

Now and After: The Pictorial Contextualization Aid to Machine Translation

現在與未來—採用圖片為機器翻譯之語境化輔助工具

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【摘要】

儘管神經機器翻譯（NMT）系統在過去幾年中產生的自動譯文品質已大幅提高，但處理特殊主題並含有許多專門術語的文本時，仍然無法提供正確、清楚的訊息。傳統中醫（TCM）網站的網頁對於機器翻譯應用來說還是具有挑戰性。為了彌補此缺陷，並幫助國際受眾者更能清楚理解中醫網站的英語機器翻譯，本人特提出將圖片作為語境化輔助工具，然後調查台灣中醫網站使用圖片輔助其機器翻譯的有效程度。基於此因，本人針對一些國內外年輕大學生族群進行問卷調查，以進一步瞭解他們認為國際受眾者接受 MT 圖片輔助中醫網頁機器翻譯的看法。調查結果顯示，具有清晰字幕且與主題相關的圖片被認為最能提高國際受眾者對於機器譯文的理解。有鑑於此，本人建議可以拿掉台灣 TCM 網站上所有與主題不相關的圖片，並使用多張附有清楚易懂字幕的圖片來替換沒有字幕的單張圖片。這些修改突顯傳統中醫網站圖片建置與國際受眾者理解機器譯文之關聯性，唯有重視此關聯效果，才能提高國際受眾者快速閱讀中醫網頁機器翻譯信息的成效。

【關鍵字】

完成體標記圖片，語境化輔助工具，機器翻譯（MT），中醫（TCM）網站，問卷調查，修改建議

【Abstract】

Despite greatly improved quality of automatic translation produced by neural

machine translation (NMT) systems over past several years, it remains ineffective to provide clear messages when source texts address a special subject and contain many specialized terms. Web pages of traditional Chinese medicine (TCM) websites are particularly a challenge for MT application. To remedy this shortcoming and enhance audiences' comprehension of English MT outputs of TCM websites, the author proposes that pictures can be used as a contextualization aid, and investigates to what extent and what types of pictorial aids in Taiwan's TCM websites can be used effectively. A questionnaire-based survey was conducted to get some respondents' views of international audiences' reception of pictorial aids to MT. The findings showed that topic/theme-relevant pictures with clear captions and more than one pictures were considered most effective to boost audiences' comprehension. In light of these findings, the author suggests eliminating all thematically irrelevant pictures in Taiwan's TCM websites and replacing standalone pictures with more than one picture that has clear captions. The modifications highlight the need of considering how pictorial materials can be used to enhance international audiences' comprehension of MT outputs for effective TCM information scanning.

【Keywords】

Pictorial Aids, Contextualization Aid, Machine Translation (MT), Traditional Chinese Medical (TCM) Websites, Questionnaire-Based Survey, Modifications

1. Introduction

Over past several years, individuals' use of websites to look for healthcare and medical information has contributed to a huge increase in the number of public health websites. Diverse medical websites are set up to provide the venues for patients, their family members, and non-medical professionals to access information and suggestions from the experts in medical subjects or/and from those who have the same health concern and medical experiences. A telephone survey conducted by the Pew Internet and American Life Project reported that "55% of fifty-two million American adults [used] the Internet for health or medical information" (Diaz et al. 2002: 182). An increasing number of TCM practice has been found in Western countries, and so those who used medical websites to acquire medical knowledge of traditional Chinese medicine (TCM) also increased (Institute of Medicine 2005; quoted in Li and Zhang 2008: 112). Some research (Corson & Crews 2007: 771; Efferth et al. 2007: 353; Li & Zhang 2008: 112) pointed out that TCM was recognized a potential source of new drug candidates. "As estimated by the World Health Organization, four fifths of all people in the world still relied chiefly on traditional medicines, mostly herbs and plants" (Hays 2008: n.p.). Hays (2008) added that after the therapies of traditional Chinese medicine (TCM) were practiced in China for more than 3000 years, their popularity had risen outside Asia in recent decades and they were viewed as a global industry worth hundreds of millions of dollars a year. Growing popularity with TCM in Western countries triggered the author's enquires about whether TCM websites in Chinese could communicate their messages to international audiences using online machine-made translations (MT) and how the draft MTs could enhance web audiences' comprehension with the help of pictorial materials.

TCM was originated in Chinese communities, so the contents of many websites addressing TCM are written in Mandarin Chinese. When international audiences read these TCM websites, they could resort to online machine translation (MT) outputs to get the gist. Thanks to the launch of neural MT systems in 2017, the current Chinese-to-English MT outputs have greatly improved their semantic and grammatical accuracy. Despite this merit, we cannot overlook that the content of TCM texts is often peppered with specialized terms, such as "que-pen xue" (lit: que-pen acupoint),

“qin-gre jie-du” (lit: combating heat and detoxifying), and the names of Chinese herb medicines, such as “chuan-qi” (lit: madeira-vine), “fu-zi” (lit: common monkshood root) and “fang-feng” (lit: divaricate saposhnikovia root). These terms remain a challenge to Google Translate, be it a statistical or a neural MT system. For example, the fixed TCM term 清熱解毒 (qin-gre jie-du) and the Chinese herb medicine 川七 (chuan-qi) were rendered by online Google Translate in 2019 into English as “detoxification” and “Chuanqi” respectively. The MT of “detoxification” is semantically incomplete as it misses translating the word 清熱 (combating heat). In addition, the transliteration of “chuan-qi” does not explicate its implicit meaning and so it is meaningless to target audiences.

There is no question we can find some solutions to overcome such an MT obstacle. We can post-edit the MT output by correcting all lexical, grammatical and syntactic errors or/and modifying the mechanical style of MT. However, the audiences reading web texts expect to get information immediately, so post-editing is hard to fulfill due to time constraint. An alternative solution is to pre-edit the source text by adapting web texts on TCM in a controlled language. Pre-editing needs to follow some rules: use of short sentences with simple sentence structure, clear meaning words, Romanized English proper nouns, and paraphrased special terms and culture-specific expressions, and relevant others (Shih 2017). Pre-editing with simplified sentences and condensed information makes audiences get only core messages, not specific or detailed information. Furthermore, time-consuming nature of pre-editing web texts might be repulsive to website providers. Confronting this challenge, the author proposes using pictures as an contextualization aid to create contextual effect (Auer 1992, 1996), and so the audiences’ comprehension of MT outputs can be improved. For Gumperz (1982a, 1982b), the reader’s understanding depends on the creation of a context that relates the information to the audience’s cognitive schema. Human understanding is not a random and casual matter; rather, it requires some non-verbal signals to help contextualize verbal messages and increase the audience’s cognitive assumptions about a specialized subject. This point suggests that pictures and illustrations can be used as a contextualization aid to help increase audiences’ knowledge and so facilitate their awareness of a specialized subject. If pictures are provided in the TCM websites, target audiences can consult

them to enhance their comprehension.

