Research Article

Cultural Differences Between Chinese and Western User Instructions: A Content Analysis of User Manuals for Household Appliances

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Abstract—Research problem: Cultural differences may be increasingly important in technical communication. Research is needed to investigate differences in document design practices and user preferences. This study examines cultural differences between Chinese and Western manuals for household appliances. Literature review: Earlier studies identified a wide range of possible differences between Chinese and Western documents, but the findings are not consistent and do not provide more generic perspectives on cultural differences. Possible reasons are the diversity of the documents used, the rather informal research designs, and relatively small sample sizes. Research question: To what extent and how do Chinese and Western manuals for household appliances differ from each other in terms of content, structure, and use of visuals? Methodology: To overcome these shortcomings, a quantitative content analysis was conducted, comparing 50 Chinese manuals and 50 Western manuals for household appliances. The coding scheme was based on earlier research findings and focused on content, structure, and the use of visuals. Results and conclusions: The results show that the content of Chinese manuals is less strictly confined to the function of user support than that of Western manuals. Compared to Western manuals, the structure of Chinese manuals appears to be fuzzier and less rigid. Regarding visuals, Chinese manuals contain more non-instrumental, entertaining illustrations than Western manuals. Underlying these differences is a more general distinction between highly instrumental Western manuals and more flexible Chinese manuals. These differences seem to point to two cultural dimensions: holistic versus analytic thinking and analog versus digital cultures.

Index Terms—Chinese culture, cross-cultural communication, intercultural communication, user instructions, user manuals.

The world is globalizing at a fast pace and the rapid technological developments know no boundaries. National markets for technical products have developed into global markets. Understanding the challenges of cross-cultural communication is crucial for companies to survive fierce competition worldwide. Ignoring cultural differences might lead to products and user support with suboptimal usability or user experience [1]–[4]. The field of technical and professional communication, therefore, has to pay attention to issues of translation [5]–[7], localization [8]–[10], and culture [11]–[17].

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An important topic in the technical and professional communication literature involves the role of cultural differences in user instructions. In previous research, two approaches can be seen. Taking differences between documents as a starting point, researchers have used content analysis of user instructions to shed light on cultural differences in document design practice. Four aspects may be distinguished: content selection, structure, style, and the use of visuals. Taking differences in use as a starting point, some other researchers have used interviews or experiments to shed light on cultural differences in user preferences or effectiveness.

This article takes the first approach. Based on a content analysis of Chinese and Western manuals for household appliances, we investigated differences in document design practices between Chinese and Western user instructions. Such differences might correspond to differences in user preferences, but may also reflect differences in expertise or habits of technical communicators.

So far, several content analysis studies have uncovered a wide range of potential cultural
Practitioner Takeaway

- This study is the first to examine cultural differences between Chinese and Western user instructions, comparing substantial samples of manuals in a systematic, quantitative content analysis, and focusing on content, structure, and visuals.
- The study uncovered many specific differences between Chinese and Western manuals and attempts to make sense of them in more generic terms.
- The overall differences between Chinese and Western manuals can be summarized in terms of multiple- versus single-purpose content, fuzzy versus rigid structure, and entertaining versus functional visuals.

differences between Western and Asian documents. However, their findings are not consistent and do not provide more generic theoretical perspectives. Some characteristics of the available studies may be responsible for these shortcomings. First, the documents included in the analyses were quite diverse: Various types of user instructions were analyzed, but they also analyzed noninstructional documents such as research reports. Second, most content analyses used small samples of documents and were conducted and reported rather informally. Small samples imply that findings may be easily skewed by particular documents included in the corpus studied. Informal research approaches mean that researchers’ own interpretations may play a significant role. Third, the coding schemes used, if any, were mostly inductive, so specific characteristics of the documents and interests of researchers guided the results. Finally, the research covered a wide timeframe (1998–2009), but no more recent studies have been performed.

To overcome these shortcomings, we conducted a formal content analysis using a much larger sample, specifically focusing on a single genre of technical communication: user manuals for household appliances. We limited our study to a comparison of Chinese and Western manuals. We operationalized Western as North American and Western European. Taking earlier research findings as a starting point, we developed a coding scheme to systematically analyze differences between Western and Chinese manuals. We focused our analyses on three aspects: content selection, structure, and the use of visuals. The fourth aspect, style, was left out, because it is too much interwoven with the nuances, habits, and complexities of language use to be suitable for quantitative analysis.

Theoretical Perspectives: Top-Down Versus Bottom-Up Approaches

Research into cultural differences may uncover many detailed differences between cultures. As informative as such specific differences may be, we need a broader theoretical framework to really make sense of them. The relationship between such a theoretical framework and content analysis research may be two-fold. On the one hand, top-down (or deductive) approaches take an existing theoretical framework as a starting point to test predictions about specific differences between documents from different cultures. On the other hand, bottom-up (or inductive) approaches try to translate specific differences between documents from different cultures into more generic insights about cultural differences.

When it comes to existing theoretical frameworks, Hofstede’s six cultural dimensions are a prominent approach [18], [19]. Using the metaphor of an onion, Hofstede assumed that values are at the core of cultural differences. Around this core, less fundamental cultural differences can be found, such as rituals, heroes, symbols, and practices. Based on an extensive research project, Hofstede proposed the following six value-based cultural dimensions:

- **High versus low power distance**: The extent to which people accept and expect hierarchy and unequal distributions of power
- **Individualism versus collectivism**: The extent to which people prefer a loose network in which they basically should take care of themselves, or a tight network in which people take care of each other and are loyal to each other
• **Masculinity versus femininity:** The extent to which people value either competition, achievement, assertiveness, and material awards, or cooperation, well being, care for the weak, and quality of life

• **High versus low uncertainty avoidance:** The extent to which people feel uncomfortable with uncertainty and ambiguous situations

• **Long-term versus short-term orientation:** The extent to which people value thrift and education and prepare for the future, or hold onto old traditions and view change with suspicion

• **Indulgence versus restraint:** The extent to which people value enjoying life and having fun, or value the regulation of such pleasures with strict social norms

Several researchers in the domains of technical communication and interface design have tried to connect these value-based cultural dimensions to user-technology interaction and user support [20]–[24]. These attempts, however, have not always been convincing. The gap between underlying values and technical communication or interface design practice appears to be wide, and leads to odd claims that people with low uncertainty avoidance scores would prefer complex structures [23], or people with high individualism scores would prefer a homogeneously colored user interface [21].

