

## <sup>1</sup>On the Mediatization Construction of Terminologies

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*ABSTRACT. Terminologies are of special significance for constructing linguistic knowledge bases. The medialization construction of terminologies can promote the dissemination of knowledge and help to remove the social inequalities and industrial divisions. With the federated publishing, communication channel selection, expansion and integration, the production and publication of terminologies will depend increasingly on interactive multimedia platforms. Meanwhile, the semantic network and other related technologies can be used to establish the semantic description and semantic relevance for data resources, which can greatly improve the efficiency of computational analysis of data and facilitate the query of mass terms. As a result, terminologies can become systematic, Internet-based, open-ended, contextualized and interactive.*

**Key words:** terminology; medialization construction; multimedia

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1. **Introduction.** One task of linguistics lies in the elaborate description of human's knowledge to cognize the world and set up a linguistic knowledge base, which is arduous and essential<sup>[1]</sup>. Such a database can never be accomplished without referring to the grammatical form and the word form, since the former contributes to constructing a conceptual framework and the latter provides contents for this framework.

As an integral part of word form, terminologies, unlike commonly used words, refer to those professional concepts and can be viewed as meaningful symbols employed by humans to know the relation between subject and object and to recognize, think, express and transform human being and the natural world, thus mirroring the mind evolution of mankind<sup>[2]</sup>. Meanwhile, the specificity of terminologies, together with the existence of knowledge gap and digital gap, makes it difficult to spread and understand terminologies. Therefore, these terminologies are both vital and complex in the process of setting up a linguistic knowledge database.

Mediatization refers to those changes in social culture and people's daily life which are precisely triggered by modern media during their process of development. Nowadays, media with internet as the best representative have played an increasingly important role in many fields of the society and such a role can be reflected by the statistics released in the 32nd *Statistical Report on Internet Development in China* published by China Internet Network Information Center on July 17, 2003. As is revealed in the report, up to the end of June, 2013, the number of net citizens has reached 591 million with the popularity rate of internet climbing up to 44.1%. What's more, the number of mobile net citizens has reached 464 million as a result of the popularization of 3G technology, the development of wireless network and the innovation of mobile phone applications. In the first half year of 2013, the average online time of Chinese net citizens has arrived at 21.7 h, with an increase of 1.2 h compared to the second half year of 2012<sup>[3]</sup>. These statistics indicate that media have increasingly entered and influenced people's life, and raised new requirements for the production, spread and standardization of language. The process of mediatization has demonstrated dual characteristics. One the one hand, media gradually immerses themselves into the operation of some social institutions and, on the other hand, media have been influenced by social status in turn<sup>[4]</sup>. In light of this, the mediatization construction can be understood as the full utility of various media and positive responses to the mediatization.

Falling in the scope of language, terminologies are the devices of knowledge transmission, thus being closely linked to media. On the one hand, the language itself cannot convey all that is intended, because of which terminologies must attach themselves to media so as to better organize, store, develop and modify the scientific thinking and concepts. On the other hand, the production and then spread of terminologies is often united with their attachment to media. As the information technology develops, people are increasingly aware of the terminologies' fundamental role in the production, acquisition, representation and transmission of knowledge<sup>[5]</sup>. The standardized use of these terminologies will not only contribute to the academic communication of science and technology, but also facilitate the integration and transmission of culture and technology<sup>[6]</sup>.

This shows that the medialization construction of terminologies is quite necessary and

can prompt the dissemination of knowledge and help remove the social inequalities and industrial divisions. In this respect, China National Committee for Terms in Sciences and Technologies, founded in 1985 under the approval of the State Council and responsible for authorizing and publishing the scientific terms on behalf of the country, has yielded substantial achievements in recent years. However, there still exists some room for further improvement in terms of broadening the media communication channels and applying these achievements. Therefore, it is both necessary and urgent to promote the production, processing and communication of terminologies by resorting to their media construction. The following sections will focus on the core work of medialization construction of terminologies, namely, the federated media publishing of terminologies, the selection, integration and expansion of communication channels, and the development of semantic network.

