Study on Enhancing Citizens' Scientific Literacy Based on Interpersonal Communication in China

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Abstract--**This paper explores the impacts of interpersonal communication on citizens' scientific literacy in China. The article claims that interpersonal communication has been an important channel of citizens' access to S&T information. This paper analyzes interpersonal communication as an important factor to enhance Chinese civic scientific literacy by the data of the civic scientific literacy survey in China in recent years. It demonstrates to attach importance to the function of interpersonal communication and gives some suggestion how to enhance citizens' scientific literacy currently in China.**

I. INTRODUCTION

The relationship between science and technology (S&T), economic and social development is getting closer. S&T has influenced every aspects of human life.[8]Therefore, it has been basic precondition for citizens enjoying S&T to make a better life to learn, understand S&T in modern society. Enhancing civic scientific literacy has become one of the most important parts of social education and life-long education, in especial basic education in China.

Chinese are increasingly aware of the importance of scientific literacy to promote theirs survival and development. In China, more and more citizens are access to S&T information through non-formal education to enhance their scientific literacy. Studies show that Chinese obtain S&T information mainly by the mass media, organizational communication and interpersonal communication. [1]

As the survey of civic scientific literacy gradually deepens in China, we found interpersonal communication had an important influence on Chinese access to scientific information. Thus, it is particularly important to explore to enhance citizens' scientific literacy on the basis of interpersonal communication under Chinese social and cultural background.

II. CONVERSATTIONS WITH COLLEAGES, FRIENDS, FAMILIES

Communicative speech is an important form of interpersonal communication. Interpersonal communication is an exchange of thoughts and feelings between two or more persons. It includes verbal and nonverbal symbolic.[4] Interpersonal communication and mass media constitute two basic activity patterns as t information exchange in human society.

In the exchanges among people, people exchange knowledge, ideas, feelings, desires, ideas and other information. Intercourse produces a mutual cognition, attraction, interaction in social relations network. Interpersonal communication is one of the oldest forms, the most common and the most basic means of communication in human society. For example, converting, correspondence, telegram, phone calls, symposia, seminars, lectures, etc. [9]

According to the differences of interpersonal media, interpersonal communication is divided into two forms of direct and indirect dissemination. Direct spread is defined as direct exchange of information face to face between propagators and acceptors without through the media. Direct spread passed information mainly through oral language, paralanguage, body language, such as conversations, intercourse, interviews, discussion and dialogues, and so on.

In China, interpersonal communication still is a very important way of communication. It has obvious social characteristics with multi- channel, multi- meaning, strong interactive, non- institutionalized, etc. There is its particularity in the Chinese community. First, there is closed interpersonal communication in many areas; Second, rural interpersonal communication is unity mode; Third, there is strong emotion in interpersonal communication in Chinese acquaintance society. [3]

In this article, Interpersonal communication we talk about mainly refers to a conversations with relatives, colleagues, friends, families, including exchange of information through verbal language, paralanguage, body language, such as conversations, intercourse, interviews, discussion, dialogues. That is a typical form of interpersonal communication.

III. THE IMPORTANT WAY OF CHINESE ACCESS TO S&T INFORMATION BY COMMUNICATION WITH COLLEAGES, FRIENDS, FAMILIES.

In China，a high proportion of citizens gets access to S&T information by conversations with colleagues, friends and families. Due to the effects of cultural factors and economic development, a great many Chinese acquire S&T information by the channel of colleagues, friends and families. The 2005 civic scientific literacy survey in China showed that 48.7% of Chinese obtained S&T information by talking to colleagues and relatives. This ratio is higher than 20.2% in 2001 and 28.5% in 2003. [2] [7] (See Figure 1)