Comparable frameworks of values- or preference-based cultural dimensions were developed by Hall [25] and Trompenaars and Hampden-Turner [26]. Not all dimensions seem to be applicable within the field of technical and professional communication, but two of them seem promising.

• Hall’s distinction between high-context and low-context cultures focuses explicitly on communication characteristics among people [25]. According to Hall:

  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. [25, p. 91]

Western countries are on the lower end of the scale, and China is on the higher end. Thus, Western users need more explicit and detailed information than Chinese users.

• Trompenaars and Hampden-Turner’s distinction between universalism and particularism deals with the importance of rules in relationships between people [26]. Universalism suggests that rules are the regulatory force and need to be consistently followed, whereas particularism suggests that circumstances diminish the overall applicability of rules. Western countries tend to universalism, while China can be characterized by particularism.

In addition, some researchers used nonresearch-based frameworks to make sense of cultural differences between Western countries and China, such as the lens of Confucianism [27] or a historical perspective on instructional documents [28].

Top-down research may have trouble translating abstract theoretical concepts into convincing and comprehensive document or interface characteristics. But a comparable problem applies to bottom-up research: Researchers uncovering specific differences between manuals, interfaces, or documents may find it hard to connect them to more general theoretical explanations.

Given this state of the art, we decided not to adopt one of the theoretical frameworks to guide our content analysis, but to develop our own coding scheme, based on the various specific findings of earlier content-analysis studies into differences between Chinese and Western documents. Next, we summarize the main findings of these earlier studies.

**Results of Earlier Content Analyses** Table I gives an overview of earlier content analyses comparing Asian and Western documents. We limited our overview to studies of informative and instructional documents and focused on content, structure, and visuals. Where possible, we complement the overview with related findings based on user research.

**Content:** Research into cultural differences in content is relatively scarce. One study suggests that Chinese manuals may contain more elements that are not directly related to the user instructions themselves, like advertisements and welcoming information [29]. This may be framed in terms of the long-term versus short-term orientation dimension: China’s long-term orientation calls for attempts to build lasting relationships with users. In the same vein, another study found that introductions and conclusions differ between American and Chinese research reports [14]. More than in American reports, Chinese introductions try to make a good impression on the reader, and Chinese conclusions try to save the face of readers by providing cautious suggestions rather than
direct recommendations [14], [30]. These tendencies all would lead to documents that are—in Western eyes—less functional.

Another difference involves the amount of technical information in manuals. Several studies suggest that Chinese manuals provide more technical information [14], [29], [31], [32], including wiring diagrams [31] and technical terminology [14]. They seem to address a mixed user group of technical professionals and end users, whereas Western manuals typically focus on end users only.

Two studies suggest that safety information is less prominent in Chinese manuals than in Western ones [14], [29]. This difference might be attributed to societal developments in Western countries, in particular the US, in which product liability has become increasingly important. It could also be framed in terms of high- versus low-context cultures. The Chinese culture can be seen as a high-context culture, in which common knowledge may be left unsaid, while Western countries have low-context cultures, in which detailed and specific information is considered to be important [29].

Structure: Several studies on differences in structure between Chinese and Western documents point toward a conglomerate of findings, reflecting that Chinese culture seems to prioritize holistic thinking while Western cultures favor analytic thinking patterns. In line with the more holistic orientation of Chinese culture, various studies found that chunking of information is much less common in Chinese manuals than in Western ones, that the structure is less prominently and explicitly presented, and that categorizations are less strict [14], [30], [32]–[34]. Chinese manuals, for instance, pay more attention to the interrelations between content elements [32]–[34]. Furthermore, Chinese documents tend to have fewer headings and structural markers than Western documents [14], [30], and the same applies to notes, warnings, and other elements that stand out from the main text [31]. The structure of Chinese documents is less fine grained than that of Western documents [33], [34].

Apart from explanations in terms of holistic versus analytic thinking patterns, several other explanations have been proposed for these differences in structuring information. Some researchers refer to differences in perceived responsibility. In Western countries, technical communication professionals are considered to be responsible for usable instructions; in China, readers are often seen as responsible for using instructions effectively [14], [30]. This difference may reflect the different phases of development of technical communication as a professional and academic discipline between China and the West [28]. Others refer to the aforementioned distinction between high-context and low-context cultures, which may also be applied to the explicit and unambiguous structure of documents: Explicitness and clarity are more prominent virtues in Western cultures than in China [29], [30]. This difference also relates to the distinction between yihe and xinghe in languages [17]. In yihe-prominent languages (such as Chinese), texts are implicitly

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**TABLE I**

OverView of MethodoLogical Features of Earlier Content Analyses

<table>
<thead>
<tr>
<th>Source</th>
<th>Year</th>
<th>Sample Characteristics</th>
<th>Types of Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carroll and Delin [37]</td>
<td>1998</td>
<td>3 WE — 3 JPN</td>
<td>User manuals for electronic products</td>
</tr>
<tr>
<td>Wang [31]</td>
<td>2000</td>
<td>2 US — 2 CN</td>
<td>User manuals for small household devices</td>
</tr>
<tr>
<td>Ding [32]</td>
<td>2003</td>
<td>1 US — 1 CN</td>
<td>Water heater manuals</td>
</tr>
<tr>
<td>Barnum and Li [14]</td>
<td>2006</td>
<td>US — CN (N = unclear)</td>
<td>Various document types</td>
</tr>
<tr>
<td>Dong [29]</td>
<td>2007</td>
<td>10 US — 10 CN</td>
<td>Home heater manuals</td>
</tr>
<tr>
<td>Wang et al. [33]</td>
<td>2007</td>
<td>GE — CN (N = unclear)</td>
<td>Automotive textbooks and service manuals</td>
</tr>
<tr>
<td>Wang and Wang [34]</td>
<td>2009</td>
<td>2 GE — 2 CN</td>
<td>Automotive textbooks and service manuals</td>
</tr>
</tbody>
</table>

Note: WE = Western, JPN = Japanese, CN = Chinese, GE = German.
organized by meaning and logic; in xinghe-prominent (Western) languages, texts are explicitly organized using structuring elements.