**2. The Federated Publishing of Terminologies.** Qian proposes that we should look into the world from the perspective of language and also examine the language from the world point of view and further claims that this assertion, while being made with reference to the theory of language holography, is a philosophy<sup>[7]</sup>. As the information technology develops fast in recent years, media can make this assertion a reality by reducing the distance between the world and language to zero rather than by making the objective distance between them disappear. Judging from the history of media, it can be seen that different phases of development, instead of replacing each other successively, reinforce one another in terms of their respective advantages. Consequently, there arises a new form of media called omnimedia which can span the time-space limitation and incorporate such information means like posture, oral language, text, audio and images. Traditional publishing, with print media as its principal medium, have maximized its absorption of advantages of other media, which is exemplified by its using illustrations, attached tapes and CDs. For example, *Dictionary of Chinese Ancient Architecture* compiled by Wang Xiaqing in 1998 has specially made room for its 38 color pictures of Chinese ancient architectures.<sup>[8]</sup>

When it comes to the development of media, the carrier of knowledge, the communication media and the receiving terminal have undergone the following changes like posture, oral language, text, hypertext, multimedia and omnimedia. Omnimedia refer to those various kinds of expressive means employed by the media when interviewing and editing the objects, including written language, graph, picture, audio, video, animated movie and webpage, etc. It has employed various kinds of media form, such as radio, television, film, audio-video, publication, newspaper and magazine and webpage, and can provide the users a merged receiving terminal by enabling the convergence of the telecommunication, Internet and broadcasting networks into a complete system<sup>[9]</sup>. The emergence of omnimedia will inevitably change the production, communication and reproduction mode of intellectual resources. As a result, these resources will present new features like presence on a gigantic scale, integrated manifestation, micro-distance reception, instantaneous discovery and interactive use, etc.<sup>[10]</sup>. During the process of these

changes, the publication has developed out of nothing, from text to hypertext, and then from multimedia to omnimedia. At present, we have entered the age of federated media publishing<sup>[11]</sup>. The federated media publishing in the real sense has on the one hand resorted to the traditional written media to make publications and on the other hand deployed the digital terminal equipment like the internet reading platform and e-book reader to maintain a simultaneous release of these publications.

Since the publication of terminologies falls exactly into the category of publication, it naturally follows the development path of it. Therefore, the publication in print form and the federated media publishing should be combined together to ensure the construction of terminologies. Before the emergence of federated media publishing, people are most likely to have print publications of terminologies. However, publications of different media are indispensable in this new era and these media include the CD of terminologies, the digital publications of terminologies, the terminology software on mobile phones and web publications etc.

The department responsible for planning and publishing terminologies should conduct a survey first about the needs of terminology users and the publication media, and then set down to publish the terminologies with various media. Through the federated publishing with diversified contents and media, it is likely to produce and publish terminologies by such interactive multimedia as internet, cell phone and the new media of radio, film and television. This way, the following aspects can be achieved: (1) the expression of terminologies through omnimedia. That is, the terminologies can be represented by various media like written language, graph, picture, audio, video, animated movie and webpage etc; (2) the transmission of terminologies through omnimedia. That is, the terminologies can be disseminated by resorting to many media forms, such as radio, television, film, audio-video, publication, newspaper and magazine and webpage; (3) the reception of terminologies through omnimedia. That is, the terminologies can be received by the televisions, internet and cell phones.

It can be seen that the federated publishing has carried on the advantages of all kinds of media, thus becoming an ideal model for people to receive information of terminologies from anywhere, at any time and in every way possible. With the federated publishing, the transmission of terminologies has become dynamic, comprehensive, open-ended, autonomous, interactive and fast. Take the terminologies issued by China National Committee for Terms in Sciences and Technologies as an example. So far, they have brought out the standardized terms in various fields, including astronomy, physics, biochemistry, electronics, agronomy and medical science and published dozens of terminology books like *Chinese Terms in Geography*, *Chinese Terms in Aviation and Technology*, *Chinese Terms in Ship Engineering*, *Chinese Terms in Ecology* as well as the relevant CD containing terminologies. In 2010, the organization collaborated with China National Knowledge Infrastructure (CNKI) and established a database called The Standardized Chinese Terms with reference to the published terms in the past few years. The database is available for free so as to help the professionals use the terms exactly.

