

Domain Analysis in Information Science: a Chinese Scholar's View

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ABSTRACT

The conditions that domain analysis becomes an academic school of Information Science (IS) are mature. Domain analysis can get strong support from Chinese library and information science scholars' research. The relation of Tsien Hsue-shen's thought to domain analysis is mainly discussed. The importance of epistemology and modern architecture of science & technology to information science and professional, social noetic study that Tsien Hsue-shen elucidated echoes domain analysis and provides mighty evidence. Some other Chinese scholars such as Zhang Xuecheng, Liu Guojun and Du Dingyou are also mentioned as far as their arguments embodied the spirit of domain analysis is concerned. The development of information science in China had experienced a stage of attaching attention to subject knowledge especially in profesional education and practice field. But the role of subject knowledge has been marginalized since 1990's. Nowadays the situation is changing and subject knowledge becomes an inseparable part of IS research in China again, which proves the validity of the domain analytic theory.

Keywords: Information Science. Chinese Scholar. Community Epistemology.

1 INTRODUCTION

It has been nearly 20 years since Danish well-known information scientists Hjørland and Albrechtsen published the classic paper "Towards a new horizon of information science" in which domain analysis was brought forward and elaborated systematically (Hjørland & Albrechtsen, 1995).

During the last 20 years, the academia all over the world has had heated discussions on domain analysis, even fierce debate sometime. Under the effort of the scholars with Hjørland at their core, the theoretical construction of domain analysis comes to be mature, and its application comes to be wide. As a theory and metatheory, domain analysis gains deserved discipline status in information science. The continuing conversation and debate don't make domain analysis depressed but make it get more understandings and acceptations, during which it becomes an emerging doctrine in IS.

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A school is usually defined as an academic group whose members share the same views and cluster on the basis of tutoring relationship (Baidu Encyclopaedia, Modern Chinese Dictionary). Domain analysis qualified as an important school appears as an alternative paradigm in information science and gradually gets approval. As to the research community, Hjørland, the founder and the main contributor of domain analysis, has a group of followers such as Erik-Mai, Nicolaisen, Tennis and so on, who enrich and develop the theory of domain analysis in various aspects. And many other scholars ponder and study the information problems from the perspective of domain analysis consciously or unconsciously.

As China fast steps into the modern information society, the theory of domain analysis has been spread broadly in China and gotten more supports and promotions among many Chinese information scientists (Wang, 2007, 2010, 2011; Lu & Li, 1998; Feng and Leng, 2009; Yang and Zou, 2012). We can see that as a representative theory of Nordic IS research, school of domain analysis is becoming one of the mainstream paradigms leading a great theoretical turn in the discipline.

2 CHINESE LIS SCHOLARS' RESEARCH RELATED TO DOMAIN ANALYSIS

2.1 Tsien Hsue-shen's idea on information science

Academician Tsien Hsue-shen (1911-2008) is leading founder of Chinese industry of "two bombs, one satellite", outstanding settler of Chinese scientific and technical information enterprise, especially in national defense field (Huo 2009, Wang 2013). It's interesting that many ideas of IS put forward by Tsien are the mighty supports to domain analysis, although he was too old to get a chance to know about domain analysis more.

2.1.1 Tsien Hsue-shen's emphasis on epistemology: echoing the epistemological method of domain analysis

Tsien has a distinct idea about the affiliation of information science: it belongs to noetic science. As the first person established Chinese noetic science, he considers it as an independent department in modern architecture of science & technology, just like natural science and social science.

Tsien suggests that noetic science is very different from cognitive science (Wang, 2007). Tsien neither agrees brain science is the appropriate start point of noetic science, nor takes cranial nerves science as the basis of noetic research. On the contrary, he stresses that the laws of this new science should be explored by starting from the macroscopic view (Zhao, 2011). Tsien (1986) refines the disciplinary status of information science and defines it as an applied science of the noetic science, paralleling with scientific methodology.

In the modern architecture of S&T, Tsien (1986) singles epistemology out for being the fundamental subject of noetic science. Because information science is an applied science of noetic science, it should be based on epistemology. To use epistemology as the theoretical guideline of IS research is of great importance for making rapid disciplinary progress. That Tsien considers epistemology as the philosophical foundation of information science is consistent with that domain analysis puts emphasis on epistemology. No doubt, Tsien agrees on Hjørland's domain analysis.

2.1.2 Social noetic science: research exemplar embodying the idea of domain analysis

Tsien attaches much importance to social thinking and group thinking. He brings forward the concept of social noetic science by which it is meant a discipline studying both the principles that human as a group thinks and the interrelations, interactions between different group thinkings. He and his workmates integrate the social noetic science into meta-synthesis³ to found the decision supporting system, Hall for Workshop of Metasynthetic Engineering (HWME).