Another structural difference involves the ordering of information. Various studies suggest that Asian documents tend to have an inductive organization, whereas Western documents are often organized deductively [14], [30], [35], [36]. Barnum and Li assume that this difference is also linked to the distinction between holistic and analytic thinking patterns [14]. However, it is questionable whether the preference for an inductive or deductive structure will manifest itself in manuals with procedural user instruction at their core.

An empirical study into the usability of and user preferences for Chinese versus Westerns ways of structuring the information in manuals did not reveal any significant differences between Chinese and Western participants in preferences and task execution, suggesting that the structural differences that manifest themselves in manuals may not be that important to users [17].

**Visuals:** Regarding the use of visuals in manuals and other documents, several researchers concluded that Asian documents contain more visuals than Western ones [30], [33], [37]. In line with this finding, user research suggests that Chinese users appreciate pictorial information more than German users do [38]. Although somewhat speculative, this conclusion might be attributed to fundamental language differences: Chinese characters are pictographic scripts, while the Western alphabet is phonetic [34].

Other findings involve the nature of visuals. Research suggests that visuals in American manuals are closely related to task performance—for example, close-ups of a specific operation—whereas visuals in Chinese manuals often focus on overall product representations [31]. Furthermore, Asian manuals appear to have more diverting, cartoon-like visuals than Western manuals [37], [39]. As an example, one can think of a picture of a refrigerator sweating from cooling a heavy load. Researchers suggest that cartoon pictures “make difficult tasks seem like fun,” “create a friendly appearance” [11, p. 169], and establish a good relationship with users [27]. Research also made clear that the effects of color differ between Chinese and German/Austrian users: Chinese users benefit more unambiguously from the use of bright colors than Germanic users [3], [21], [40].

Finally, research suggests that there may also be differences in the way visuals and text are combined in documents. In Chinese and other Asian documents, pictures may be loosely integrated in the text, without explicit textual references or even clear intrinsic relationships, whereas the alignment of text and visuals is more strictly regulated in Western documents [14], [29], [31], [32], [41]. This loose relationship between visuals and text may be framed in terms of high-context versus low-context cultures: Users from high-context cultures (like China) can fill in the context for visuals, while users from low-context cultures need specific clues about the relationship [29]. In contrast to Western manuals, Asian manuals may contain visuals that have only decorative functions, without containing useful information or illustrating user tasks [39]. Japanese, for example, emphasize the importance of aesthetics as a way to build a good impression, whereas Americans want visuals to be clear and comprehensible for readers to follow [41]. Other researchers suggest that text and visuals in Chinese manuals are often complementary, while they tend to be redundant in Western manuals [33], [34].

**Conclusion:** In all, several cultural differences regarding structure, content, and visuals have been found. (See Table II for an overview.) Many of the proposed differences seem to make sense and sound intriguing, but there is no hard evidence for their existence, and they are not consistently found in all studies. What is more, the links with underlying cultural dimensions are not always clear. A large-scale formal content analysis systematically exploring the prevalence of the differences proposed so far and trying to relate the differences to more general cultural dimensions could be an important next step. This conclusion from our review of the literature leads to the following research question:

**RQ.** To what extent and how do Chinese and Western manuals for household appliances differ from each other in terms of content, structure and use of visuals?

**Methodology**

To answer our research question, we conducted a quantitative content analysis focusing on manuals for household appliances aimed at the general public. In this section, we will describe the sample of manuals that we examined, the coding scheme we used, our intercoder reliability, and our data-analysis techniques.
For our study, we formed a sample of 50 Western and 50 Chinese manuals for household appliances. All manuals were designed in their own culture and published between 2007 and 2016. A first step in the process was the selection of 10 product categories, using three criteria:

- Products should not be too simple and should have enough functions. (Hair dryers, for instance, were excluded.)
- Products should be popular in both cultures. (Rice cookers, for instance, were excluded.)
- The range of products included should be diverse.

These criteria led to the selection of the following product categories:

- Refrigerators
- Washing machines
- Water heaters

<table>
<thead>
<tr>
<th>Chinese Documents</th>
<th>Western Documents</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>More noninstrumental elements</td>
<td>Fewer noninstrumental elements</td>
<td>[29]</td>
</tr>
<tr>
<td>More attention to relationship with reader and face (introduction and conclusion)</td>
<td>Less attention to relationship with reader and face (introduction and conclusion)</td>
<td>[14], [30]</td>
</tr>
<tr>
<td>More technical information</td>
<td>Less technical information</td>
<td>[14], [29], [31], [32]</td>
</tr>
<tr>
<td>Safety information less prominent</td>
<td>Safety information more prominent</td>
<td>[14], [29]</td>
</tr>
</tbody>
</table>

**Structure**

- Chunking of information less common
- Structure less prominently and less explicitly presented
- Less strict categorizations
- More attention to interrelations between content elements
- Fewer headings and structural markers
- Fewer notes, warnings, and other standout elements in the text
- Less fine-grained structure
- Preference for inductive organization