According to Harold Innis, the famous communication researcher, media can be

classified into two categories, time-bias media and space-bias media. Then, the time-bias media to which terminologies attach themselves will inevitably bring time and space features to terminologies. With the federated media publishing, terminologies can achieve the dual existence of both time and space, thus acquiring the reality and eternity that has transcended space-time continuum. At this time, the relative distance among the world, cognition and language will be reduced to approaching to zero, which is quite similar to the above mentioned philosophical assertion demanding us to look into the world from the perspective of language and to examine the language from the world point of view. So then, the federated media publishing is the irresistible trend for the production, accreditation, publication and transmission of terminologies. Meanwhile, only by resorting to this kind of publishing can we satisfy the requirements of effective accreditation and standardization of terminologies. Of these requirements, the compulsory ones include monosemy, clarity, correctness and broad application of terminologies while the accessional ones include productivity and constancy. <sup>[12]</sup>

**3. The Selection, Expansion and Integration of Term Communication Channel.** Three models of communication, namely, interpersonal communication, organizational communication and mass communication, constitute the communication system in this information society. Zhou makes a comparison of the relative characteristic of these three models in terms of the following 15 aspects like textuality, communication link, interactive response, communication direction, range and speed, and audience selection, etc. He further demonstrates the relative differences, distinctive features and complementarities through the form of charts <sup>[13]</sup>. From his study, it can be seen that the communication process of these models share the similar essential features, but they must adapt themselves to different communication state and environment, different social relations of disseminators and recipients, and different communication requirements. The communication of terminologies should also accommodate the above differences. Meanwhile, we should take notice that the trend of media convergence has rendered these three communication channels to be further integrated into an omni-directional, three-dimensional media form; and the communication of terminologies must follow the media integration and undergoes the expansion and integration of communication channels on the basis of the existed channels.

Nevertheless, as information technology especially digital technology evolves fast, the production, storage and communication of information have undertaken dramatic transformation. For instance, having realized the interaction and combination of the ternary human-cyber-physical universe, the big data technology can bring changes to many areas like massive data storage, data mining, video image analysis, information perception, information transmission and information safety, etc. These technologies have great application value in the communication of terminologies, thus being factors that must be considered when selecting the communication channels of terminologies. Let's take the intelligence analysis of image video for example. It has the cognitive advantages of fully exploring visualizing information like video image and can achieve an organic integration

of human and physical universe. Furthermore, with the help of interactive analysis between human and computer and the interactive technology, it can assist people to intuitively and efficiently understand the information, knowledge and wisdom beneath massive data<sup>[14]</sup>. If these technological factors are considered when selecting the communication channels of terminologies, the communication and perception of terminologies can be promoted. This is because the contents and rules of terminologies beyond description can be presented in visual symbolic form by resorting to visualizing information like video image. In particular, modern media technology can also help people to have a quick communication with visualizing information, thus enabling them to utilize their parallel processing ability of visual perception to get the key information contained in terminologies quickly.