With regard to the function of pictures, there has been a significant body of research to support the positive effect of pictures on the reader's comprehension (Daley 2003; Eisner 2002; Liu 2007; Mackey 2003). Fukuyama (2006: 186) claimed that pictures could be used to improve the reading comprehension of L2 learners, and Hibbing and Rankin-Erickson (2003:758) argued that the texts with pictures provided readers with two sources of information, and therefore enhanced the reader's comprehension. From Majidi's (2016: 1827) point of view, when readers cannot understand a text, they can consult the accompanying visual images. After they examine visual signs and cross-refer to the text, they can match the meanings of words with the images and arrive at a better understanding. Additionally, some scholars (Bowen 1982; Pillai & Vengadasamy 2010; Talif 1995) agreed to the use of visual aids, such as picture and videos, to make students understand the abstract ideas of literary texts more easily. Sivapalan et al. (2010) claimed that visual aids, such as color, images, illustrations, graphics, pictures and others, helped create an interesting setting, and could stimulate readers' interest in reading literary texts. The visual aids can also enhance students' appreciation of literature and help them cope with complex literary concepts. The preceding articles inspire the author's curiosity to probe if pictorial materials in existing TCM websites can be equally effective to produce the contextual effect and help international audiences understand the gist of English MT outputs better. The objective of this article is therefore to investigate to what extent the pictures of TCM websites, including those in homepages and web texts, can be used as an effective contextualization aid to enhance international audiences' understanding. Furthermore, this research will probe how the locations and formats of the pictures used in today's TCM websites can be modified to maximize their contextualization effect. To the end, a questionnaire-based survey is conducted and three research questions (RQ) are raised to guide investigation.

RQ1: To what extent do the respondents agree that pictures used in the homepages of TCM websites can attract international audiences' interest and help them get the main idea of the English MT output as a contextualization aid?

RQ2: To what extent do the respondents agree that the pictures used in the web

texts of TCM websites can attract international audiences' interest and help them get the main idea of the English MT output as a contextualization aid?

RQ3: How can the pictorial materials of current TCM websites be modified to maximize their contextual effect and help international audiences comprehend the gist more easily?

RQ1 and RQ2 probe some respondents' views of how international audiences will react to the impact of the pictures of different types with different thematic relevance, and how they agree to use pictures to help understand the gist of English MT outputs better. RQ3 aims to propose some methods that may be used to modify the available pictorial design of TCM websites and boost their contextual effect. It is noted that this research does not evaluate the errors of MT outputs. Its main objectives are to discover how some respondents look at the function of the pictures in TCM websites and how some suggestions can be made to modify the pictorial design of current TCM websites. These two concerns constitute the major research routes.

2. Theoretical review

Since this article aims to investigate how pictorial aids can create contextual effect effectively and enhance international audiences' comprehension, some important concepts of contextualization aids and contextual effect will be introduced. Before it, TCM websites and their major characteristics are to be introduced using some of Taiwan's TCM websites as examples.

2.1 Websites on traditional Chinese medicine (TCM)

A rough web-based survey of Taiwan's Chinese TCM websites leads to the finding of four types in general, including hospital/clinic websites, medical company websites, Wikipedia and web blogs. Hospitals' and clinics' websites are developed to enhance visibility, market their medical practices and provide a venue for the customer's service and support. These websites present medical information in a variety of formats, including texts, video, audio, and relevant others. Web blogs are "the oldest and most established form of social media, which has been used in medicine since as early as 2004" (Ventola 2014: 492). Many medical blogs have

been developed by professional physicians or those who are enthusiastic about TCM study, and can be identified as one of the reliable sources of medical information. The blogs publish a huge amount of information, and use photos and pictures to attract audiences. They also have homepages to show latest news and service updates. Some doctors expect to use web blogs to share their medical philosophies and increase the public's knowledge of their medical service. In addition, there are non-profit websites of medical companies and health-care organizations that introduce their missions, services and contact details on the homepages. They provide medical contents that range from theoretical concepts to medical treatments and also contain some pictorial elements. In addition, there is an English TCM Wikipedia that provides huge medical data, but the data are not referenced and their authors are unknown. The English Wikipedia website does not need to be translated by the MT system.

The above four types of websites have pictorial materials on homepages and in web texts. This article refers to homepages as web pages that have some sort of navigation bar near the top, and that show various links with headings or short messages; web texts mean the linked full-length texts written by doctors that provide detailed information and some forwarded short texts. The pictorial contents under the author's investigation cover a variety of subjects, including doctors, patients (e.g., Dr. Yang Li-Shu's Traditional Chinese Medicine Internet Hospital), medical treatments, medical staff, Chinese medicine (e.g., Shan Hui-Tang Traditional Chinese Medicine Clinic website), herbal medicine (e.g., Sheng-Chang Modern Chinese Medicine Clinic website), flowers (e.g., Dr. Cao Rong-Ying's blog), beautiful scenery (e.g., Kate's Wonderland blog), medical books (e.g., Dr. Peng Wen-Ya's blog) and others. Some pictures are relevant to the topics of web texts but others are not. Some respondents' views on international audiences' reception of the pictures' attractive features, thematic relevance, design and amount will be investigated, as these factors often affect the audiences' understanding of MT outputs.

2.2 Contextualization aids and contextual effect

In addition to TCM websites, basic concepts of contextualization and contextual effect need to be introduced at some length. According to the online Merriam Webster Learner's Dictionary (2016), "contextualization" is the act or the process of providing information about the situation in which something happens for the addressee's easier interpretation or understanding. Gumperz (1982a, 1982b) defines contextualization as referential signals that are related to verbal messages and that provide a context in which the meanings of messages can be interpreted more clearly and accurately. This means that contextualization effect that is produced as the result of a combination of verbal and nonverbal signals allows addressees to infer the addressor's communicative intention and constrain their scope of interpretation to get accurate messages.