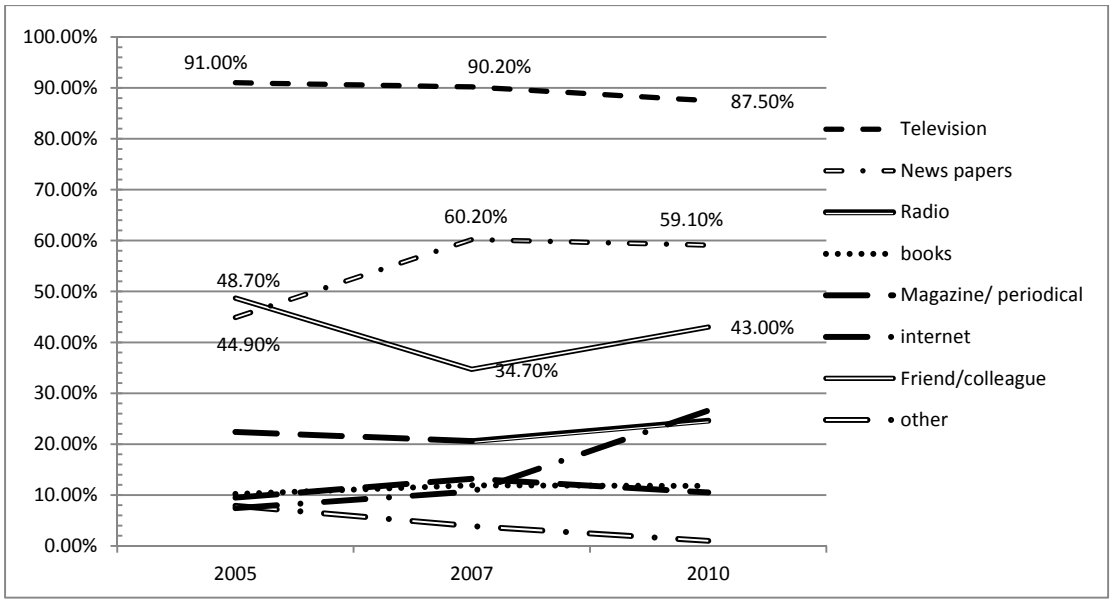

Figure 1: Primary source of S&T information in 2005，2007 and 2010

NOTES: the problem that respondents answered is: "which channel do you get S&T information through firstly, and secondly, thirdly by other channels?" (three choices at most).

SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2005, 2007, 2010.

Generally, with the growth of citizens' needs for S&T, the proportion of Chinese access to S&T information increases by colleagues, friends, families. In 2003, the way to talk with people (friends or colleagues) accounted for 28.5%.[2] But this proportion was up to 48.7% in 2005, 34.7% in 2007, 43.0% in 2010.[5] Moreover, in 2007 and 2010, Chinese got S&T information through different channels, and the way of conversations with people was ranking third, only behind television and newspapers. Television remained the most important channel of the public access to S&T information. (See Figure 2)

From different gender, more female gained S&T information by communication with colleagues, friends and families. The survey showed that the female of 51.4% acquired S&T information by this conversations, and the male also was the percentage of 46%.[6]