The reasons why the new channels of terminologies communication lie in the following aspects: firstly, since its birth, the new media has had a huge impact on the traditional media with its technological superiority and the speed and size of development, thus changing the way to express, preserve and communicate information. As is revealed by the 32nd *Statistical Report on Internet Development in China*, net citizens have improved the breadth and depth of their using the internet and increased their user stickiness and surfing time<sup>[3]</sup>; secondly, the media convergence is irreversible in its development. Since media has evolved “from the simple to the complex, from text to image, from audio to video, from narrow band to broadband, from the common to the individualized”<sup>[15]</sup>, it can encompass the whole world. With the new media which is characterized by its mass storage, real-time retrieval system, free access and interactive participation, the information of terminologies can be spread better and faster. To be more specific, here is a random choice of terminology files which is marked with its upload time and the times of being viewed in Baidu Library. When the following files are investigated in terms of their spread in the network media, the results show that, by the zero hour of Jan.7, 2014, Terms of Automobile, uploaded on Dec.2, 2009, has been viewed for 304,947 times; Terms of Airplanes (English-Chinese), uploaded on Jun.8, 2009, has been viewed for 106,605 times; Terms of International Trade, uploaded on Sep.2nd, 2010, has been viewed for 61,471 times. The view times are much higher than the published volume number of term publications issued by China National Committee for Terms in Sciences and Technologies. For example, the print number of *Chinese Terms in Metallurgy*, *Chinese Terms in Topography*, and *Chinese Terms in Astronomy* is 1-3,000 respectively and that of *Chinese Terms in Ecology* is 1-2000<sup>[16]</sup>.

The expansion and integration of terminology communication channels rely heavily on the new media. It is because the new media can employ different means like written language, image, audio, animated movie and video to convey the information of terminologies and combine different media to promote the dissemination of terminologies. With the digital information technology and the network technology, the information of terminologies, once carried by the traditional paper-media, can be expressed by the new media dissemination channels. The information is preserved and conveyed by multi-media in an all-dimensional way and people can decide which medium can be used to work out, publish and spread terminologies on the basis of their need, preference, habits and

conditions. For instance, the increasingly popular social networking web platforms like Wechat and Face book have become new mass communication channels, thus being important ways of selecting, expanding and integrating communication channels of terminologies. With these new channels, the communication of terminologies can be more miniaturized, prompt and de-massified, and better fit the development trends of communication channels, that is, development from fixity to flexibility, from large-scale to portability, from material things to information, and from paper media to internet.

**4. The Construction of Semantic Network for Terminologies.** As symbols of matching forms with meaning, terminology has the meaning as its core. Unlike the common used words, terminologies have their distinctiveness, which increases the difficulties of understanding them. Furthermore, although computer is considered the extension of human intelligence, it can never match mankind in understanding natural language. The semantic issue is the core issue in natural language processing. Once the federated media publishing of terminologies is finished, we need also consider how people obtain the information of terminologies among mountains of information on the web and then achieve a comprehensive understanding of it in a faster and more convenient way. For instance, in Chinese linguistic field, such terms like “构块”, “构式”, “构块式”, “句式” and “构架” are all translations of the same term, namely “construction” in Construction Grammar.

As a further example, for the same term “动量词” in Chinese linguistics, there are different English translations like “action measure words”, “verbal quantifier”, “quantifier of action” and “dynamic classifiers”. Obviously, the understanding and standardization of various translations of the same term depend on its semantic meaning.

Firstly, here is an issue deserving our consideration, that is, how large the group of information-searching people is? According to the 32nd *Statistical Report on Internet Development in China*, the number of search engine users in China is huge. The data show that, by the end of June, 2013, our country has 470 million internet users, with an increase of 19,280,000 compared to the end of 2012. The growth rate for half a year is 4.3%.<sup>[3]</sup>

Meanwhile, many net citizens have turned to the mobile search due to several factors like the rapid development of mobile internet, the boosted performance of smartphones, the lowered price of smartphones and also the reduction of mobile data price. As an opportunity of new growth for the web-search companies now, the mobile search has become the second largest mobile application, thus playing an important role in the daily life.

The mobile search results from the expansion of demands for search on computer on the one hand and people’ s information searching demands in small gaps on the other hand. Since there are a huge number of people searching information, we should consider how to help people obtain the information of terminologies among numerous and complicated information on the web and then achieve a comprehensive understanding of it in a faster and more convenient way. Under these circumstances, it is the urgent demand for people to get authoritative and trustworthy information; and furthermore, prolific sources of data are springing up with the development of information technology but there is little semantic

relevance among them, thus causing the emergence of information isolated islands and damaging the interoperability and interchangeability of these data. In the meantime, due to the lack of semantic description, the computer cannot extract the semantic information of these resources of data and then conduct an intelligent analysis and processing. The efficient communication between mankind and computer and between one computer and another is thus hindered. Therefore, the semantic web and the related technologies are needed so as to establish the semantic description and semantic relevance for these resources of data, with which the computer's understanding and the processing the data will be improved substantially. On the basis of the present technology, the internet products, such as Mapping Knowledge Domain, Baidu Zhixin Search, can process the language deeper at the semantic level<sup>[17]</sup>.