- Chunking of information more common
- Structure more prominently and more explicitly presented
- Strict categorizations
- Less attention to interrelations between content elements
- More headings and structural markers
- More notes, warnings, and other standout elements in the text
- More fine-grained structure
- Preference for deductive organization

**Visuals**

- More visuals
- More diverting, cartoon-like visuals
- Preference for bright colors
- Visuals loosely integrated in the text

- Fewer visuals
- More instrumental visuals related to task performance
- No preference for bright colors
- Alignment of text and visuals more regulated

Corpus: Sample of Manuals for Household Appliances

For our study, we formed a sample of 50 Western and 50 Chinese manuals for household appliances. All manuals were designed in their own culture and published between 2007 and 2016. A first step in the process was the selection of 10 product categories, using three criteria:
• Vacuum cleaners
• Air purifiers
• Humidifiers
• Food processors
• Televisions
• Space heaters
• Wireless speakers

For each product category, five Chinese brands were randomly selected from the top 10 brands on a Chinese website (China Top 10 Brands) and five Western brands from a top 10 American website (Consumer Reports). Only original Chinese or Western brands were included. Finally, one manual for each brand was randomly chosen. All 50 Western manuals were available on the companies’ official websites. Of the Chinese manuals, 29 were available on the companies’ official websites, 18 were found from other online sources (e.g., manual websites, WeChat, Weibo), and three printed manuals were used.

In total, the sample consisted of 1895 pages of Chinese and Western manuals. The Chinese manuals appeared to be significantly shorter in terms of numbers of pages than the Western ones ($M = 14.2$ versus 23.7 pages; $t$-test: $t = -2.963$, df = 59.1, $p < 0.005$).

Caching Scheme
The coding scheme for this research was largely based on insights from previous studies. We translated the insights from those studies into codable manual characteristics. In addition, we completed open coding of 20 manuals (10 Chinese and 10 Western) to test the codability of the literature-based coding scheme and to complement the coding scheme with new potential differences that emerged from comparing the manuals. These 20 manuals were not part of the 100 manuals included in the main research. Table III presents the categories in the resulting coding scheme.

• Regarding content, we concentrated on the inclusion of elements that go beyond the core elements of a user manual (the procedural and declarative information supporting task execution). We looked for extra elements on the front page and further on in the manual.
• Regarding structure, we focused on structural markers such as headings, chunking of information, bulleted and numbered lists, tables, columns, and elements that stand out from the main text.
• Regarding visuals, we distinguished various types of visuals, and looked at their relationship with textual information.

As can be seen in Table III, we took into account the differences in length between Chinese and Western manuals. Recurring elements were counted and divided by the number of pages. Variations within structural elements and visuals were counted and divided by the total number of such structural or visual elements. For example, variations in headings (e.g., first-level headings) were counted and divided by the total number of headings.

Reliability
All coding of the manuals was done by the first author. To test the intercoder reliability of the coding scheme, we asked a second coder, who just like the first author had both Chinese and English language proficiency, to code 10% of the sample. The manuals used by the second coder were subdivided into content units, to facilitate the coding process and to make sure that the same segments were coded. In total, 852 segments were coded by the second coder. A Cohen’s kappa of 0.90 indicated a strong agreement between the two coders.

Data Analysis
Codes were assigned in ATLAS.ti and exported to SPSS. Dichotomous variables (content elements that were either present or absent in a manual) were analyzed using $\chi^2$ tests. All other variables were analyzed using independent-sample $t$-tests. Looking for significant differences was only the beginning of our analysis. On the basis of the specific differences found per aspect (content, structure, visuals), we tried to infer more general, overarching differences between Chinese and Western manuals.

Results
Because we included many variables in our analyses, we must be selective in the reporting of the results, and immediately try to make sense of their implications per aspect of the manual. We start with the content elements, then the structure, and finally the visuals.

Content: Multiple Versus Single Purpose
Table IV gives an overview of significant cultural differences regarding content elements. Our main conclusion on the basis of the differences found is that Chinese manuals are more likely to have multiple purposes than Western manuals. Multifunctionality is a common phenomenon in document design [42], [43], but Western manuals seem to limit themselves more to the function of end-user support than Chinese manuals do. This finding largely confirms the overall conclusions of one earlier study [29]. Various specific differences
TABLE III
CODING SCHEME

<table>
<thead>
<tr>
<th>Content: Front Page</th>
<th>Content: Other Parts</th>
<th>Structure</th>
<th>Visuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company name</td>
<td>Copyright</td>
<td>Total number of headings [p]</td>
<td>Total number of visuals [p]</td>
</tr>
<tr>
<td>Company logo</td>
<td>Disclaimer</td>
<td>First level heading [h]</td>
<td>Photo [v]</td>
</tr>
<tr>
<td>Company slogan</td>
<td>Welcome message</td>
<td>Second level heading [h]</td>
<td>Screen capture [v]</td>
</tr>
<tr>
<td>Company contact</td>
<td>Advertisement</td>
<td>Third level heading [h]</td>
<td>Personification [v]</td>
</tr>
<tr>
<td>Company service</td>
<td>Safety information</td>
<td>Fourth or higher level heading [h]</td>
<td>Detailed depiction of human [v]</td>
</tr>
<tr>
<td>Product name</td>
<td>Technical information [p]</td>
<td>Numbered heading [h]</td>
<td>Pictogram [v]</td>
</tr>
<tr>
<td>Product model</td>
<td>Tips beyond the use of device [p]</td>
<td>Heading marked by layout [h]</td>
<td>Technical line drawing [v]</td>
</tr>
<tr>
<td>Product series</td>
<td>Quality certificate</td>
<td>Heading level unclear [h]</td>
<td>Detail enlargement [v]</td>
</tr>
<tr>
<td>Product picture</td>
<td>Standards references [p]</td>
<td>Different types of heading signs used [p]</td>
<td>Circuit diagram [v]</td>
</tr>
<tr>
<td>Manual name</td>
<td>Troubleshooting section</td>
<td>Three or more sentences with actions in one paragraph [p]</td>
<td>User Interface icon [v]</td>
</tr>
<tr>
<td>Manual table of content</td>
<td>Warranty</td>
<td>Three or more actions in one sentence [p]</td>
<td>Others visual types [v]</td>
</tr>
<tr>
<td>Manual language list</td>
<td>Glossary</td>
<td>Total number of lists [p]</td>
<td>Visual in procedural information [v]</td>
</tr>
<tr>
<td>Other elements</td>
<td>Index</td>
<td>Ordered list [l]</td>
<td>Redundant text-visual relationship [v]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bulleted list [l]</td>
<td>Non-redundant text-visual relationship [v]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nested list [l]</td>
<td>Decorative text-visual relationship [v]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lists used to structure steps/actions [l]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Change of list bullet shape [l]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tables [p]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Warning signs [p]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Columns</td>
<td></td>
</tr>
</tbody>
</table>