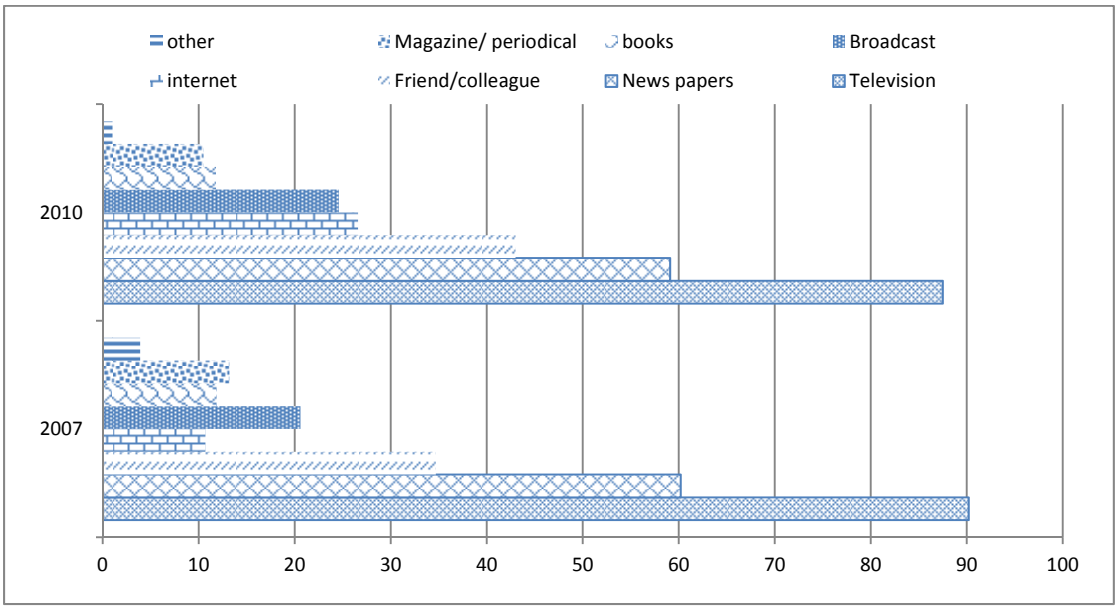

Figure 2: The ranking of Chinese access to S&T information in 2007 and 2010(Year/Percent)

SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2007, 2010.

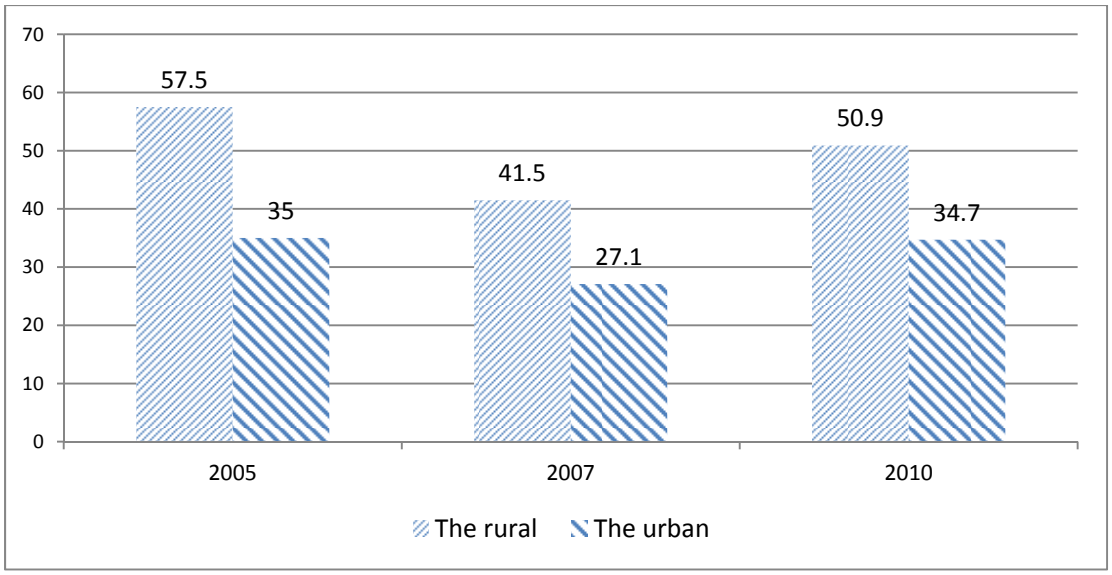

Figure 3: The proportion of the rural and the urban residents getting S&T information by colleagues, friends and families in 2005, 2007 and 2010 (Percent / Year)
SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2005, 2007, 2010.