Specific to the terminology study, knowledge spreading and scientific exchange, the construction of terminology itself should also be more intelligent. That is, the automatic identification and integration of terminology information should be pursued so that the readers can easily understand terminologies and then search their desired information.

To realize this goal, the construction of terminologies should, through the application of media, realize the following aspects. Firstly, we should embed the semantic data in the terminologies when they are generated so that the computer can identify them automatically and link to the related texts. Taking CNKI as an example, it is a net-like knowledge system using sememes and role memberships to describe concepts. Within this system, the tree model of sememes can connect each sememe in a tree format and conduct an intelligent processing of them. This is a good reference for the construction of terminologies. Secondly, we should use natural language processing technique and ontology technique to identify the terminologies in texts and establish auto-linking to relevant data outside the texts so as to help readers understand terminologies without resorting to other sources, because the identification and statistical monitoring of changes in the use of terms, through the medium of texts, may provide innovative opportunities and reduce the extensive lead-time from invention to innovation<sup>[18]</sup>. Thirdly, with the help of natural language processing technique and web mining algorithm, we should capture the terminologies in which readers show their interest and then recommend the related information to them.

For example, if we take “规范化(normalization)” as the key word to query the related terminologies in the Chinese Data Bank for Normalized Terminologies, we'll soon get several terms, such as “规范化(normalization)” and “规范化语言(nominalized language)” included in *Chinese Terms in Computer Science and Technology*, “非规范化(non-normalization)” included in *Chinese Terms in Geographic Information System*, “规范化状态变量(canonical state variable)” included in *Chinese Terms in Automation*, and “模/数转换的规范化(normalized analog-to-digital conversion)” included in *Chinese Terms in Mechanical Engineering*. The semantic network construction is the basis for this retrieval process. With this process, the external knowledge can be used to guarantee the accuracy, normalization and timely updating of those terminologies. In general, with such techniques as the semantic web, terminologies can become systematic, internet-based, open-ended, contextualized, and interactive.



The semantic network construction of terminologies can have other potential applications. For example, the synonymy phenomenon is widespread in the field of terminologies, but it is quite different from the corresponding phenomena in common used words. Synonymous terminologies have rich-types. What's more, since there is the need for international coordination of terminologies, it is necessary to make a cross-linguistic study of synonymous terminologies. With the semantic network, we can systematically arrange and integrate the existed synonymous terminologies so as to better produce, define and translate terminologies.

**5. Conclusion.** In conclusion, terminologies are of special significance for constructing linguistic knowledge bases. Terminologies fall into a category of language on the one hand and are closely related to all kinds of media on the other hand. The success in combining terminologies with media not only has the extensive using value for communicating terminologies, but also contributes to realizing the special social function of both terminologies and media. The present review and approval of terminologies has yielded fruitful results, but there is still great room to achieve the federated media publishing and application of these results. It is urgent to make good use of the media construction to promote the production, processing and communication of terminologies.

The federated media publishing of terminologies, the selection and integration of communication channels and the semantic web construction are now the core work of the medialization construction of terminologies. With the federated publishing, communication channel selection, expansion and integration, the production and publication of terminologies will depend increasingly on interactive multimedia platforms. The semantic network and other related technologies can be used to establish the semantic description and semantic relevance for data resources, which can greatly improve the efficiency of computational analysis of data and facilitate the mass term search. As a result, terminologies can become systematic, internet-based, open-ended, contextualized, and interactive. The above are not only the requirements of the development of terminologies, but also an irresistible trend of media development.