Note: [p] = divided by the number of pages; [h] divided by the number of headings; [l] divided by the number of lists; [v] divided by the number of visuals.

hint in this direction. First, by including specialized technical information and circuit diagrams (see Fig. 1), Chinese manuals more often consider technical experts to be part of the user audience [14], [29], [31], [39]. Second, Chinese manuals more often include corporate information and advertisements (see Fig. 2) [33], quality assurance (see Fig. 3), and tips beyond the use of the device than Western manuals. Examples of the latter include recipes for food processors, knowledge about relative humidity for humidifiers, types of indoor and outdoor pollutants for air purifiers, and proper food storage temperatures for refrigerators. Third, Chinese manuals make more explicit attempts to build and maintain a good relationship with the user than Western
TABLE IV
SIGNIFICANT DIFFERENCES REGARDING CONTENT ELEMENTS

<table>
<thead>
<tr>
<th></th>
<th>Chinese Manuals</th>
<th>Western Manuals</th>
<th>Significance</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inclusion of specialized target audiences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical information [p]</td>
<td>0.12 (0.13)</td>
<td>0.03 (0.05)</td>
<td><em>p &lt; 0.01</em></td>
<td>Cohen's d = 0.85</td>
</tr>
<tr>
<td>Circuit diagrams [v]</td>
<td>0.04 (0.09)</td>
<td>0.01 (0.03)</td>
<td><em>p &lt; 0.05</em></td>
<td>Cohen's d = 2.50</td>
</tr>
</tbody>
</table>

**Advertisements and corporate information**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Product advertisements</td>
<td>70%</td>
<td>20%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.50</td>
</tr>
<tr>
<td>Company name on the front page</td>
<td>72%</td>
<td>20%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.52</td>
</tr>
<tr>
<td>Company slogan on the front page</td>
<td>36%</td>
<td>10%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.31</td>
</tr>
<tr>
<td>Product name on the front page</td>
<td>86%</td>
<td>54%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.35</td>
</tr>
<tr>
<td>Manual name on the front page</td>
<td>98%</td>
<td>78%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.31</td>
</tr>
</tbody>
</table>

**Quality assurance**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Quality certificate</td>
<td>36%</td>
<td>2%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.43</td>
</tr>
<tr>
<td>Standards references [p]</td>
<td>0.32 (0.30)</td>
<td>0.10 (0.16)</td>
<td><em>p &lt; 0.01</em></td>
<td>Cohen's d = 0.89</td>
</tr>
</tbody>
</table>

**Information stretching the concept of user support**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Tips beyond the use of the device [p]</td>
<td>0.04 (0.08)</td>
<td>0.01 (0.03)</td>
<td><em>p &lt; 0.05</em></td>
<td>Cohen's d = 0.44</td>
</tr>
</tbody>
</table>

**Relationship with users**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Instructions for manual use on the front page</td>
<td>72%</td>
<td>38%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.34</td>
</tr>
<tr>
<td>Welcome message</td>
<td>66%</td>
<td>46%</td>
<td><em>p &lt; 0.05</em></td>
<td>Phi = 0.20</td>
</tr>
</tbody>
</table>

**Legal information**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright information</td>
<td>18%</td>
<td>86%</td>
<td><em>p &lt; 0.01</em></td>
<td>Phi = 0.68</td>
</tr>
<tr>
<td>Warranty</td>
<td>47%</td>
<td>70%</td>
<td><em>p &lt; 0.05</em></td>
<td>Phi = 0.22</td>
</tr>
</tbody>
</table>

Note: [p] = divided by the number of pages; [v] divided by the number of visuals.

Fig. 1. Examples of circuit diagrams in Chinese manuals.

manuals do [14], [29], specifically by welcome messages (see Fig. 4) and explanations of the use of the manual.

The only type of “extra” content that can be found more in Western than in Chinese manuals involves legal information (warranty texts and copyright information). This may reflect different legal practices between China and Western countries. Contrary to earlier research [14], we did not find differences in the prevalence of safety information between Chinese and Western manuals.
Fig. 2. Example of an advertisement in a Chinese manual (with translation).

Do you still remember the joy when Mom bathed us in childhood?
With mother’s care, our delicate skins enjoyed the comfortable warm water.
Thoughtful, comfortable, safe, warm, and cheerful ...
This is the greatest love in the world!
We pay special attention to this love, committed to creating the water heater we want, which can make this great love last...

Fig. 3. Example of a standards reference and quality certificate in a Chinese manual.

Fig. 4. Example of a welcome message in a Chinese manual (with translation).