From the rural and urban, most of the rural residents got S&T information by colleagues, friends, and families. The 2005, 2010civic scientific literacy survey in China showed more than half of the rural residents obtained S&T information by colleagues, friends, and families.[2][6] (See Figure 3)

In different degree of education, most of people with illiteracy (68.1%, 2010) and elementary school (61.5%, 2010), junior high school (47.6%, 2010) get access to information by conversations with colleagues, friends, and families.[6] (See Figure 4)

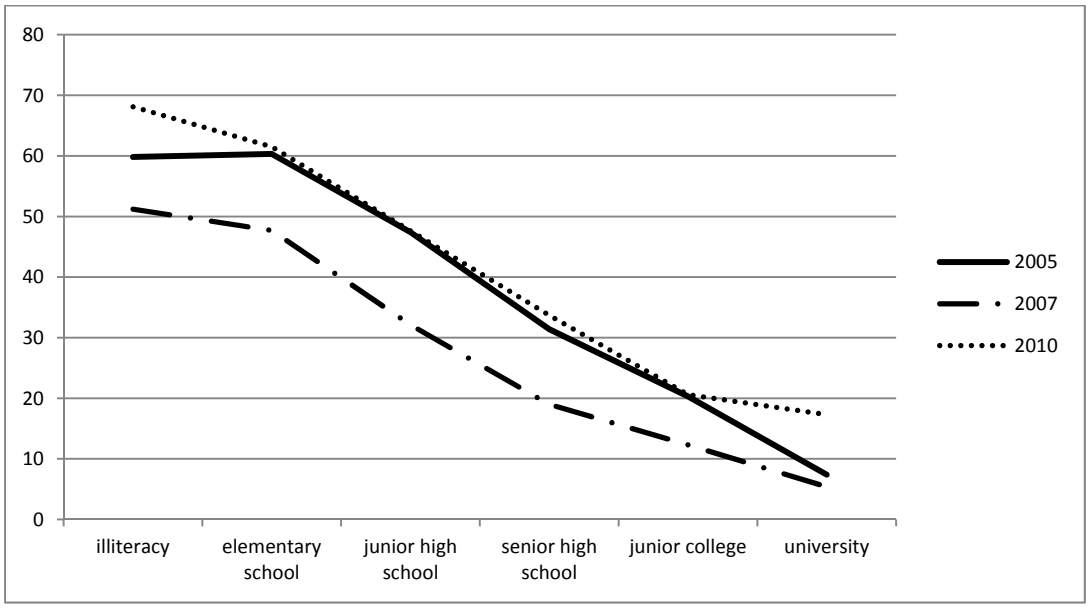

Figure 4: The proportion of different degree of education getting S&T information by colleagues, friends, and families in 2005, 2007 and 2010(Percent / Degree of education)
Note: In China, illiteracy is the state of not knowing how to read or write; Elementary school is the state of having only a primary-school education(1-6years);Junior high school is the state of having only a junior-high school education(7-9years);Senior high is the state of having d only a senior-high school education(10-12 years); Junior college is the state of having only a junior-college education(12-15 years); University is the state of having a university education(16 -18years or longer).
SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2005, 2007, 2010.

According to the different ages, most of elder people got access to information by conversations with colleagues, friends, and families. The age 60-69 years of 54.7% and the age 50-59 years of 50.8% got S&T information by friends, colleagues and families, and this ratio is higher than other ages in 2010. [6](See Figure5)

For different regions, there were very large proportion of Chinese access to S&T information through friends, colleagues and families. In 2005, there were people of 38.3% choosing the way of the conversation to get S&T information and the middle is 44.8%, and the west is 64.3%.[2] In 2007, 2010，this percentage have declined, but its proportion higher than other channels. (See Figure 6)

For selected population, the civic scientific literacy survey in China showed, in 2007, the percentage of leading cadres and public servants, the urban workforce and famers were respectively 12.1%, 28.1%, 41.8% getting S&T information through the way of the conversation, and to 2010, their percentage respectively increase to 20.7%, 35.2 %, 52.3%.[5][6](See Figure 7)