Based on Gumperz's (1982a, 1982b) definition, the use of contextualization cues can help conversation participants or addressees interpret the meaning behind each utterance in a conversation or a speech (Auer 1992: 6, Auer 1996: 11; Eerdmans et al. 2002; Gumperz, 1982a, 1982b, 1989a, 1989b, 1991). If clear, adequate and correct communicative clues are provided in the setting of a language activity, the contextual effect can be created and helps participants' communication run smoothly. In a similar manner, the author infers that contextualization cues created by pictorial aids can create a non-verbal context to frame audiences' interpretation of MT messages, and thus audiences can interpret textual meanings in the right track and get accurate messages easily.

Gutt's (1991, 1992, 2000: 161) concept of optimal relevance also supports the concept of contextual effect. If contextualization cues of a nonverbal text are relevant to audiences' cognitive schema or background knowledge, they can help audiences make sense of all connotative or referential meanings of a text without consulting additional materials or data. This is the concept of Gutt's (1991, 1992) optimal relevance and its advantage is similar to contextual effect in terms of reducing audiences' unnecessary efforts to comprehend a message. In this article, set within the framework of helping international audiences get the gist of English MT outputs of TCM websites, all pictorial aids are expected to create contextual effect and bring the effectiveness of optimal relevance to audiences. This means that semiotic

elements of pictures in the MT outputs need to be relevant to audiences' cognitive assumptions and background knowledge, and so they can provide clear communicative clues to help audiences cope with the vague concepts of English MT outputs. For example, when audiences read an MT output that describes the auricular therapy: We press vaccaria seeds on acupuncture points and fix them with a tape, they might not have a clear idea about the situation. At this point, if a picture is given that shows a person whose ear is covered with seeds and a tape is used to fix the seeds, the pictorial content can visualize the scenario and helps the audiences guess the meanings and understand the MT message easily. Furthermore, if a picture of fire cupping is given, the audiences reading the MT output of the therapy can retrieve some contextual clues from the picture and then figure out the meaning more clearly. A saying goes that a picture is worth a thousand words, and this point suggests that pictures can work as an effective contextualization aid.

3. Methodology

3.1 Participants

Since this research aims to investigate what types of pictorial elements the respondents think will help international audiences get the gist of English MT outputs of TCM websites, a web-based questionnaire is conducted. Notably, this questionnaire does not investigate the quality of MT outputs, so the participants do not need to identify semantic, grammatical or syntactic errors in MT outputs. The questionnaire is only designed to elicit responses from the participants who are asked how they feel international audiences would react to the pictures and if they agree that the pictures can help international web audiences understand the gist of English MT outputs. To make the participants more diversified, some Taiwanese university students who are English majors and some native English speakers who are studying at university in the U.S. are invited to do the questionnaire. The English majors in Taiwan are chosen because their higher English proficiency level allows them to understand English MT outputs easily. Meanwhile, to prevent these English majors' privilege of understanding better TCM knowledge than American university students, those invited English majors must be those who do not have sufficient TCM knowledge. As Tsai and Lan (2015) have put it in their study, Taiwan's younger

generation has become increasingly ignorant of TCM particularly when traditional Chinese medicine clinics have been declining in recent years in Taiwan. Indeed, TCM background knowledge varies from person to person, not much related to the locations where the respondents have inhabited. Some American university students might have studied TCM by themselves due to their personal interest.

In addition, the questionnaire participants are all young people because a study claims that the high usage rate of social media are young people aged from 18 to 29 (Ventola 2014). The author feels that the young people, particularly university students, know something about the MT system, e.g., online Google Translate, and often use websites to look for information, so they are invited to complete the online questionnaire. The author admits that the survey results cannot generalize all situations because the respondents' English proficiency, their TCM knowledge and their pictorial preference, might affect the results. Despite this limitation, the present survey can still be regarded as a pioneer study to provide some insights into the effectiveness or/and inadequacy of pictorial aids that are being used in Taiwan's TCM websites and that are expected to contextualize the MT content.

3.2 Materials

The questionnaire consists of two parts. Part 1 focuses on the respondents' reception of the homepage pictures and Part 2, the pictures of web texts. As mentioned earlier, there are three major types of TCM websites that convey medical information in Mandarin in Taiwan. To make the sample websites more representative, the English MT outputs of a hospital website, a medical company website and a doctor's blog, accompanied by some pictures, were offered to the respondents for a preview before they answered the questions. The participants needed to read instructions to understand the objective of the questionnaire, which announced that their reception would be consulted to determine if current pictorial materials in the TCM websites were helpful for international audiences to get the gist of the English MT.

Part 1 raises six questions; question 1 concerns whether the respondents agree that the homepage pictures can help international audiences understand the main idea of the English MT output; question 2, whether homepage pictures can enhance

international audiences' interest in reading the MT output; question 3, whether relevant-to-topic homepage pictures can boost international audiences' understanding; question 4, whether homepage pictures with captions can enhance international audiences' understanding; and questions 5-6, what reasons they choose for their most-favored pictures used in the MT outputs of the homepages of TCM websites.

Part 2 contains seven questions; question 1 concerns whether they agree that pictures in the English MT outputs of web texts can stimulate international audiences' interest; question 2, whether relevant-to-topic homepage pictures can enhance international audiences' understanding; question 3, whether a single picture can reduce international audiences' understanding; question 4, whether pictures in sequence can enhance international audiences' understanding; question 5, whether pictures with clear captions can boost international audiences' understanding, and questions 6-7, what reasons they choose for their most-favored pictures used in the MT outputs of web texts of TCM websites.

3.3 Procedures

Before the author conducted the survey, the author's nephew studying at university in U.S. helped find his classmates to participate in the questionnaire, and the author's students and the students' friends were asked to participate in the questionnaire. These English majors and native English speakers were not permitted to read Chinese source texts. Only English MT texts, pictures and selection questions were given online. After one month, fifty-one correspondences were collected with ten done by native English speakers in the U.S. and forty-one done by university students who were English majors in Taiwan.

Since this study tries to get general views, and does not emphasize a variation in the views across gender, ages, and educational backgrounds, the respondents were not asked to provide the information of their ages, gender and educational backgrounds.

4. Findings and discussion

This section reports the results of the survey that reveal how some university

students in Taiwan and in USA respond to pictorial materials used in TCM websites. The contextualization effect of pictorial materials is evaluated based on the respondents' feedback, and thus some suggestions are given to modify present TCM websites.