My new owner:
I hope you enjoy your purchase!
I am "oxygen bar” F720, an air purification humidifier from the XXX family. I like fresh and healthy air, ready to provide you, my owner, with purified air and scientific humidity. I believe that you, my owner chose “oxygen bar” most likely because of my ability to do so~
TABLE V
SIGNIFICANT DIFFERENCES REGARDING STRUCTURE

<table>
<thead>
<tr>
<th></th>
<th>Chinese Manuals</th>
<th>Western Manuals</th>
<th>Significance</th>
<th>Effect Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Headings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First level headings [h]</td>
<td>0.63 (0.29)</td>
<td>0.47 (0.29)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.55$</td>
</tr>
<tr>
<td>Third level headings [h]</td>
<td>0.05 (0.10)</td>
<td>0.12 (0.18)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.48$</td>
</tr>
<tr>
<td>Fourth or higher level headings [h]</td>
<td>0.00 (0.00)</td>
<td>0.03 (0.08)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.53$</td>
</tr>
<tr>
<td>Different types of heading signs used [p]</td>
<td>0.16 (0.11)</td>
<td>0.10 (0.10)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.57$</td>
</tr>
<tr>
<td><strong>Lists</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of lists</td>
<td>2.18 (1.94)</td>
<td>1.56 (1.14)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.39$</td>
</tr>
<tr>
<td>Nested lists [l]</td>
<td>0.12 (0.11)</td>
<td>0.06 (0.07)</td>
<td>$p &lt; 0.01$</td>
<td>Cohen's $d = 0.65$</td>
</tr>
<tr>
<td>Lists used to structure steps/actions [l]</td>
<td>0.15 (0.12)</td>
<td>0.23 (0.17)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.54$</td>
</tr>
<tr>
<td>Bulleted lists [l]</td>
<td>0.38 (0.28)</td>
<td>0.50 (0.26)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.44$</td>
</tr>
<tr>
<td><strong>Meaningful chunks of information</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed use of declarative and procedural information [p]</td>
<td>0.19 (0.26)</td>
<td>0.07 (0.12)</td>
<td>$p &lt; 0.01$</td>
<td>Cohen's $d = 0.59$</td>
</tr>
<tr>
<td>Three or more sentences with actions in one paragraph [p]</td>
<td>0.20 (0.26)</td>
<td>0.10 (0.14)</td>
<td>$p &lt; 0.05$</td>
<td>Cohen's $d = 0.48$</td>
</tr>
<tr>
<td>Three or more actions in one sentence [p]</td>
<td>0.15 (0.20)</td>
<td>0.02 (0.05)</td>
<td>$p &lt; 0.01$</td>
<td>Cohen's $d = 0.89$</td>
</tr>
<tr>
<td>Warning signs [p]</td>
<td>0.38 (0.40)</td>
<td>0.60 (0.34)</td>
<td>$p &lt; 0.01$</td>
<td>Cohen's $d = 0.59$</td>
</tr>
<tr>
<td><strong>Other structural elements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tables [p]</td>
<td>0.29 (0.21)</td>
<td>0.17 (0.21)</td>
<td>$p &lt; 0.01$</td>
<td>Cohen's $d = 0.57$</td>
</tr>
<tr>
<td>Columns (one versus more than one)</td>
<td>94% – 6%</td>
<td>44% – 56%</td>
<td>$p &lt; 0.01$</td>
<td>Phi = 0.54</td>
</tr>
</tbody>
</table>

Note: [p] = divided by the number of pages; [h] divided by the number of headings; [l] divided by the number of lists.

**Structure: Fuzzy Versus Rigid** Table V summarizes the significant cultural differences regarding structure. The main conclusion here is that the structure of Chinese manuals seems to be fuzzier and less rigid than that of Western manuals. In contrast to earlier research [14], we did not find differences in the total number of headings. Differences involve the levels of headings: Chinese manuals appear to be flatter (with more first-level headings) than Western manuals (with more third- and higher-level headings). Despite the flatter structure, Chinese manuals use more types of heading signs. Heading signs refer to signals that help readers identify headings from the main text, including font size, numbers, underlining, shades, or colors (see Fig. 5). The variety of heading signs, then, is based on other considerations than the way the manual is organized and may even be more or less random.

Also in contrast with earlier research [14], the total number of lists is higher in Chinese manuals than in Western manuals. However, we found a different usage of lists. Chinese manuals contain relatively
many nested lists that are more or less integrated in the text (see Fig. 6), while Western manuals use lists as simple standout elements in the text, often to structure steps in the procedural information.

Regarding the chunking of information, traditionally one of the cornerstones of instructive communication [44], Chinese manuals appear to be less rigid than Western manuals. This quality can be seen in mixtures of declarative and procedural information, in combinations of three or more action sentences in one paragraph, and in combinations of three or more actions in one sentence (see Fig. 7). In addition, we found that Chinese manuals tend to contain fewer standout warning messages alerting users of dangers. This finding confirms insights from earlier research stressing the holistic nature of Chinese documents [14], [30], [32]–[34].

Finally, we found some differences regarding the use of columns and tables. Chinese manuals are significantly more often designed in a one-column format than Western manuals. This fact might be explained by the holistic orientation of Chinese people [14], as a multiple-column format may be seen as disrupting the flow of a page. Chinese manuals also contain significantly more tables than Western manuals. The reason for that preference is unclear.

Our results appear to contradict earlier suggestions that Chinese manuals are less structured than Western ones and lack structural elements such as headings or lists [14], [30], [32]–[34]. In fact, because of the larger numbers of lists and tables and the equal number of headings that we found, our results suggest that Chinese manuals use more structural elements than Western manuals. The differences seem to involve the way that structural elements are applied. Western manuals strive for clear, unambiguous hierarchies; they try to chunk information into meaningful and useful units, and make procedural steps and warnings stand out from the text. Chinese manuals, despite the use of structural elements, have a more fuzzy structure, pay less attention to hierarchy in the overall structure, tend to be less strict in chunking information, and are more reluctant to include standout elements. Many of the structural differences thus seem to involve the organization of information rather than the use of structural elements.