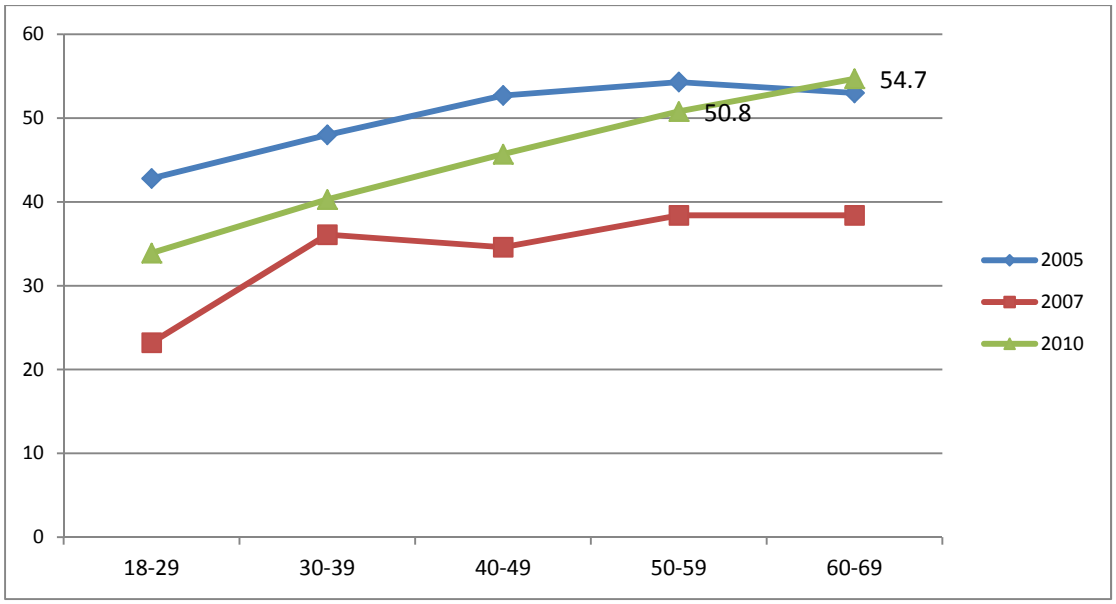

Figure 5: The proportion of different ages getting S&T information colleagues, friends, and families in 2005, 2007 and 2010 (Percent / Age)
SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2005, 2007, 2010.

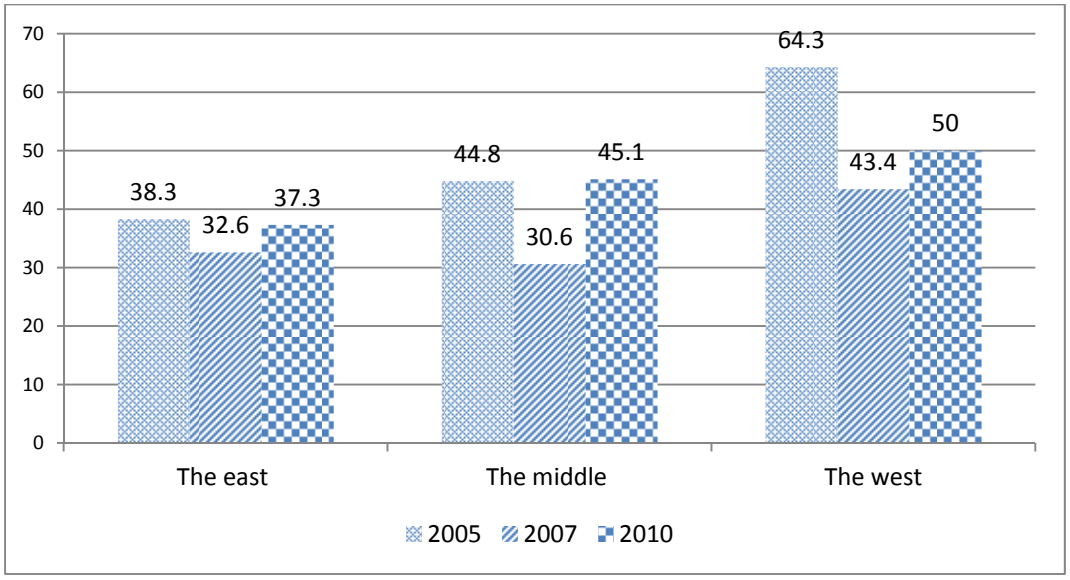

Figure 6: The proportion of different regions getting S&T information by colleagues, friends, and families in 2005, 2007 and 2010 (Percent / Region)
SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2005, 2007, 2010.

