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A Comparative Study of Knowledge Construction within Online User Support Discussion Forums in Chinese and English-Language Cultural Contexts

Abstract

Many IT companies like HP, Dell and Lenovo have established both English language and Chinese user support forums for their consumers to share and construct knowledge. The innovative knowledge generated in these virtual product user communities is valuable for companies enabling them to incorporate users' innovative insights and problems solving skills. This research compares the knowledge construction processes within such forums in English and Chinese cultural contexts. The research adopts a method combining content analysis of discussion threads where technical problems are solved, complemented by observation and thematic analysis of interviews with forum members. The results show that the cultural and language differences do not cause a big change of users' knowledge construction patterns. However, the character of Chinese language and culture can indirectly affect the process by including more social information to influence social interactions. The research suggests that more tailored facilitation strategies should be adopted in managing producer sponsored user support forums designed for different cultural regions.

Keywords Knowledge Construction, User Support Discussion Forum, Cultural Difference, Chinese Culture, Social Media

1. Introduction

Social media is a broad term which refers to multiple computer-mediated tools and internet based services for people to seek, share, and create content, and for group members to interact and collaborate with each other (Kim et al., 2010; Lerman, 2007). It is defined in general terms by (Kaplan and Haenlein, 2010: 61) as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content." They are "tools that enable open online exchange of information through conversation and interaction" (Yates and Paquette, 2011: 6). Hundreds of different social media platforms, for example, from traditional text messaging, discussion groups, Internet forums, blogs, wikis, podcasts, to social networking web sites (Hanna et al.,2011; Li et al., 2010). These diverse social media sites are each different in their scope and functionality (Kietzmann et al., 2011).

It is increasingly recognised that "social media is about creating, influencing, and sharing; and, importantly, it can have a powerful impact on performance" (Chui et al., 2006: 271). It can help the firms exploit the opportunities provided by creative consumers (Berthon et al., 2007). Lee et al. (2003)'s findings indicate that the discussion forum is the most popular tool adopted in virtual communities. One type of social media of particular interest to this article is the company sponsored discussion forum where virtual communities of product users share and create knowledge to solve their technical problems through peer support.

Many multinational IT producers, such as DELL, HP and Lenovo, have established such discussion forums in different languages for their regional users. However, there does not seem to have been any research on the impact of national cultural differences on virtual product user community members' collective knowledge construction behaviours. Such research would be of theoretical importance for our understanding the impact of culture on use of IT and social media. It would also be of practical importance to develop tailored facilitation for better management in different regions. In this context the research presented in this paper sought to conduct a systematic analysis of how knowledge construction in online forums was shaped by cultural context.

The paper is laid out as follows: the literature reviews briefly reviews existing theories and studies about cultural differences and its relationships with knowledge management. It points out the gap in the existing literature. The methodology section introduces how the empirical data about the knowledge construction was collected and analysed. The findings firstly present a content analysis framework for exploring knowledge construction, and a knowledge construction process model to illustrate the patterns. Then it describes the knowledge construction activities in different language and culture forums, based on thread analysis. The discussion section considers the differences of knowledge construction in the two different cultural contexts, and explores the reasons for differences. The conclusion section outlines the theoretical contributions and practical implications, and recommends future research.

2. Literature Review

There are many theories classifying (/analysing) national culture, such as Hofstede's (1984) cultural dimension theory, Hall's (1976) classification of high-context culture and low-context culture, and Triandis's (1995) classification of individualism and collectivism. However, there are not many empirical studies on national cultural influences on knowledge management (Ardichvili et al., 2006) – even though it is recognised to be a very significant

topic. Some researchers have explored knowledge transfer and sharing within multinational corporations or joint ventures (Inkpen and Dinur, 1998; Simonin, 1999; Gupta and Govindarajan, 2000; Kogut and Singh, 1988; Kogut and Zander, 1993; Ford et al., 2003). Other researchers have conducted comparative studies of knowledge sharing within organizations in different countries, such as cases of America and China (Chow et al., 2000), cases of Russia and China (Michailova and Hutchings, 2006), and cases of China, Russia and Brazil (Ardichvili et al., 2006). In these cases, the researchers identify several significant cultural differences that influence knowledge sharing, such as collectivism and individualism, in-group and out-group orientation, low-context and high-context communication, face loosing, status and power distance.