4.1 The respondents' views of international audiences' reception of homepage pictures

In reply to RQ1 about how the respondents felt about international audiences' reception of homepage pictures, the findings showed that nearly all respondents (96.4%) agreed that homepage pictures with clear captions could help international audiences understand the gist of the English MT output better; 82.1% of respondents agreed that thematic pictures on the homepage could help international audiences understand the MT output better; 80.4% of respondents agreed that homepage pictures might enhance international audiences' understanding of the main idea of the MT output. Only 60.7% of respondents agreed that homepage pictures could attract the audiences' attention. Overall, more than half of respondents agreed that homepage pictures, either a single one or more than one picture, would have a positive effect on international audiences' understanding of English MT outputs. Figure 1 shows the statistical results of the respondents' views on international audiences' reception of the pictures used in the English MT outputs of TCM homepages.

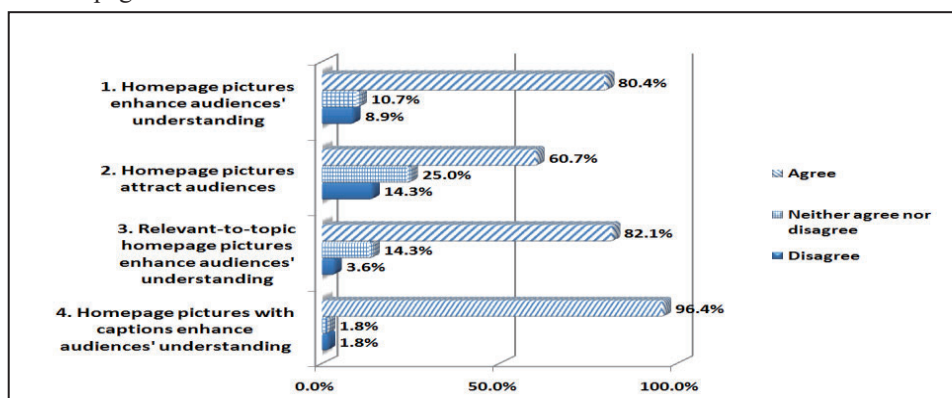


Fig. 1 Respondents' views on international audiences' reception of homepage pictures

As indicated above, those respondents who agree that pictures with clear captions can help international audiences comprehend the English MT output better takes up the highest percentage. For example, the homepage of the website of ShenNong Limited shows the pictures of scales, a container for smashing several kinds of herbal medicines, and medical books that have the caption of Traditional Chinese Medicine (TCM). The caption of TCM helps audiences guess what the pictures refer to. Since different audiences might have different ways of interpreting pictorial contents and affect their comprehension, captions under the pictures can guide them to move towards the right track and interpret the pictorial message accurately. Captions have the indexing function and help frame the audiences' interpretation of pictorial signals within a limited scope of meanings. This view is supported by Auer's (1996: 23) claim that contextualization cues such as captions have the indexing function to restrict the number of possible inferences and so help readers make a more correct interpretation. More importantly, pictures and captions together provide two venues of communicative cues, so the contextual effect is stronger and the audiences can guess the meanings of MT outputs more easily using dual aids. Interestingly, the lowest percentage of respondents agreed that homepage pictures could attract international audiences' interest. This means that according to the respondents, although pictures may help with understanding, they do not attract interest. The function and the emotional appeal of pictures are separate.

When asked to choose what homepage pictures can help international audiences predict the web content best, more than half of the respondents chose the homepage picture of the company website. Regarding the reasons, the choice of the picture that is relevant to the topic takes up the highest percentage (62.5%); the clear table/menu, the second highest percentage (30.4%); more than one picture and beautiful pictures, the lowest percentage (3.6%). Figure 2 shows the respondents' choices of the reasons.

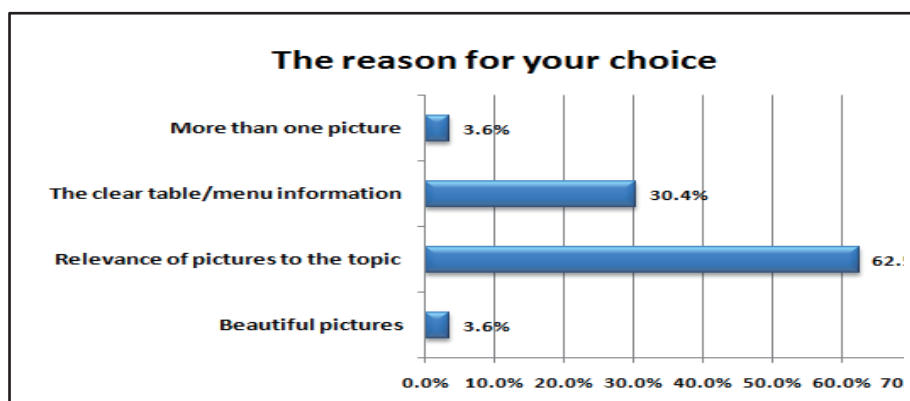


Fig. 2 The respondents' choices of the reasons for international audiences' favorite homepage pictures

The above findings suggest that in recommending TCM websites with their English MT outputs to international audiences, the respondents' first concern is thematic relevance of pictorial contents to the topic of the website. For example, the homepage of Dr. Yang's hospital website shows some pictures of Chinese medical treatments, including acupuncture, pulse taking, fire cupping and others. Looking at these pictures, audiences can predict what themes the web texts address and what information they will provide. Only when pictures are thematically related can they create the contextual effect and help audiences guess the meanings of MT outputs easily. The thematic pictures help foster the audiences' comprehension of MT outputs, and this point accords with Ausubel's (2000) argument that when a picture is contextually relevant to the content of a passage, it "not only provides the readers with background information but also activates an organizational schema for the text as a whole by facilitating top-down processing" (quoted in Majidi 2016: 1827). In addition, the importance of picture's thematic relevance concurs with Gumperz's (1982a, 1982b) theory that referential signals of contextualization aids relate to verbal messages, so they can generate the contextual effect and activate the audiences' cognitive schema to reduce their reading load and interpreting difficulty.

4.2 The respondents' view of international audiences' reception of pictures in web texts

Similar to the respondents' views on the audiences' reception of pictures with captions on the homepages, the statistical results of Part 2 showed that the highest percentage (94.6%) of respondents agreed that pictures with clear captions in the MT outputs of web texts were most helpful; 87.5% of respondents agreed that pictures in the web texts could attract international audiences' interest in reading MT outputs; 85.7% of respondents agreed that relevant-to-topic pictures were helpful, and 83.9% of respondents agreed that pictures in sequence helped boost international audiences' comprehension of draft MT outputs. Only 50.9% of respondents agreed that a single picture was effective as the contextualization aid. Figure 3 shows the statistical results of the respondents' views of how various types of pictures can be used in web texts to help international audiences comprehend the English MT outputs.