“The nature of human’s thinking is social” is the essential idea of social noetic science. There are two kinds of Chinese scholars’ discussions on the nature of social thinking. One stresses on the social feature of thinking, stating that since human is synthesis of social relations and thinking is social actor’s thinking, so human thinking is shaped by forefathers, other people, social environment and historical traditions (Dai, 2007: 15). The other one studies social thinking from the perspective of group thinking. People sharing the same natural and social characteristics cluster a group in the process of thinking.

As the thinking subject, this group shows its thinking ability as a whole to form the specific systematic function and produce general thinking ability that any single person isn’t able to get. It’s an expansion of individual cognitive ability. It’s not a simple multiplicity of individual thinking but a social thinking that forms on the basis of the interrelations, interactions among a group of people according to a given rule. The modern research on human intelligent behavior finds that most intelligent activities are involved in social group. The most important and most part of intelligence are manifested in social activities. Social intelligence is the product of social thinking and can be seen as group intelligence emerging from group thinking (Dai, 2007: 163-165; Dai, etc. 2013: 35-36).

Both kinds of discussions about social thinking reflect the essential idea of domain analysis. The first actually is a republication of socio-cognitive view. The opinion that individual cognition is formed by the sociocultural and historical context, which the socio-cognitive view argues, is manifested well in the first kind of discussion (Hjørland, 2004).

The second supports domain analysis as community epistemology. Tsien's view that the think subject is group consists with the domain analytic view that community is the basic research unit (Hjørland & Albrechtsen, 1995). Since group thinking means the ways by which community as a whole produces, acquires, uses and assesses knowledge, so it belongs to the research field of community epistemology. Besides, social thinking based on the meta-synthetic methodology puts stress on the emergence of social intelligence and group intelligence and integrates science of complexity into its research. This is worthy of reference for domain analysis.

2.1.3 The necessary expertise of IS researchers: Modern architecture of science and technology & Science Studies

Domain analysis calls for the study on sociology of knowledge and regards it as an influential discipline in relation to information science. This is echoed in Tsien's research. By using the modern architecture of science and technology as reference framework, Tsien discusses the disciplinary relations and background knowledge of information science. He claims that IS scholars and practitioners, should understand not only the development of modern architecture of S&T, the disciplinary relations changes and declines of old disciplines in that architecture, but also knowledge about social phenomenon of S&T research activities to avoid our narrowness. So in order to do the information research and analysis well, in Tsien's opinion, we must have some special kinds of knowledge: one is architecture of science; the other is science of science (Shi, 2009).

Architecture of science is the S&T knowledge, while science of science is a kind of social science and refers to the sociological knowledge about scientific research activities. To learn and master these two kinds of knowledge, then internalize them into the disciplinary framework is a necessary way to improve the theoretical level of information science.

Tsien's idea is consistent with the domain analytic paradigm. Domain analysis focuses on the roles of subject knowledge, science studies and sociology of scientific knowledge in IS; it insists that information science is meta-science, that is, the science of science. Because of that, science should become the research object of IS and exploring the system structure and social features of science should become the goal of IS.

The research output is knowledge of science architecture and sociological knowledge of science, which actually are the aforementioned necessary knowledge of IS research formulated by Tsien. I think if Tsien was alive, and had chance to know the domain analytic thought, he would be applaud it and become a firm advocate and propagator of domain analysis.

2.2 The related researches of other famous Chinese scholars

In addition to Tsien Hsue-shen, there are many LIS Chinese scholars whose researches are related to domain analysis. Especially some well-known library scientists in earlier times could be seen as the contributors to the domain analysis. Limited to space, this paper focuses on Zhang Xuecheng, Liu Guojun and Du Dingyou.

2.2.1 Chinese classical bibliography with Zhang Xuecheng as the representative

The thought of Chinese classical bibliography fits domain analysis. Chinese bibliography research also stresses that the work of bibliographic organization should be integral to academic research and contributes to it in the knowledge domain, which is considered as the primary objective of bibliography. The typical representative is the research of scholar Zhang Xuecheng in the Qing Dynasty.

Zhang fully develops the idea that Chinese classical bibliography regarded bibliographic organizations as organizations of academic thoughts. He points out that the main functions of bibliography are to identify and clarify the different academic schools and theories, elucidate and represent the origin, development, evolution and scholastic inheritance of the academic schools to guide scholars to access literature and conduct research; classification, indexing and interpretation of documents must be connected with academic history and academic development (Lu, 2008). Zhang's regarding bibliographic organization as important methods of scholarly pursuits improves the status of bibliography and promotes the social recognition to it. His thought has become the core idea of the Chinese classical bibliography (Lu, 2008).