The cultural differences between collectivism and individualism, and the high-context and the low context are the most frequently discussed features in influencing knowledge activities. Individualists tend to put personal goal before the larger social group, and perceive themselves as independent of other members. In contrast, collectivists tend to place the goal of the larger collective in priority, and see themselves as interdependent with others (Hofstede, 2001). Bhagat et al. (2002) state that members of collectivism and individualism cultures processing information and constructing knowledge in distinctively different ways. Members of individualistic cultures (e.g. USA) consider information independent of its context, concentrate on and welcome the written and codified information. People in collectivist cultures (e. g. China) tend to seek contextual cues in information and ignore written information (Bhagat et al., 2002). This finding can be supported by Hall's (1976) classification of low-context and high-context cultures. People in low-context cultures (e.g. USA) tend to rely more on explicit information in communication. The emphasis on the written word in the low-context culture leads to acceptance of communication media with low media-richness, such as online discussion forums (Ardichvili et al., 2006). Members in high-context cultures (e.g. China) usually imply a message through its context and environmental settings, which includes behaviour, situation, and paraverbal cues. This makes people in high-context cultures prefer to choose media with high media-richness, such as face-to-face communication (Ardichvili et al., 2006).

Knowledge sharing in organizations is heavily influenced by individual employees' cultural values (Hofstede, 2001; Hambrick et al., 1998; Pfeffer and Sutton, 2000). Cognitive styles in learning and knowledge creation also differs in different national and ethnic cultural contexts (Korac-Kakabadze and Kouzmin, 1999; Ginsburg et al., 1981). However, there are very few

studies concentrating on exploring national cultural factors which influence knowledge transfer and knowledge management (Bhagat et al., 2002; Ford and Chan, 2003). There are even fewer studies that explore this subject in the context of virtual communities: Ardichvili et al. (2006) conducted an empirical study of exploring cultural factors affecting knowledge sharing strategies in virtual communities of practice. There are no empirical studies comparing knowledge creation or construction patterns in virtual communities under the influences of different national cultures. The current paper seeks to make a contribution to filling this gap.

2. Research Methodology

In order to explore the impact of cultural differences on knowledge construction activities, the research reported in this paper sought to undertake a systematic comparison between English and Chinese user discussion forums (i.e. virtual product user communities) affiliated to respective company websites.

2.1 Data Selection

A purposive sampling strategy was chosen in selecting cases, i.e. multiple virtual communities consisting of product users hosted on producer websites were selected, including Dell Support Forum in English, Dell Support Forum in Chinese, Lenovo Support Forum in English, Lenovo Discussion Board in Chinese, the HP Discussion Board in English, and HP Technical Support Forum in Chinese.

The sampling strategy was based on selecting information-rich cases, "those from which one can learn a great deal about issues of central importance to the purpose of the research" (Patton 1990: 169). Despite the language and cultural differences, these selected forums appeared to share some apparent common attributes, such as that they were sponsored by the producers and hosted on the producers' websites, used a similar technical platform of an online forum, designed for sharing and creating knowledge, consisted of community members of product users, managed with similar moderation strategies, and discussed similar topics of around solving products' technical problems through peer support. Most of these forums are active in terms of a large number of published posts, community members, and a high percentage of successfully solved problems. Hence a differing cultural context seemed one of the most salient differences between the communities.

Website documentation including community mission statements provided an initial understanding of the nature of the groups. For more in-depth understanding data was collected through thread analysis, interviews and observation.

