 2006)	Content Analysis
Practical writing vs literature writing	Chinese: poetic language	(Barnum & Li, 2006)	Content Analysis
	Chinese: verbose prose/rich, ornate prose, and greater use of adj. and adv.	(Barnum & Li, 2006)	Content Analysis
	Chinese: proverbial expressions	(Barnum & Li, 2006)	Content Analysis
	Chinese: more parallel structure	(Han, 2009)	Content Analysis
Less direct	Chinese: introductions less straightforward	(Barnum & Li, 2006)	Content Analysis
	Chinese: end with facts and optimistic view of the future. American: end with direct recommendations.	(Barnum & Li, 2006)	Content Analysis
	Chinese: indirect	(Dragga, 1999)	Informal Research
	China and American writers show little difference about the indirect or direct writing style.	(Junhua Wang, 2009)	Content Analysis
Less specific	Chinese: focus on ideal situation, not specific steps	(D. D. Ding, 2003)	Content Analysis
	Chinese: limited specificity	(Han, 2009)	Content Analysis
	Chinese recipe is not specific about the Ingredient amounts and time length.	(Barnum & Li, 2006)	Content Analysis
	Chinese recipe has fewer Ingredients listed.	(Barnum & Li, 2006)	Content Analysis
	Chinese recipe is specific about the cutting methods. American recipe is not specific about the cutting methods.	(Barnum & Li, 2006)	Content Analysis

Table 13

Differences in Visual Design

General	Differences	Sources	Type of Study
Elaborative and redundant text-graphic relationship	Inaccurate correspondence between a graphic and a verbal explanation in Chinese culture.	(Q. Wang, 2000)	Content Analysis
	Illustration is shown out of context in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	Loosen text-visual integration in Chinese culture.	(Q. Wang, 2000)	Content Analysis
	Visuals are rather loosely integrated with the text, without labels and reference in Chinese culture.	(D. D. Ding, 2003)	Content Analysis
	Visuals are not so well integrated with the corresponding texts in Chinese culture.	(Q. Wang, 2000)	Content Analysis
	Chinese: the text-graphic relationship of Chinese textbooks is elaborative German: redundant.	(Y. Wang & Wang, 2009)	Content Analysis
Different target audience	The Chinese manuals emphasize technical information, with tables and wiring layout. The American manuals emphasize task performance.	(Q. Wang, 2000)	Content Analysis
	More technical data are contained in Chinese culture.	(D. D. Ding, 2003)	Content Analysis
	Chinese manuals do not describe every required action.	(D. D. Ding, 2003)	Content Analysis
	Assembling or installing task is illustrated briefly in Chinese culture.	(Q. Wang, 2000)	Content Analysis
Less page design elements	Lack page design elements such as controlled use of white space, in-text emphasis, diagrams, lists, a variety of type sizes and fonts, and so forth in Chinese culture.	(Barnum & Li, 2006)	Content Analysis
	There are more emphasis markers used for notes and warnings, such as bold font and icons in American manuals.	(Q. Wang, 2000)	Content Analysis
More graphics	More graphics in Chinese culture.	(Y. Wang and Wang, 2009)	Content Analysis

Table 14

Differences in User Behavior

General	Differences	Sources	Type of Study
Chinese have better understanding of pictures	Chinese mechanics have a better understanding of graphics than the Germans.	(Y. Wang & Wang, 2009)	Experiment
	Chinese mechanics needed less information than the German.	(Y. Wang & Wang, 2009)	Experiment
	Chinese have high competence in understanding pictographical information. While German have a better understanding of textual information.	(Honold, 1999)	Experiment
Pragmatism	The objective of learning for Chinese is directly basic and useful features. German users would like use all relevant features.	(Honold, 1999)	Experiment
	Chinese make less use of information kinds, and show consistent preference of online help to printed documentation. German use more kinds of information, printed documentation first, and then online help.	(Honold, 1999)	Experiment
More dependent on experience	Chinese: rote learning (knowing by heart, learning by imitating). While the German focus on understanding (Knowing the principles, Learning by exploring).	(Honold, 1999)	Experiment
	Chinese users would like get help form their relationships (Guanxi), often informal and oral ways. Germans prefer formal sources.	(Honold, 1999)	Experiment

Table 15

Differences in Content

Differences	Sources	Researches
In the user manual for refrigerator, traditional characters are used to make it possible to export to Taiwan, Hong Kong, or other parts where people still use traditional characters.	(Barnum & Li, 2006)	Content Analysis