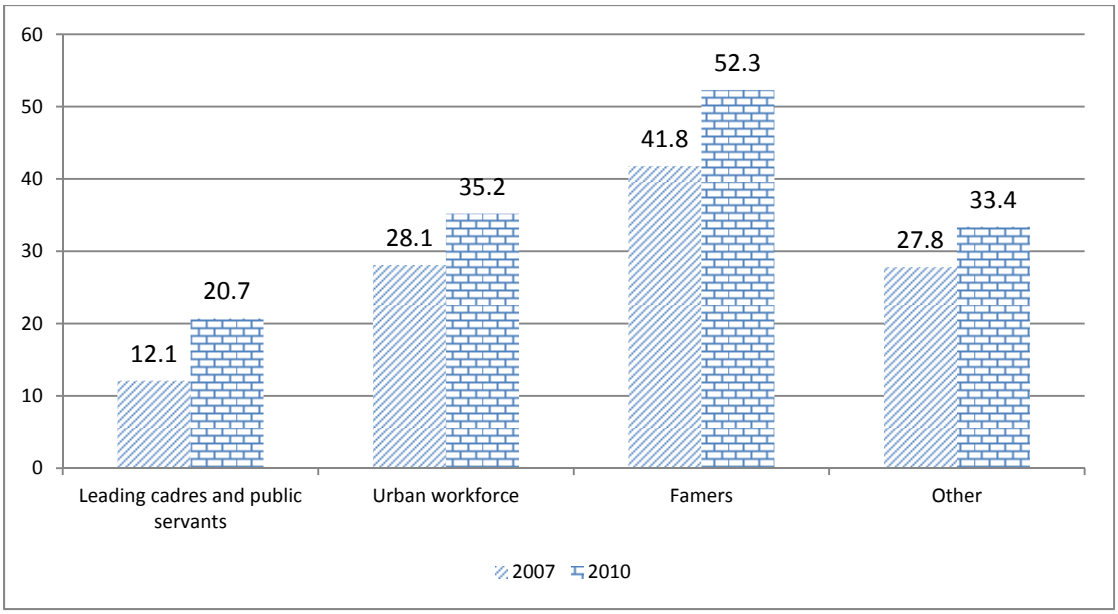

Figure 7: The proportion of selected population getting S&T information by colleagues, friends, and families in 2005, 2007 and 2010 (Percent / Population)
SOURCES: Project for the survey on China Citizen's Science Literacy, Report on China Citizen Science Literacy, 2007, 2010.

From above the analysis, it is observed that the way of the conversation have played an important role in Chinese getting S&T information. It has had a significant impact on improving Citizens' Scientific Literacy in China.

IV. TAKING FULL ADVANTAGE OF COMMUNICATION WITH COLLEAGES, FRIENDS, FAMILIES

The conversation is still an important way of S&T popularization in China, especially in rural areas. We should pay attention to analyze the features and trends of the way, and take advantage of it to strengthen the dissemination and popularization of S&T knowledge to enhance citizens' scientific literacy.

(1) The changing diversity of interpersonal communication including by friends, colleagues, and families.

The development of internet produces the various forms of interpersonal communication. The number of Internet users is rapid growth in China. In the end of December 2012, Chinese Internet penetration is up to 45.8%.[10] It is the fastest growing especially in mobile Internet. According to the statistics from China's Ministry of Industry and Information Technology, in the end of March 2013, the total number of mobile Internet users had reached 817 million. Vice chairman of the China Internet Association Huang Chengqing in the Fifth Global Mobile Internet Conference in 2013 said that China and Asian regions gradually developed into the most promising worldwide mobile internet market. 2013 Internet Trends report noted that by the end of 2012, there were already more than 2.4 billion Internet users, an increase of 8% compared with 2011. However, the vast majority of growth in the number of users is from the mobile terminal.