**Visual: Entertaining Versus Functional**  Table VI presents the significant cultural differences regarding the use of visuals. In contrast to earlier studies [30], [33], [37], we did not find that Chinese manuals contain more visuals than Western manuals. However, our results showed some differences in the prevalence of certain types of visuals (see Fig. 8). Western manuals tend to contain more product visuals that have a clear function in supporting user instructions, specifically detailed enlargements showing magnified parts of a product or action, and technical line drawings displaying specific features of a complex product. Chinese manuals contain more decorative and human visuals, such as cartoons, cartoons with personifications (e.g., the product with a face), and pictures with more or less detailed human figures in them. In Chinese manuals, it is often possible to infer the gender or age of humans depicted; in Western manuals,
Fig. 7. Examples of several action sentences in a paragraph and several actions in a sentence.

**TABLE VI**

<table>
<thead>
<tr>
<th>Visual types</th>
<th>Chinese Manuals</th>
<th>Western Manuals</th>
<th>Significance</th>
<th>Effect Size (Cohen’s d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical line drawings [v]</td>
<td>0.46 (0.31)</td>
<td>0.65 (0.34)</td>
<td><em>p &lt; 0.01</em></td>
<td>0.58</td>
</tr>
<tr>
<td>Detail enlargements[v]</td>
<td>0.01 (0.02)</td>
<td>0.03 (0.05)</td>
<td><em>p &lt; 0.01</em></td>
<td>0.53</td>
</tr>
<tr>
<td>Pictures with detailed human figures [v]</td>
<td>0.02 (0.04)</td>
<td>0.00 (0.01)</td>
<td><em>p &lt; 0.01</em></td>
<td>0.69</td>
</tr>
<tr>
<td>Cartoons [v]</td>
<td>0.22 (0.27)</td>
<td>0.06 (0.17)</td>
<td><em>p &lt; 0.01</em></td>
<td>0.71</td>
</tr>
<tr>
<td>Cartoons with personification [v]</td>
<td>0.10 (0.20)</td>
<td>0.00 (0.00)</td>
<td><em>p &lt; 0.01</em></td>
<td>0.71</td>
</tr>
<tr>
<td><strong>Placement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visuals in declarative information [v]</td>
<td>0.53 (0.26)</td>
<td>0.40 (0.30)</td>
<td><em>p &lt; 0.05</em></td>
<td>0.46</td>
</tr>
</tbody>
</table>

*Note: [v] = divided by the number of visuals.*

Fig. 8. Examples of visuals. (a) Detailed enlargement. (b) Technical line drawing. (c) Cartoon. (d) Cartoon with personification. (e) Picture with human figure.
humans tend to be more abstract, possibly to avoid stereotyping or to make them compatible with (abstract) product depictions. These observations are in line with earlier findings, indicating that Chinese visuals are often intended to create a friendly atmosphere and contribute to a good relationship with users [14], [31], [37].

Furthermore, Chinese manuals contain more visuals related to declarative information than Western manuals do. No differences were found for visuals related to procedural information.

Regarding the relationship between visuals and text, our results do not show any differences. Earlier studies claimed that the integration between text and visuals is looser in Chinese manuals as neither labeling nor placement is used to underline their relationships [14], [29], [31], [32], [41]. We found that, both in Chinese and Western manuals, it is not difficult to pinpoint related texts and visuals. We also found that manuals in both cultures have similar proportions of redundant (similar information in text and pictures), nonredundant (different information in text and pictures), and decorative (pictures used to decorate the page) relationships between text and visuals.

We also did not find any differences regarding color. Earlier research suggested that Chinese documents are more colorful than Western ones [3], [21], [40], but our results do not support that assumption.

**DISCUSSION**

To systematically investigate differences between Chinese and Western manuals, we conducted a large-scale content analysis of Chinese and Western manuals for household appliances. On the basis of the specific differences found, we tried to formulate more generic cultural differences. In this section, we first give an overview of our main findings. Then, we discuss the theoretical and practical implications, followed by limitations, suggestions for future research, and a conclusion.

**Main Findings** Our research revealed differences between Chinese and Western manuals in all three aspects (content, structure, and visuals). Most of our results confirm earlier research findings, but not all earlier findings are corroborated by our study.

Regarding content, we conclude that the content of Chinese manuals is less confined by the function of providing instructions to end users. Compared to Western manuals, Chinese manuals often also contain information aimed at technical experts, provide more corporate and marketing information, and more explicitly build on a lasting relationship with the user of the product. The genre boundaries of user manuals are thus less strict in Chinese than in Western manuals. This finding led us to characterize the difference in terms of multifunctionality: Chinese manuals tend to have multiple purposes, whereas Western manuals more often have the single purpose of instructing end users. The latter, however, may be subject to change: The increased attention to user experience might have similar consequences for Western manuals.

Regarding structure, we found that Chinese manuals differ from Western manuals in that they are less rigid in hierarchical structures, use fewer elements that stand out from the text, and do not always chunk information according to its functionality. Chinese manual headings tend to be less hierarchical, and use a wider variety of layout features to signal headings. Lists and warning information are more often integrated in the text. And information is not always chunked in the ways that Western technical communicators would do, separating declarative from procedural information, and clearly distinguishing between procedural steps using lists, new paragraphs, or new sentences. Many of the findings of previous studies are confirmed by these results, but the most simple and straightforward assumptions were not: Chinese manuals do not use fewer headings and lists; they use them differently. Chinese technical communicators acknowledge that manuals need structural elements, but at the same time seem to have a holistic perspective on manuals.

Regarding visuals, our research findings reject the common assumption that Chinese manuals contain more visuals than Western ones. We mainly found a difference in types of visuals used: Where Western manuals predominantly contain functional images visualizing the product, the tasks, and an abstract user, Chinese manuals frequently choose playful and entertaining visuals and highlight the human aspect in visuals more.