The main source of data was forum discussion threads. In order to explore knowledge construction specifically, a judgement sampling strategy was used to select theoretically interesting discussion threads on computer technical problems. Laptops and notebooks are personal electronic products that have more technical questions and problems in their usage than other home electronic appliances. Computer users usually prefer to find quick solutions by participating in the discussions on internet forums. Discussion threads with accepted answers suggest a complete knowledge construction process with rich and theoretically interesting elements.

2.2 Data Analysis

Qualitative content analysis was adopted to explore the knowledge construction occurring within the online discussions threads in the selected forums. Graneheim and Lundman (2003) suggest that this method can be used to deal with interpreting and analysing the latent content besides simply summarizing surface content. Qualitative content analysis is defined by Hsieh and Shannon (2005:1278) as "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns". It is mainly used to explore characteristics of the textual language used for communication purposes, especially in terms of its content (verbal meaning) or contextual meaning (Lindkvist, 1981; McTavish and Pirro, 1990; Tesch, 1990).

A starting point for categories was Henri's (1992) content analysis framework. From the starting point of his framework, data was used to confirm the existence of a category or suggest the need for a new one. For the qualitative content analysis of selected discussion threads, the researchers chose a single post as unit of analysis, and developed a categorization matrix to code the data. Threads were analysed in Excel, with emerging sub-categories as columns and the posts in temporal order, in rows. These categories are internally meaningful to describe the data and externally meaningful in relation to other categories (Dey, 1993). A category can be split into sub-categories, and sub-categories with similar events and attributes can be grouped together as a category (Roberson, 1993). The authors were careful to ensure that these categories were exhaustive and mutually exclusive (Krippendorff, 1980). The final

developed categorization framework contains two levels of categories: main-level and sub-level categories. A definition and examples were developed for each category.

In phase one of the research using this method a content analysis framework of knowledge construction and a knowledge construction process model were developed, based on data from the English language Dell Support Forum and Dell Ideastorm community (Authors, forthcoming). In later stages of the research, the same judgement sampling was used in selecting four comparatively long discussion threads (with posts mainly from five to thirty responses, depending on each forums' general thread length) with rich knowledge construction elements (/rich data) in successfully solving technical problems of computer products from the other selected forums. These threads were analysed to test how widely the content analysis framework and knowledge construction model applied. The resultant comparison between English language user discussion forums and Chinese ones was used to identify the cultural influences on knowledge construction activities.

Two other methods of data analysis supported the study. Observation is considered to be an appropriate data collection method for case studies (Eisenhardt, 1989). In this research, the observations were made of community members' postings in the selected forums and the moderator's moderation activities. Observation also played an extremely important role in selecting discussion threads in order to derive the richest picture of knowledge construction patterns. In addition, in the first phase of work email interviews with 20 participants of Dell Support Forum, analysed by thematic analysis, helped develop and confirm the knowledge construction model.

4 Findings

4.1 The Content Analysis Framework and Knowledge Construction Process Model

The first phase of the work was developed a content analysis framework and analysis of thread patterns yielded a model of how knowledge was being constructed. The content analysis framework for knowledge construction activities includes five main categories of "Knowledge construction Episodes", "Problem description episodes", "Non-constructive episodes", "Moderation Episodes", and "others".

"Knowledge construction episodes" are directly related to building new knowledge to solve technical questions and problems. They include five main categories which are the key bricks for constructing new knowledge:

- An "Initiation Episode" is where a question is asked triggering a discussion.
- A "New Idea Proposing Episode" describes messages where a new possible solution is proposed.
- An "Exploration & Explanation Episode" is a complicated process involving asking and answering focused questions, refining or elaborating already stated ideas, and exchanging information. Its sub-category "clarifying ambiguity (about the idea)" can be distinguished from the sub-category "repeating/refining or elaborating already stated idea" through identifying the replying relationship to the focused question in other posts.
- An "Evaluating & Testing Episode" is where users test proposed ideas by applying them or evaluating them by reasoning or existing facts.
- Finally the "Resolution Episode" is the point at which it is officially or by consensus concluded that an acceptable answer has been found.