In this sense, the Chinese classical bibliographer's mind and the domain analytic scholars' minds in modern information science meet.

But unfortunately, modern Chinese library science does not inherit the fine tradition of Chinese classical bibliography that locates the goal of bibliographic organization as distinguishing and organizing different schools of academic thoughts, and actively participating in academic research activities. Modern Chinese library science research mainly is introduction and replication of library science in the western countries, which particularly emphasizes on IT application to library.

This way of conducting research greatly weakens the position of the fine tradition of classic bibliography. At present, we can make good use of the rise timing of domain analysis in China and vigorously recover the tradition of Chinese classical bibliography, to make this tradition that is full of strong intellectual factors rejuvenated in Chinese LIS research.

In this way, the Chinese traditional paradigm and the Nordic domain analytic paradigm will shine each other.

2.2.2 Liu Guojun and Du Dingyou: their thoughts in relation to domain analysis

Chinese library scientists' focus on the relationship between scientific classification and bibliographic classification to a certain degree coincides with the arguments of domain analysis implicitly. The view of domain analysis that we LIS researchers should attach importance to scientific classification is supported by Chinese modern library scientists with Liu Guojun and Du Dingyou as representatives.

Liu (1899-1980) was the dean of the Department of Information Management in Peking University. Hailed as the grand master of Chinese library science, he was the first to introduce MARC and online cataloguing to China, and also one of the first Chinese scholars that introduced and studied DDC in China.

As for the relationship between scientific classification and bibliographic classification, Liu (1962) believes the former should be the most basic method. The nature of the scientific content of a book and its position in the architecture of science are the most important factors to consider when being classified. LIS researchers cannot arbitrarily group and divide the categories in bibliographic classification.

The arrangement of categories should be scientific to avoid messing up the relationship between different subjects and confusing the division of science. Category organization in LIS must obey the principles of disciplinary organization and follow its status quo. Only in this way can bibliographic classification be of assistance to scientific research (Liu, 1962).

Liu (1953, 1981) also points out that knowledge classification is some different from bibliographic classification. The design work of the later is not just copying the former. The reason is: for ancient books or books that contain old and stuck questions and knowledge, there should be corresponding categories in bibliographic classification to put them in so that user can access these books easily. This requires that we should design bibliographic classification on a holistic knowledge evolving point of view.

In retrospective information retrieval, domain analysis states that all different kinds of semantic relations (old and new) in each period caused by the changes of theoretical views should be shown in semantic tools and presented to the users (Hjørland 2006). It's not difficult to see that Liu's views are the same to Hjørland's argument and also based on historicism.

To sum up, apart from being directly influenced by academic development, growth of S&T knowledge and scientific classification, bibliographic classification are fundamentally constrained by the social nature and determined by the evolving nature of themselves (Liu, 1978). Therefore, one can see that Liu was indeed a supporter of domain analysis.

Another Chinese library scientist enjoying the same popularity with Liu, Du Dingyou (1898-1967) argues that because the books contain lore, mastering the classification of lore is the requisite for the work of classifying books. Bibliographic classification should be based on scientific classification and obey the rules of scientific classification to reflect the evolving process of objective reality and advances of science.

But these two kinds of classification aren't all the same. Good bibliographic classification is one side, scientific, the other side, pragmatic to serve readers better (Du, 1962, 1957a, 1957b). As to the principles of classifying and indexing, Du (1957a) thinks that to develop the utilities of a book as possible as an indexer can is the most important one. Under such a view, the problem indexers should consider at first is that what kind of the user group will read the book. If only indexer targets users group, she/he can know the potential utilities of the book for that special group and then determine which category the book belongs to. This is consistent with domain analytic views of subject analysis.

As for library science, Du (1926) states it is science of science, whose top goal is to make library become confluence of scholarship and improve academic level of each discipline. He proposes that library science should help each kind of science make progress and contribute substantively to academic research and knowledge growth of all sciences. That ought to be what all librarians and library scientists are praying for day and night. In other word, Du illustrates the goal of library and information science well in remote east from the angle of domain analysis.