Internet has made a peer-to-peer of interpersonal communication, such as microblogging, e-mail, SMS message, QQchat, WeChat. Actually, new ways are developing traditional conversation with friends, colleagues and families in China. Microblog has changed the way of Chinese access information. The number of Chinese microblog users has exceeded 300 million. Different from linear propagation of the traditional media, microblogging network has more powerful dissemination. If a person has 10,000 fans, each fan has 100 followers, and then the spread just twice, the impact will be able to reach millions of magnitude.

WeChat is a mobile text and voice messaging application developed by Chinese internet service portal Tencent. There are WeChat number more than 400 million users in China and now has more than 100 million overseas users. It is becoming the most popular messaging and social media App in China.

So, now taking advantage of interpersonal communication means that we must change conventional communication mode. We must turn to the new forms, such as, microblog, WeChat to make them play a huge influence in the course of S&T popularization.

(2) Cultivating "opinion leaders" of interpersonal communication.

Not only in rural areas, but also under social network environment, we should attach great importance to the impact of key opinion leaders on citizens' behaviors to getting S&T information.

We should make an emphasis on the needs of farmers. There is more obvious influence on farmers' access to S&T

by the way of the conversation. It is still the main channel for farmers' access to S&T information. According to the 2007 civic scientific literacy survey in China, the television and newspapers were accounted for 91.1% and 51.2% which the farmers got access to S&T information through, followed by the conversation(41.8%). In 2010, it reached 52.3%, more than newspapers channel of 52.0%. [7]

In the rural areas, there are those taking risks, willing to try. They actively seek new technologies or sometimes learn advanced technology and have a train in other places spontaneously. When they come back home after the success, they gradually spread them to other farmers in the same village or other. This is a typical opinion leader, promoting to spread S&T information of agriculture in China. So, we should consciously develop this opinion leader, and give training opportunities to those farmers eager for new technologies. We may make them aware about the agricultural S&T, and then provide the conditions through all kinds of channels so that they can do demonstrations in the rural communities, gradually be trained as opinion leaders. At last, we will make opinion leaders as the center, then to an area.

More than that, in the urban communities, key opinion leaders is under social network environment of interpersonal communication. It is different from traditional key opinion leaders. In the network of public opinion, it has the special effects of linking up information, leading public opinion, building social culture, and so on. Network opinion leaders form social hot topics about S&T by guiding network opinion, and draw the attention of traditional media to promote the common solution of actual problems. Network opinion leaders help to guide the public to understand scientific problems, phenomenon.

So, the developing of internet provides the better condition to cultivate opinion leaders in the urban communities. First, we should encourage scientists to start a blog and microblog and have a voice in some debates about S&T. We should cultivate S&T BBS network moderator and improve the atmosphere of network scientific forum. We must make initiatives to implement network real-name registration. Promoting gradually to implement real-name registration in the forum, blog, microblogging, so that everyone establishes a legal awareness and public awareness, and thus assume their social responsibility and legal responsibility for their S&T words.

(3) Interpersonal communication makes for the dissemination of scientific spirit and ideas. Now, Chinese are not only a lack of basic S&T knowledge, but also scientific spirits and ideas. It is particularly important how to strengthen scientific spirit and ideas for them to improve scientific literacy. The way of the conversation makes for scientific spirits and ideas. We should expand its contents and make the conversation to play a role in spreading more scientific spirit and ideas.

VI. CONCLUSION

It can be conclude that the conversation is still an important way of S&T popularization in China from different angles. We should change the conventional way of the conversation and turn to the new forms, such as, microblog, WeChat. We should pay attention to cultivate "opinion leaders" in the rural and under social network environment of interpersonal communication. We should spread more scientific spirit and ideas by communication with friends, colleagues, and families.

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