The main-level category of a "Problem Description Episode" is about clarifying the symptoms of the problem and gathering contextual knowledge about it. This main-level category contains the sub-categories of "Repeating same/similar problem" and "Judging the existence of the problem". The subcategory of "Repeating same/similar problem" differs from "clarifying ambiguity (about the problem)" in its non-interactive nature. The problem description episodes were found to facilitate the knowledge construction process by providing knowledge about the problem and knowledge about its context. They facilitate rather than form the main discussion (/knowledge construction) process.
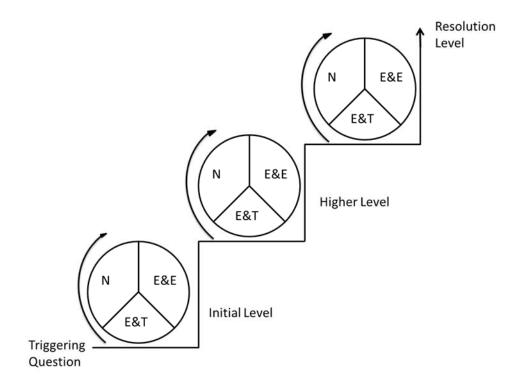
The third main-level category of postings are "Non-constructive Episodes," which consist of categories such as "Suggestion to give up finding a solution", "Suggestion to wait for an authentic solution", and "Raising unnecessary issues". This category refers to discussion content which does not have a direct relationship with constructing new knowledge and does not actively push forward the knowledge building processes for solving problems.

The fourth main-level category is a "Moderation Episode," which refers to activities conducted by both the formal moderator and community members themselves. It contains moderation activity including "Comments about promoting/demoting the discussion idea", "Mediating argument / stopping talk about unnecessary topics", etc. They can also influence the knowledge building process. There is a corresponding relationship between the "Non-constructive Episode" and "Moderation Episode". For example, posts falling into the sub-

category of "Raising unnecessary issues" are stopped through community members' collective moderation behaviour of "mediating the argument/ stopping talk about unnecessary topic".

The fifth main-level category of "Others" in this research mainly refers to invalid posts, which do not form valid discussion content, such as repetitive posts. The framework of knowledge construction derived from Dell User Support Forum (English) does not include categories of pure social information, which is not very common in English virtual product user communities according to the thread analysis.

Based on the common knowledge construction process occurring within discussions, a model that illustrates the process in idealised form was developed and is presented as in Figure 1.

(N= New Idea Proposing Episode; E&E= Exploration & Explanation Episode; E &T= Evaluating & Testing Episode)

Figure 1: Model of the Knowledge Building Process within a Virtual Product User Community

The process starts with an "Initiation Episode" (i.e. the triggering question), and ends with a "Resolution Episode" (i.e. finding accepted answers to the question). Between these two episodes, the discussions usually follow the sequence of a "New Idea Proposing Episode", "Exploration & Explanation Episode", and "Evaluating &Testing Episode" in a cumulative

and progressive order. This process repeats itself and occurs in an iterative way until a proposed idea is identified as the feasible and permanent solution, after evaluation and testing. The model illustrates a progressive process of knowledge construction in the virtual product user community. The hierarchical level of ideas proposed in each stage is also reflected in this description. Each newly proposed idea is usually based on previous ones and is oriented so as to be more reliable.

The main problem solving strategy is of "trial-and-error" and this is used in constructing new knowledge in order to find the most effective solutions. Different solutions are continuously proposed until one is tested and found to be widely accepted as a workable answer. The effectiveness and efficiency of this strategy is highly relevant to the nature of newly constructed knowledge in the virtual product user community: the proposed ideas can be immediately applied to the products or be evaluated with existing facts. During this process, the latest idea is usually proposed based on previous ones, and becomes more and more reliable as the discussion proceeds. This is also reflected in the low level of critical thinking required to achieve solutions. Trial-and-error replaces demanding high level thinking.