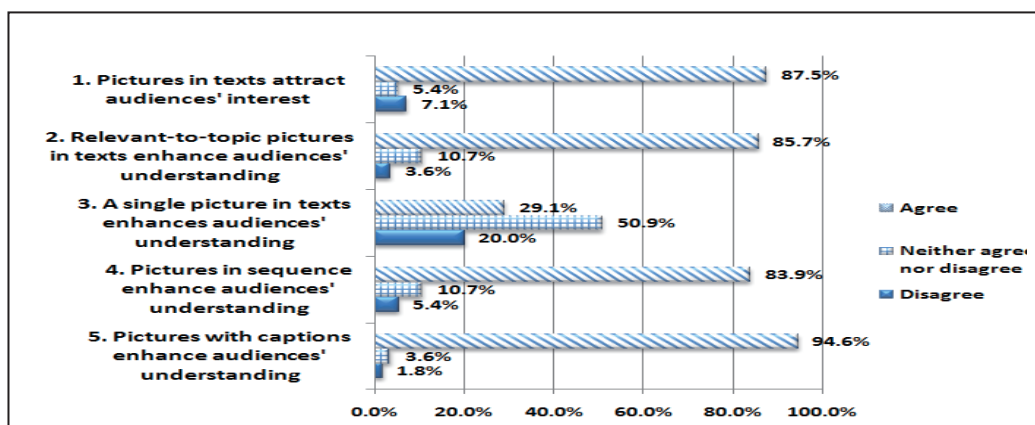


Fig. 3 The respondents' views of audiences' reception of pictures in web texts

Like Part 1, findings of Part 2 similarly show that the highest percentage of respondents (94.6%) prioritize the pictures that are used along with clear captions in web texts. For example, Dr. Peng Wen-Ya's blog shows a caption under a picture with the English MT: *Baihui in the top of the head, it is recommended to hand tapping 3 minutes*. The audiences might have difficulty understanding the MT of the caption, but making a cross-reference between the picture of a woman who is pressing her head with her fingers and the caption below the picture can greatly reduce the comprehension challenge. This point can be supported by Hibbing and Rankin-

Erickson's (2003: 758) claim that readers' comprehension can be greatly improved using both verbal and non-verbal messages together because two sources of information can communicate a message more effectively than a single source of information. Another finding indicates that many respondents (82.1 in Part 1 and 85.5% in Part 2) agree that thematically-relevant pictures can be helpful for international audiences to get the gist of MT outputs. This finding of thematic-relevance preference is also supported by Ausubel's (2000) argument that a picture with contextual relevance to a textual passage can activate the audience's cognitive schema and enhance the efficiency of their information processing.

A significant difference between Part 1 and Part 2 is that 87.5% of respondents agree that pictures in web texts can attract international audiences' interest, but only 60.7% agree to the same function of homepage pictures. By comparing the pictures used by homepages and web texts, we find that the pictures display different types. The former uses small size doctor photos, but the latter, the bigger size photos of two beautiful women receiving medical treatment and a doctor operating massage. Thus, we may infer that whether pictures can foster international audiences' interest is not relevant to the locations of pictures; instead, pictorial contents and sizes dominantly affect the respondents' emotion and choices.

When asked to choose international audiences' favorite pictures in web texts, the findings showed that the highest number of respondents chose the pictures in the doctor's blog; the second highest number of respondents, the pictures in company website, and the third highest number of respondents, the pictures in hospital websites. When asked about the reasons, 53.6% of respondents chose relevant-to-topic pictures; 19.6% of respondents, use of more than one picture; and 16.1% of respondents, pictures with clear captions and beautiful pictures. Figure 4 shows the respondents' choices of the reasons.

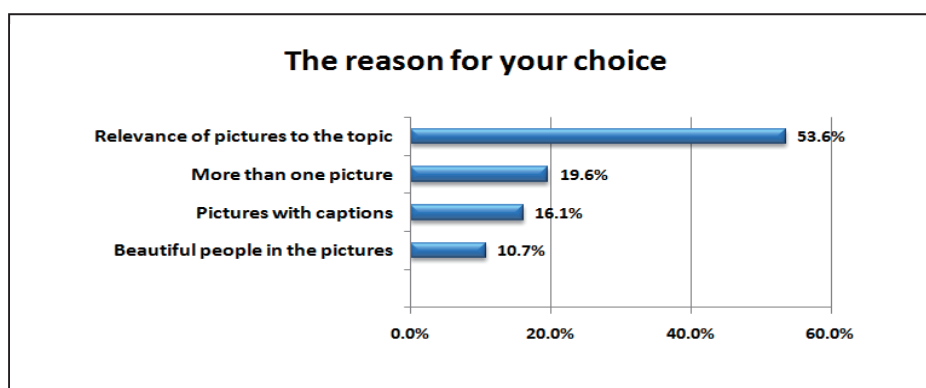


Fig. 4 The respondents' choice of reasons for international audiences' favorite pictures in web texts

A comparison of Part 1 and Part 2 shows that all respondents have a similar view about international audiences' preference for thematically-relevant pictures, taking up 62.5 % and 53.6 % respectively. The former is 8.9 percentage points higher than the latter. Such a small difference suggests that the homepage does not provide adequate information of verbal texts for consultation, so the homepage pictures need a higher level of thematic relevance to the topic than the pictures in web texts. Another notable point is that only 3.6 % of respondents in Part 1 agree that more than one picture on the homepage are helpful, but 19.6 % favor more than one picture in Part 2. The former is 16 percentage points lower than the latter. One possible reason for this gap is that the respondents find that the homepage only provides a short introduction with the names of medical faculty and treatment methods, so there is no need of using more than one picture for illustration. In contrast, web texts of TCM websites provide detailed and theme-specific information, so they need to use more than one picture to contextualize the information. Additionally, web texts can use the hyperlinked function to accommodate more pictures than the homepage for international audiences' consultation. After combining the results as shown in Figures 1 and 3, we reach a conclusion that more than half of respondents (76.2 %) agree that pictorial materials can be used either in homepages or in the web texts of TCM websites to boost international audiences' interest and comprehension. And, thematically-relevant pictures are paramount to optimize the contextualization effect.