Of course, there still exist some problems needing to be solved during the development of information technology. For instance, it is possible now to get access to some public, or professional data banks established on the basis of internet. Various terminological data banks with wide range of terms have provided a strong support for related activities in different fields. With the popularity of full-text terminological data banks, there will be great changes with regard to all links of the publication, communication and semantic network construction of terminologies. A terminological data bank with high density information can contain as much information as all the books of several libraries. Then, the issue of copyright, rather than technological issues will be one of the problems crying out for solutions in the sphere of federated publishing and semantic network construction of terminologies.

## REFERENCES

- [1] Jin, L. X.: Lexical-semantic Selection in the Process of Language Generation and Understanding (生成和理解过程中的词汇语义选择). *Linguistic Science*, No.3 (2007): 3-9 [In Chinese].
- [2] Zheng, S. P.: On the Terminology's Reflecting the Evolution of Human Mind - Reading Notes of Bialystok Declaration (术语是折射人类思维进化的一面镜子——《比亚韦斯托克宣言》阅读笔记). *China Terminology*, No.5(2007) :10-13 [In Chinese].
- [3] [http://www.cnnic.net.cn/hlwfzyj/hlwzxbg/hlwtjbg/201307/t20130717\\_40664.htm/2013-12-12.pdf](http://www.cnnic.net.cn/hlwfzyj/hlwzxbg/hlwtjbg/201307/t20130717_40664.htm/2013-12-12.pdf)
- [4] Zhang, H. Y.: On the etymology of medialization ( “媒介化” 词源探析). *Youth Journalist*, No. 18 (2013): 48. [In Chinese].
- [5] Qiu, B. H.: Analysis of the Statement “Terminology is the Statement of Information Technology” (浅论术语学是知识技术的前提). *China Terminology*, No.2(2013) [In Chinese].
- [6] Yan, C., Hao, J. H., Su, H., Sun, Z. Y.: Representation of Terms Symbols and the Role in Dissemination (术语符号的表示方式及在传播中的作用). *China Terminology*, No.3(2013) [In Chinese].
- [7] Qian, G. L.: The Theory of Language Holography (.语言全息论). The Commercial Press, Beijing(2002) [In Chinese].
- [8] Wang, X. Q.: Dictionary of Chinese Ancient Architecture (中国古建筑术语词典). Shanxi People's Publishing House, Taiyuan (1996) [In Chinese].
- [9] Liu, Q.: Meta-criticism on the China Film Criticism in the Omni Media Era. PhD Thesis at Shandong University (2011) [In Chinese].
- [10] Shen,S.R.:The emergence of modern intellectual resources industry and development of traditional publishing industry (现代知识资源开发产业的兴起与传统出版业的发展). *Modern Publishing*, No. 5 (2013): 10-15. [In Chinese].
- [11] Fang, Y.: The Federated Media Publishing of the Textbook for International Chinese Language Education (汉语国际教育教材全媒体出版探析). *China Publishing Journal*, No.23(2013): 42-44 [In Chinese].
- [12] Wu,L.K.: Requirements for the term (对术语的要求). *Terminology Standardization and Information Technology*, No. 3 (2003): 16-21.
- [13] Zhou, Q. S.: A Comparative Evaluation on the Channels of Social Communication of Literature (文献社会传播渠道形式的对比评价). *Library Work in Colleges and Universities*, No.2(1995):22-24 [In Chinese].
- [14] Ren, L., Du, Y., Ma,Sh., Zhang, X.L., Dai, G.Zh. : Visual Analytics Towards Big Data(大数据可视分析综述). *Journal of Software*,2014,25(9):1909-1936 [In Chinese].
- [15] Yan, S. J.: Introduction to New Media (新媒体概论). Chemical Industry Press, Beijing (2011) [In Chinese].
- [16] <http://www.term.gov.cn/pages/book/index.jsp>.
- [17] Wang, H. F.: The Semantic Study in the Context of Internet (面向互联网的语义研究). <http://nlp.zzu.edu.cn/CLSW2013/index.html> [In Chinese].
- [18] Schierz, Amanda C.: Monitoring knowledge: A text-based approach. *Terminology*, No.2(2007): 125-154.