One of the attributes of this newly created content analysis framework is its exclusion of the social dimension. This is because social messages, which refer to a "statement or part of a statement not related to formal content of subject matter" (Henri, 1992: 126), are very rare in the Dell Support Forum (English), i.e. English virtual product user community. According to Hara et al. (2000), social cues can include self-introduction, greetings, jokes, expressions of personal feelings, the use of symbolic icons, and so on.

4.2 Comparison of Threads Analysis between English and Chinese Support Forums

In the second stage of the research, the content analysis framework derived from Dell was applied in analysing threads selected from multiple English and Chinese user support forums, as shown in the following table 1.

In order to obtain a more comprehensive understanding of the user support forums in different languages and knowledge construction patterns, these threads were analysed from several perspectives. Numbers of posts in each thread and discussion participants were calculated to investigate participation level. More importantly, the knowledge construction elements (i.e. episodes included in the analysis framework) were also analysed by calculating the numbers of posts falling into every main-level category. Through the analysis, we can

understand the similarities and differences of knowledge construction in English and Chinese forums. At the same time, we can also find the elements exist in different cultural background but not appearing in the newly created framework through looking at the posts falling outside the whole analytical framework.

The result in column 11 - Posts falling into the whole analytical framework-is often 100% and rarely below 90%. This proves that the content analysis framework developed in the first stage is effective to capture most discussion content in both English language and Chinese user support forums. Columns 6, 7 and 8 show that most user generated contents concentrate on the main-level categories of "Problem Description episodes", ""Non-constructive episodes", and especially, the "Knowledge Construction Episodes". The column 10 (Invalid Posts) suggests that most of the selected discussion forum have good content management, except HP Technical Support Forum in Chinese.

Table 1: Comparative Analysis of Knowledge Construction Occurring in Discussion Threads in English and Chinese User Support Forums

	Forum	Thread	Number of posts	Number of participants	Posts falling into "Knowledge Construction Episodes"	Posts falling into "Problem Description Episodes"	Posts falling into "Non-constructive Episodes"	Posts falling into "Moderation Episodes"	Others (Invalid Posts)	Posts falling into the whole analytical framework
English User Support Forums	HP Discussion Board In English	1	39	27	36 (84%)	4 (9%)	3 (7%)	0		100%
		2	12	3	9 (64%)	4 (29%)	1 (7%)	0		100%
		3	19	13	15 (71%)	4 (19%)	2 (10%)	0		100%
		4	31	13	24 (73%)	6 (18%)	3 (9%)	0		100%
	Lenovo Forum in English	1	26	12	26 (81%)	4 (13%)	2 (6%)	0		100%
		2	12	3	12 (86%)	0	2 (14%)	0		100%
		3	25	19	16 (59%)	5 (19%)	3 (11%)	3 (11%)		100%
		4	32	9	33 (92%)	1 (3%)	2 (5%)	0		100%
Chinese User Support Forums	Dell Technical Support Forum (in Chinese)	1	12	4	13 (100%)	0				100%
		2	7	3	8 (100%)	0				100%
		3	7	4	6 (75%)	2 (25%)				100%
		4	7	2	6 (55%)	2 (18%)				100%
	HP Technical Support Forum in Chinese	1	22	10	18 (75%)	1 (4%)	0	0	3 (13%)	82%
		2	10	4	7 (70%)	0	0	0	2 (20%)	90%
		3	16	10	16 (94%)	1 (6%)	0	0	0	100%
		4	7	4	7 (100%)	0	0	0	0	100%
	Lenovo Discussion Board in Chinese	1	5	2	3 (60%)	0	2 (40%)	0		100%
		2	6	2	6 (86%)	0	1 (14%)	0		100%
		3	4	3	3 (75%)	0	1 (25%)	0		100%
		4	5	4	3 (60%)	1 (20%)	1 (20%)	0		100%

[Note: Some posts can fall into two sub-categories, thus the percentages rate is decided by how many posts falling into different categories rather than the total posts number in the thread]

4.2.1 Similarities: similar knowledge construction patterns and knowledge construction strategies

The knowledge construction patterns and strategies in the five user support forums, including both the English and Chinese ones, are quite similar to that in Dell Support Form (English), given the similar variables of discussion topics, communication technical platform, moderation strategies, and sponsorship. Thus, there is no big difference in knowledge construction patterns between English language and Chinese user support forum.