4.3 Suggested modifications

The statistical results demonstrate that many respondents agree that international audiences can consult pictures to help understand the gist of MT outputs, but some improvements are needed. Thus, some suggestions are given to modify the amount and types of pictures used in today's TCM websites to maximize their contextualization effect for MT audiences.

4.3.1 Use of more than one picture

To provide more contextual clues and help international audiences understand the MT outputs of TCM websites more easily, it is recommended that sequential and/or more than one picture is used, not standalone pictures. We may compare how a website looks differently before and after the use of more than one picture. Figure 5 shows the English MT of a web text that uses only one picture (KingNet website 1996-2016).

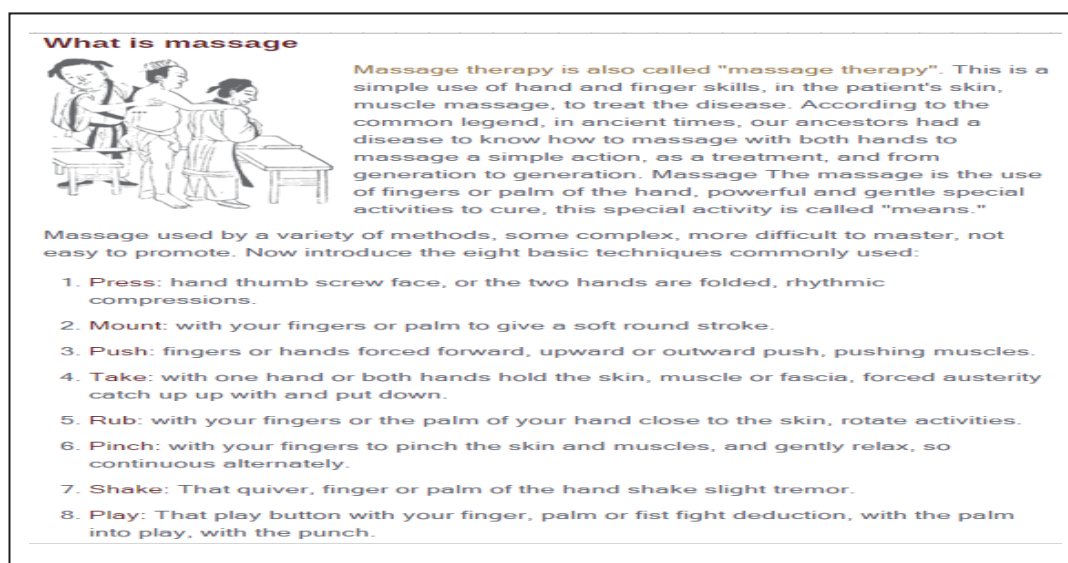


Fig. 5 The English MT of a web text with a single picture of massage

The above web text (KingNet 1996-2016) uses only one picture to illustrate the practice of massage. The eight techniques of massage are not given any pictures. To make up for this weak contextual effect resulting from the lack of ample pictures, the author proposes that the MT output of each massage technique should be attached

with one picture. Figure 6 shows how the web text can be modified by supplementing more pictures. All supplementary pictures are retrieved from Google Pictures on the web. The reproduction of the pictures does not have the issue of infringement because the retrieval sites of the pictures are open to academic research purpose (Intellectual Property Office, Taiwan's Ministry of Economic Affairs, n.d.).

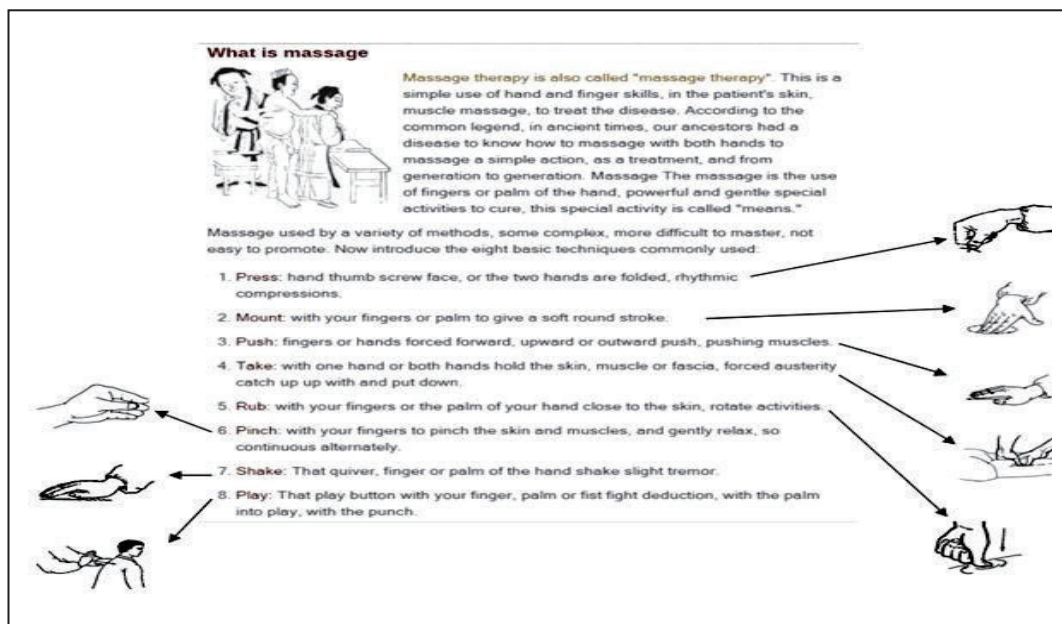


Fig. 6 The web text with pictures added to show all the message techniques

Reading the MT output with more pictures as shown in Figure 6, audiences can understand the gist of the MT better. For example, when audiences look at the pictures of “folded hands” and “pinch,” they can clearly know what they refer to. After this, they cross-refer to the MT, Press: hand thumb screw face or two hands are folded, rhythmic compression and Pinch: with your fingers to pinch the skin and muscles, and gently relax, so continuous alternatively, they can guess the meaning of MT outputs more easily although they present only vague concepts. Many scholars (Bowen 1982; Pillai & Vengadasamy 2010: 146; Talif 1995) have mentioned that the visual aids of picture and videos can help students cope with the abstract ideas of literary texts easily. Although TCM web texts do not have abstract concepts, their English MT outputs with semantic and syntactic errors often make audiences feel confused. Thus, the clarification of vague messages of MT outputs is the same

challenging as the decoding of abstract concepts in literary works. As readers can use the pictorial aid to resolve the problem of abstract literary concepts (Sivapalan, et al. 2010), MT audiences can similarly use sufficient pictorial aids to help interpret the unclear messages of MT outputs, and enhance their comprehension of the MT gist.