**Theoretical and Practical Implications** Our research revealed undeniable differences between Chinese and Western manuals. However, it remains to be seen how important the cultural differences are for the quality of user instructions. The most striking differences in content and visuals do not seem to involve the primary
functionality of user instructions (helping users to understand and use the device), but are related to image and relationship building, and creating a pleasant atmosphere. The role of user instructions contributing to creating a product or brand image, building a lasting relationship, and creating an atmosphere has so far been underexplored in the literature on technical communication [45]. It may be a cultural difference in itself that Chinese manuals seem to pay more attention to these aspects.

Regarding structure, it seems questionable whether Chinese users will be disadvantaged by the stricter hierarchy, the more rigid chunking of information, and the standout elements in the text. As a matter of fact, one earlier user study has already showed that a Chinese or Western-based structuring of user instructions had no effect on the task performance and appreciation of both Western and Chinese users [17]. It should be noted, however, that the structural differences implemented in the experimental materials in that study did not entirely reflect the insights that resulted from this content analysis. So there may be reasons to assume that the cultural differences in user manuals may be less important than previously assumed, and that a “community of practice” [46] has emerged in which users have a more or less universal perspective on the usability—not necessarily on the user experience—of user instructions.

How do our findings relate to more generic conceptions of cultural differences in the context of technical communication? Even though Hofstede’s value-based cultural dimensions [18], [19] have been a prominent theoretical approach in technical communication and interface design [20]–[24], we do not think that any of the differences found connects well to them. Instead, we think that two related cultural dimensions might be used to make sense of the differences between Chinese and Western manuals. These dimensions may be helpful in reaching a deeper understanding of the Chinese and Western technical communicators.

The first dimension involves thinking patterns and worldview, distinguishing between holistic and analytic thinking. This is a fundamentally different perspective on life, which seems to apply to all imaginable contexts, but it is not a value-based difference and cannot be placed anywhere in Hofstede’s onion model. Chinese people have a more holistic way of thinking, stressing the bigger picture and caring less about breaking down phenomena into smaller units. The bigger picture is an overall impression; it is the starting point, and not a network of meaningfully connected smaller units. Western people have a more analytic way of thinking, believing that breaking down phenomena into smaller meaningful units will be helpful in making sense. If Westerners think of the bigger picture, doing so is often the result of connecting their sensemaking of smaller units. Many of our findings illustrate this difference.

Regarding content and visuals, Chinese do not necessarily see the user manual as a clearly demarcated entity in the user experience, with a fixed and limited set of functions. As a result, Chinese manuals may have content that is less likely to appear in Western manuals.

Regarding structure, Chinese manuals seem to be less committed to making the hierarchy of content explicit and breaking down instructions into useful and usable chunks. At face value, the structural elements are there, but they mainly contribute to the overall impression, rather than helping users to break down actions into small steps.

The second dimension involves the clarity, comprehensiveness, and impact of guidelines and specifications. This is in line with Trompenaars and Hampden-Turner’s [26] distinction between universalism and particularism. However, we would argue that is not only the following of rules that makes a difference here but also the rules themselves. Where Western manuals seem to value clear and strictly functional specifications, Chinese manuals tend to be more loosely connected to such specifications. This finding applies to the selection of content, the application of structuring principles, and the choice of visuals. We propose the distinction between analog and digital cultures as responsible for this difference. Digital cultures strive for binary systems of guidelines and specifications that are all applied; analog cultures tend to see guidelines and specifications as more or less fluid, at best as helpful suggestions.

It is hard to say whether the differences we found may be attributed to differences in the state of development of Chinese and Western technical communication. Western technical communication has a long tradition, in which expository approaches to writing user instructions developed gradually into research-based instructional approaches [44]. In China, technical communication as a discipline is now beginning to emerge, after several initiatives in the past decades [14], [47]–[50]. Although academic developments are moving fast in China, we can imagine that the
further development of an instructional style optimally supporting users is still in progress. This fact might account for some of the differences in structuring information that we found. Only user research can shed more light on this.

Technical communication professionals involved in the localization of user instructions may use our findings in two ways. The specific differences found within the three domains (content, structure, and style) might be used as very specific guidance during the localization process. We can also envision taking the overall characterizations we gave for the three domains—content: multiple versus single purpose; structure: fuzzy versus rigid; visuals: entertaining versus functional—as a more generic guidance. However, the differences uncovered here do not necessarily reflect user preferences; they reflect differences in the state of the art of designing user instructions.

Limitations and Suggestions for Future Research Our study had several limitations. First, our research was limited to written user manuals for household appliances. It would be interesting to see whether the findings are the same for different types of user instructions, such as those for large software packages (in which the need to provide user-friendly structure may place higher demands on the manual) or instructions for professional devices (in which visuals may need to be more businesslike). It would also be interesting to explore cultural differences in different genres of user support, such as video instructions [51], [52].

Second, our coding scheme was largely based on earlier research. This may be a strength, because we could build on earlier insights available. However, it may also be a weakness, as a more open coding process could have helped us to detect differences that were completely overlooked by previous research. A large scale, systematic, but more open-ended content analysis of Chinese and Western manuals might shed more light on this question.

Third, we had to omit style and formulation aspects in this study. It would simply be too hard to reliably include stylistic variations in our quantitative research. Simply comparing formulation characteristics in Western and Chinese instructions will not do. One must have a reference point for normal language use in Western countries and China (a goal that seems to be impossible to reach). Still, style and formulation may be responsible for a significant number of cultural differences. Future research could take a translation perspective here, carefully analyzing how bilingual translators transform Chinese instructions into Western instructions, and vice versa.

Finally, it is important to stress that the users’ perspective is, by default, missing from a content analysis. Systematically investigating how Chinese and Western users judge and use Chinese and Western user instructions will be an important next step in the research on cultural differences in the domain of technical communication.

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REFERENCES


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