For instance, the knowledge construction patterns in the HP Technical Support Forum in Chinese are quite similar to other English virtual product user communities. All of the knowledge construction episodes are involved in these four threads. Even in the short thread 4, a simple knowledge construction process was identified. In the first 3 posts of this thread, the questioner described his problem and triggered the whole discussion ("Triggering Question Episode), and then one forum user proposed a solution idea in the 4th post ("New Idea Proposition Episode"). In the next two posts, the solution idea was put forward by the questioner and then further clarified by the third discussion participant ("Knowledge Exploration & Explanation Episodes". In the 7th post, the idea is evaluated by a fourth forum user in this thread ("Evaluating & Testing Episode"). The above knowledge process directly reflects the knowledge construction process model.

Another example is the second thread in the Dell Technical Support Forum in Chinese. In thread 2, the first post described the technical problem: the video games of Warcraft (or World of Warcraft) usually stuck while playing music or flash videos. Then forum user go*** proposed a solution idea in the 2nd post: reinstall dedicated graphics card driver. This suggestion is made based on his same experience: his nephew also had same technical problem, which was solved by reinstalling dedicated graphics card driver. In the 3rd post, the initial poster CQ** responded with "buddy, thanks a lot for your reply" and asks a focused question about "where to download the driver?" In the 4th post, another forum user Qg*** participated in the discussion and justified the suggested idea proposed in 2nd post:

> "you can consider the cause of graphics card if the problem only occurs when playing music and flash".

In addition, he also proposed a new idea of refreshing the BIOS if the first solution idea did not work. In the 5th post, the initial poster asked more questions about the content in the 4th post: "Should I just install the driver? I am unfamiliar with Windows 7, and it seems quite difficult for me to refresh Bios. Is there any upgrade of Bios for my type of laptop?" In the 6th post, forum users Qg*** answered the above question about the driver and BIOS. In the 7th post, the initial poster asked another question about how to install the graphics card driver and stated that he did not want to refresh Bios. In the 8th post, the forum user go*** clarified how to download and install the driver.

From the above description of the whole discussion, the strong logical connections between the posts, especially the asking-and-answering relationship between the 5th post and the 6th post, and the 7th post and 8th post can be observed.

The whole discussion in thread 2 proceeded in the way described as the knowledge construction process model. It clearly followed the order of a "Triggering question", followed by "New Idea Proposing" and an "Exploration & Explanation" stage (which can be reflected from "Asking focused questions" and "Clarifying the ambiguity" process). The whole thread ended with the 8th post and there was no further feedback about testing the suggested idea by the initial poster. Therefore, the "Justifying & Testing" episode was absent in this thread. However, it is still clearly illustrated how the knowledge was constructed occurs in a logical way, and in the pattern as the model suggests. Furthermore, the knowledge construction strategy of "trial-and-error" is also apparent.

Moreover, the discussions in these discussion forums, including the English and Chinese ones, also strongly focused on "Knowledge Construction episodes". Other main categories of "Problem Description Episodes", "Non-constructive Episodes", and "Moderation Episode" were also involved in the discussion, but only account for a small portion of all posts. The categories of "Others" (i.e. invalid posts) only occasionally occur in the HP Technical Support Forum in Chinese. Posts with pure social information only exist in the Chinese user support forums rather than English ones.

Even in the many short discussion threads of Chinese user support forums, where only parts of the knowledge construction episodes are involved, some key elements of knowledge construction process described by the knowledge construction process model is still reflected.

For instance, in the first thread of Lenovo Discussion Board in Chinese, the question "the laptop keeps on turning on and off" in the starting post triggered a discussion, and in the 4th post another user proposed a solution idea of "reinstalling power management software". Then this idea was evaluated by linking it to the existing fact by the questioner in the next post: "I have already installed power management software downloaded from official website". In this case, the "Triggering Question Episode", "New idea Proposing Episode", and "Evaluating & Testing Episode" were all involved in the discussion, except "Knowledge Exploration & Explanation Episode" is absent.