4.3.2 Use of topic/theme-relevant pictures

Since the greatest number of respondents agrees that topic/theme-relevant pictures can generate optimal contextual effect, the author suggests that non-thematic pictures should be modified or removed. For example, the pictures of doctors, patients, medical staff, flowers, family, beautiful landscapes on the homepages of the TCM websites are irrelevant to the main features of TCM hospitals, clinics and institutions. Thus, they can be replaced with topic-relevant pictures of medical treatments and Chinese herbal medicine. If so, the contextualization effect of pictorial aids can be successfully generated

4.3.3 Use of pre-edited captions

One more thing for modification is the use of pre-edited captions for the pictures. Pictures might not be helpful when the MT outputs of the picture captions are incomprehensible. For example, the MT of the caption, *Winter sleepy spirit of the poor; do so on the information photos* (see Appendix 2), is difficult for international audiences to understand its meaning. Thus, I suggest that the original caption be edited by using a simple sentence structure and connecting two clauses with a conjunction. A pre-edited caption can be given: 在冬天，你常想睡覺，所以你可以依照圖片指示去按摩你自己 [Zai dongtian, ni chang xiang shuijiao, suoyi ni keyi yishao tupian zhishi qu anmo niziji], and its English MT output is comprehensible: *In the winter, you often want to sleep, so you can follow the picture instructions to massage yourself* (created by online Google Translate in May of 2019). The MT of the clear caption can also help international audiences understand the pictorial messages better. After the audiences get the contextual clues, they may understand easily the MT output of the main text: *Winter easy to feel tired, office workers are easy to sleep, easy to bed in the morning....* At this point, we confirm that international audiences can understand the MTs of main texts more easily by

using pictures with comprehensible captions.

5. Conclusion

In the age of globalization, web texts have become the important source of information for audiences' knowledge acquisition. Advances in machine translation systems have made the web-based MT outputs easier for audiences to get the gist, but the draft MTs of TCM web texts remain a challenge due to the nature and complexity of the content of TCM. Thus, it is our suggestion that pictures are used as a contextualization aid to fulfill the function of a scaffolding strategy. Despite the small sample size of this study, the findings have taken on some research significance.

- (1) The respondents' views of international audiences' reception of pictorial aids used in the MT outputs of TCM websites concur with previous studies that claim that using pictures can raise readers' comprehension. As the reader of literary works relies on pictures to have a better comprehension of abstract literary concepts, MT audiences can similarly use pictures with clear captions to understand better the vague messages of MT outputs.
- (2) The contextual effect of pictorial materials is not based on color and images. Instead, thematically-relevant pictures with pre-edited clear captions and more than one picture in sequence help maximize the contextual effect.
- (3) Modification of pictures in today's TCM websites suggests the importance of relating pictorial materials to audiences' background knowledge and their easier comprehension of MT outputs. The pictures should not be used only for beautifying web pages.

Once again, this paper emphasizes that TCM web texts address specialized subjects, and use many specialized terms, so the NMT system fails to handle their translations accurately. However, if pictures are used, they can create the contextualization effect, and web audiences can understand the gist of the English MT more easily by consulting the pictures.

In conclusion, what follows in the wake of this paper's proposal is adding theme-relevant pictures along with clear captions. The irrelevant pictures should be

eliminated and more than one theme-relevant picture should be provided. Only when we use the right amount and types of pictures in future TCM websites can international audiences understand the gist of English MT outputs more easily.

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Appendix 1

Questionnaire on homepage pictures as a contextualization aid to MT outputs

Part A: Your view on the use of pictures in the homepage of traditional Chinese medicine websites

Instructions

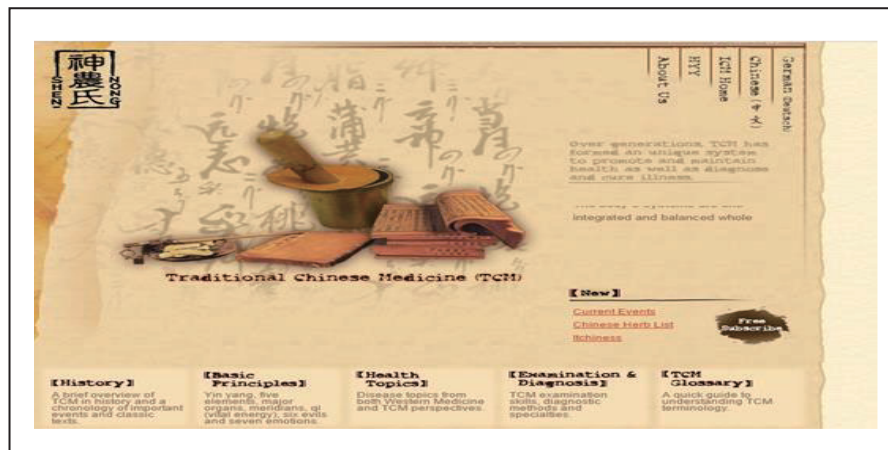
If one of your foreign friends wants you to recommend traditional Chinese medicine websites and their English MT outputs for knowledge acquisition, what's your view on the use of pictures to help them understand the main idea of English MT outputs? Please read the following three English machine-created translations along their pictures extracted from three websites. After that, you are requested to answer subsequent selection questions.

(1) Hospital website



The picture above is retrieved from Dr. Yang Li-Shu's Traditional Medicine Internet Hospital website (<http://www.doctoryang.info/dryang.php?page=service>)

(2) TCM Company website



The picture above is retrieved from ShenNong Limited. (<http://shennong.com/eng/front/index.html>)

(3) Doctor's Blog



The picture above is retrieved from Dr. Peng Wen-Ya's Blog (<http://drwenya23584858.pixnet.net/blog>)

Questionnaire

- (1) Do you agree that the picture in the homepage can help international audiences understand the main idea of the English MT output of the website?
Agree ☐; Neither agree nor disagree ☐; Disagree ☐
- (2) Do you agree that the picture in the homepage will attract international audiences to read the website regardless of the pictures' irrelevance to the

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topic?

Agree ☐; Neither agree nor disagree ☐; Disagree ☐

- (3) Do you agree that the picture in the homepage should be related to the topic, so it can help international audiences understand the main idea of the MT outputs of the websites?

Agree ☐; Neither agree nor disagree ☐; Disagree ☐

- (4) Do you agree that the captions of pictures can help international audiences understand the main idea of the MT outputs of the websites better?