2.3 Research tradition of subject knowledge and its renaissance in information science in China

The developmental history of Chinese scientific and technical information enterprise is a history that concentrates on subject knowledge. Before 1990s, scientific and technical information science is the synonym of information science and the work of the S&T information is the synonym of information work in China. It is generally regarded that mastering respective subject knowledge in different industries is prerequisite to all types of S&T information service, such as metallurgy information service, mechanics industrial information service, traffic industrial information service, nuclear technological information service, and so on. Therefore, Chinese S&T information service centers recruited many researchers and graduates having diplomas of nature science, technology or engineering and let them be trained in LIS to be special librarians. Most of the excellent scholars and executives of IS at that time were the masters in science. For example, Yuan Hanqing, the first director of Institute of S&T Information of China, was a famous chemist and science academician.

Chinese IS education also concentrates on subject knowledge. However, until the end of the 1990s when the IS major was reformed by the Chinese Education Ministry, the status of content had been equal to that of form in IS curriculum, and even more important than the later one. When I was an undergraduate student majoring in S&T information science in Tianjin Normal University in the middle of 1990s, the serial courses-introduction to modern science& technology were set from the first semester and lasted for four semesters. In each semester, a professor employed from other polytechnic university taught us a course about science or technology, such as introduction to chemical engineering, the foundation of life science, metal craft technology and electric engineering. During the courses we students were organized to visit factories and related high-tech companies and practice there, aiming to lay the foundation of the subject knowledge for students who would undertake the job of S&T information service after graduation. The facts turned out that subject knowledge-oriented pedagogy of IS is very effective.

In 1998, the Chinese Education Ministry cancelled the major of S&T information science and integrated it with business information management and MIS to create a new major—"information management and information system". Since then, the courses related to the subject knowledge gradually disappeared in undergraduate curriculum. With widespread use of the Internet and enhancing role of IT in IS discipline, Chinese IS education including master degree and Ph. D degree education attaches too much importance to the courses related to computer science. Technology-oriented studies have a high ratio in IS dissertations. The balance between content and form in information organization and retrieval research are regrettably lost. The form is more preferred. In China the hot topics of general information science and form-oriented research fade the subject knowledge in LIS.

It is gratified that in recent years some scholars have pointed out that ignoring subject knowledge does do harm to LIS. Thus, they call for the renaissance of the subject knowledge in LIS education and research. After checking recruiting information in Chinese libraries and information centers, I find that the masters and doctors majoring in science and technology are highly demanded. Since I taught in university, I have always encouraged LIS students to minor and try to get the second bachelor degrees. The students are required by me to explore and reflect on the minors with the identities of the LIS profession. Most students follow my suggestions and choose the minors, such as math, education, chemistry, economics linguistics and accounting, etc. Any amounts of students say that they benefit a lot from this and their confidences of undertaking the job of information service in the future become stronger. I think this is the reason why domain analysis is so attractive.

The scholars of the domain analytic school have paid attention on subject knowledge for a long time. Since domain analysis was brought forward formally in 1995, subject knowledge has always been its core issue. The scholars of domain analysis maintain that in every subject domain there exist unique terminologies, the ways of their use and discourse conventions, knowledge about which is an expertise that information profession should master when performing information service.

3 CONCLUDING REMARKS

I teach the course of information storage and retrieval to undergraduate students majoring in business administration each semester. Several years ago when I was teaching the chapter of online document retrieval in the class one day, one of the students rose his hand and asked me: "Professor, the intellectual level about these methods of information organization and retrieval is too average. Why not organize and access documents or information according to the theoretical views?" Of course he, whose major is not LIS, did not hear of domain analysis before. I suddenly realize that what domain analysis research concerns is the informational nature of human beings in society. Domain analysis can address the intrinsic needs of human beings. Domain analysis provides optimal strategies for effective human information processing. Only through information work based on domain analysis can human information needs in society be best satisfied.

Over the past twenty years, domain analysis has established its academic status in the international LIS circle. Being an important metatheory, paradigm and methodology, domain analysis become the theoretical foundation of LIS research. The developmental history of the domain analytic school represents the rise of Nordic school in LIS. In this paper, some representatives of Chinese LIS scholars, whose thoughts are related to domain analysis, are elucidated. It is demonstrated that these scholars' thoughts give mighty supports to domain analysis. For the next twenty years it is my strong belief that domain analysis will still be the most promising and the most fruitful research direction in LIS field. The great disciplinary changes that domain analysis will bring about may be beyond our expectations.

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Note

1. Meta-synthesis is the put forward by late Tsien to resolve Open Complex Giant System (OCGS). Meta-synthesis has an intimate relation to social noetic science. Meta-synthesis has become one of the important theoretical foundations of information science in China. Languages, genres, and other typified communication practices. There are different semantic distances between the agents. (Hjørland, 2004c).

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