4.2.2 Differences: Participation Levels and Prevalence of Social Messages

Difference1: low-level of participation in the Chinese Forums

One of the differences between the selected English and Chinese User Support are the lengths of threads, participation levels, and success rates. According to observation, the general publication situations in Chinese user support forums like Lenovo Discussion Board in Chinese are less impressive than the English ones in terms of users' activeness, number of posts, reply rates, discussion participants numbers, problem solution success, and the expertise of its members.

This could be for a number of reasons: a). The short history of the forum. For instance, the Dell Technical Support Forum in Chinese was just launched a few months before the analysis was conducted in June 2013. This meant the Chinese user support forum lacked maturity in its member size and expertise, and established community identity and community culture. b). Poor moderation and management work. The Lenovo Discussion Board in Chinese assigned many volunteer moderators but they were not very active in performing their duties. Many spam posts exist in the forum as well. 3). Low-motives of sharing knowledge with others. Take the Lenovo Discussion Board in Chinese, for example, it has more than one million registered members, but only a small number of posts were published each day. The reply rates to the questions were extremely low, and most of the threads had no replies. Active users were small in number.

As the table 1 illustrates, although the "Knowledge Construction Episodes" have the highest percentages in both English and Chinese user support forums, the Chinese ones generally have higher percentages of posts falling into "Non-constructive Episodes". For instance, in the Lenovo Discussion Board in Chinese, a large portion of posts were related to the sub-category of "Statement of waiting for other members" solutions or feedback", which belong to the main category of "Non-constructive episodes". This reflects the low-level participation and knowledge expertise of Chinese user community members.

Difference 2: Prevalence of Social messages

According to the coding results, the newly developed content analysis framework is effective to code all discussion threads in the English user support forums. However, it has limitations in directly coding pure social information. It can be seen from the fact that a small part of posts in threads of the Chinese user support forum (i.e. HP Technical Support Forum in Chinese) cannot be coded due to their pure social messages. However, in the Chinese user support forums, the social messages posted in the discussions can promote the participants' motivation and interaction, and also enhances the ties of the members.

In contrast to the absence of the social cues in the English user support forums, the Chinese user support forums have more posts with pure social messages. For instance, the 18th post in the first thread in HP technical Support Forum in Chinese just has the content of "祝你成功" ("May you succeed." posted by 阿*on 2013-05-24 07:41 AM). The 21th post in the first thread also only contains the social information of "谢谢分享" ("thanks for sharing" posted by An*** on 2013-06-13 03:26 PM). The first post expressed good wishes to the questioner.

The second post expressed the gratitude to the idea proposer. This shows other participants' acknowledgement of the idea proposer's knowledge contribution. Others' acknowledgements can promote the "ego" (/fame/reputation) of these active users, which is one of the important motivation factors of knowledge contribution according to the interview analysis:

"That in-turn gave me credibility and confidence within a community."

Therefore, these posts containing merely social information are considered to facilitate interaction between the discussion participants and promote participation, although they only account for a small percentage of the whole discussion thread. The whole post containing pure social information is quite rare in other forums, especially in English language ones. The researcher suggests that this could be related to online community cultures. According to the interviewees, the community culture in English support forums stresses providing technical support with expertise rather than building social relations.

To conclude, the results show that the content analytical framework of knowledge construction, which was created in this study, can effectively code most discussion contents with the exception of pure social information. The variables of culture and language do not have apparent influence on changing virtual product user community members' collaborative knowledge construction behaviours. However, they can indirectly influence the process by promoting participation motives and interactions.