Agree ☐; Neither agree nor disagree ☐; Disagree ☐

- (5) In your opinion, which picture in the homepage can help international audiences predict the web content best?

☐ (A) Hospital website

☐ (B) TCM company website

☐ (C) Doctor's blog

- (6) The reason for your choice is?

☐ (A) More than one picture

☐ (B) The clear table/menu information

☐ (C) Relevance of pictures to the topic

☐ (D) Beautiful pictures

☐ (E) Others

Appendix 2

Questionnaire on pictures in web texts as a contextualization aid to MT outputs

Part B: Your view on the use of pictures in the web texts of Chinese medicine websites


Instructions

Please read the following three English machine-created translations with relevant pictures extracted from three websites. After that, you are requested to answer subsequent selection questions.


(1) Hospital website

Acupuncture acupuncture points neck and shoulder - massage DIY:

Wind pool
[Acupuncture point name] : the wind pool.
Body parts: head acupuncture points.
[Twelve meridians]: foot Shaoyang gall bladder.
[Treatment]: Shufeng antipyretic, Cong ears eyesight, Xuan Chang meridian effect. Head, eye, rhinitis, tinnitus, high blood pressure, hemiplegia. In addition, the treatment of neck, ear, eye, side head, brain diseases.
Point to find method: the neck after the big tendon (trapezius) on both sides of the hair side of the pit in the nest.
[DIY] acupressure:
1. (massage): rubbing method.
2. (strength rhythm): put his hands after the ear to the thumb pulp, press the acupuncture points from the bottom up for 10 seconds, rest for 5 seconds.
3. (repeated time): left and right of the 5 minutes, daily morning and evening of the 1st.

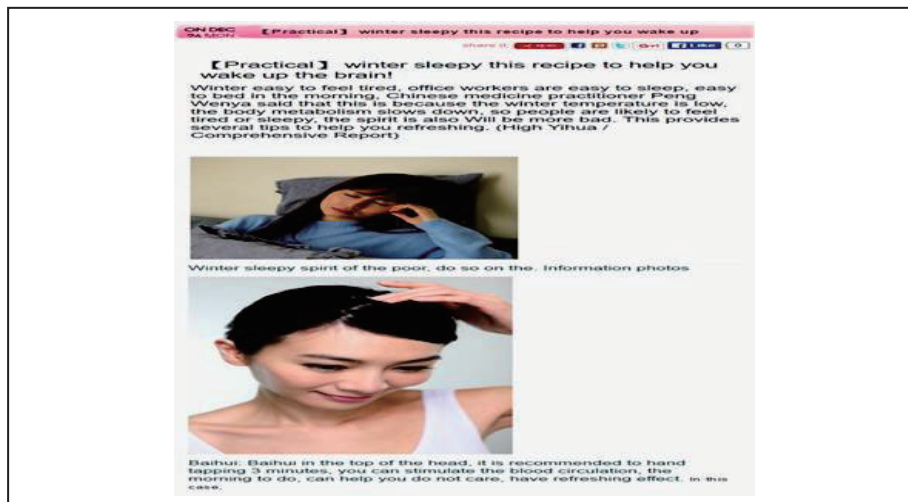


2. Shoulder well
[Acupuncture point name] : shoulder well.
Body parts: shoulder acupuncture points.
[Twelve meridians]: foot Shaoyang gall bladder.
[Treatment]: conditioning qi and blood, Shi fang, Tonglue, in addition to paralysis effect. Attending headache, stiff neck, neck pain, shoulder pain, mastitis.
[Point to find]: the seventh cervical spine and shoulder outside the high bone protrusion (ie clavicle acromion) the middle point of the connection is the point, points straight down on the nipple.
[DIY] acupressure:



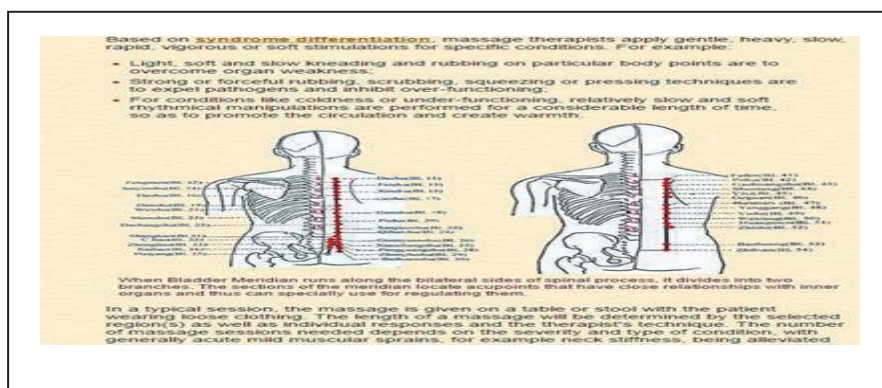
The picture above is retrieved from Dr. Yang Li-Shu's Traditional Medicine Internet Hospital website (http://www.doctoryang.info/health_detail.php?id=409)

(2) TCN Company website



The picture above is retrieved from ShenNong Limited (http://shen-nong.com/eng/treatment/massage_practice.html#1)

(3) Doctor's blog



The picture above is retrieved from Dr. Peng Wen-Ya's blog. (<http://drwenya23584858.pixnet.net/blog/post/>)

Questionnaire

- (1) Do you agree that the picture will attract international audiences to read the MT output of the website?
Agree☐; Neither agree nor disagree☐; Disagree☐
- (2) Do you agree that the picture in the text should be related to the topic, so it can help international audiences understand the main idea of the MT output?
Agree☐; Neither agree nor disagree☐; Disagree☐
- (3) Do you agree that the single picture might not be of much help for international audiences to understand the main idea of the MT output?
Agree☐; Neither agree nor disagree☐; Disagree☐
- (4) Do you agree that more than one pictures or pictures in sequence can help international audiences understand the main idea of the MT output?
Agree☐; Neither agree nor disagree☐; Disagree☐
- (5) Do you agree that if a picture has a caption, it can help international audiences understand the main idea of the MT output better?
Agree☐; Neither agree nor disagree☐; Disagree☐
- (6) Which website pictures do you think international audiences will like better?
And why?
Website pictures
☐ (A) Hospital website
☐ (B) TCM company website
☐ (C) Doctor's blog
- (7) Why ?
☐ (A) Relevance of pictures to the topic
☐ (B) More than one picture
☐ (C) Captions of the pictures
☐ (D) Beautiful people in the pictures
☐ (E) Others

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