5. Discussion

This research did not find big influences of knowledge construction patterns in solving technical problems caused by different cultures and language. This may be because the users prefer to find the solution in the most efficient way with least efforts, and the strategy of problem solving by trial and error adopted for this sort of problem works well. The proposed solution ideas to technical problems under discussion can be tested by applying or evaluated by existing facts. Thus, cultural differences do not make a difference to how people approach this sort of problem. However, it did identify differences in online social interaction patterns in different national cultures (i.e. in the support forums of English and Chinese). This might affect knowledge construction, but only indirectly. More social information in the discussion threads in Chinese virtual product user communities can promote interaction and motivation when participation is low and thus push forward the knowledge construction process. Therefore, this is in accordance with Chua's (2002:387) identification of "the positive correlation between the level of social interaction and the quality of knowledge created".

There are multiple reasons why social messages in English virtual product user communities are not common. It could be related to the purpose of the community, the sponsor's

moderation, or community culture. Thus this type of community in the English language is mainly established by the producer to help its customers to solve technical problems in the most effective and efficient way, rather than to focus on building social relations among community members. Its community culture values the "helpful role" in solving technical problems rather than "social role" in building social ties. Without active interaction of social messages to enhance the tie, the function of the community can still be achieved through the clear definition of its aim, a well fostered community culture, active community members' contributions, and effective moderation work. Furthermore, the members in the English language forum have an individualistic culture background which promotes the independence of each other (Ardichvili et al., 2006).

In contrast, the reasons for the greater frequency of social messages in the Chinese user support forums could be related to the low-level participation, and poor moderation failing to foster participation. Another reason is the collectivism in Chinese culture which leads people to perceive themselves as interdependent with others. This naturally requires more social ties through exchanging social messages. The high-level context communication culture of members in Chinese forums creates a feeling of a need more social messages (/social cues) and contextual cues in the information to covey meaning (Bhagat et al., 2002).

The exclusion of the social dimension in this content analysis framework does not mean to deny its importance in the knowledge sharing and building process. Social messages among the community members are not salient in the discussion threads in English yet, according to interviewees social interaction is quite strong in the private sub-community, consisting of the most active community members in the English Dell User Support Forum. Its discussions are not generally related to technical issues. This suggests that the social dimension still plays an important role in facilitating knowledge construction by promoting connections and a community sense of active knowledge contributors, although this occurs in an indirect way.

6. Conclusion

Cultural issues in terms of language in use on the forum and community members' language and cultural background is investigated in this research. However, this research identifies that different cultural and language backgrounds of community members does not cause a change of knowledge construction patterns in virtual product user communities. That is to say, the knowledge construction model developed in this research can be applied to describe

knowledge creation activities in both English and Chinese virtual product user communities. The thread analysis demonstrates that there is more pure social information in the user support forums with a Chinese cultural background, than on English forums. The social information is more related to promoting interaction and participation motivation. This needs further exploration to understand the exact function of social information and its relationship with cultural attributes in virtual product user communication.

This research also generates several important practical implications for user support forum sponsors (i.e. producers). The findings empirically show that this type of virtual community existing on the discussion forum can produce innovative insights and knowledge. This suggests that the producers should value its innovative capacity and build effective knowledge transfer mechanism to incorporate users' innovative knowledge into the organization's innovation activities. As the knowledge construction model illustrates, all types of participation in the discussions are of value in the knowledge construction process, either in English or Chinese ones. Thus, the forum members' participation, either by raising a question or suggesting a solution should be encouraged. This is especially important for the Chinese user support forums, which usually have low-level participation and activeness. To achieve this, a multiple incentives should be adopted, including monetary and psychological rewards, to promote people's participation motive. Moreover, different facilitation strategies should be implemented in manging user support forums with different language and for different market regions. For the English user support forums with high-level participation, the user community members prefer less moderation and more freedom. As for the Chinese ones with less activeness, its facilitation should emphasize on incentives to enhance social ties, for instance, organizing off-line activities.

In future research, the newly developed content analysis framework for exploring knowledge construction can be expanded by including the social dimension in order to fit different cultures. It can also be applied in analysing knowledge construction activities in other social media, such as social networking sites. Meanwhile, its validity and generalizability can also be tested.

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