# The Western Computer and the Chinese Character:

# Recent Debates on Chinese Writing Reform

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**ABSTRACT**

The use of the computer and its dependency on an alphabetic language, particularly English, has made this invention not only a technological device but also a strong cultural force that reshapes the global cultural landscape. As a response to the force of alphabetic dominance and to the motivation of the four modernizations, China witnessed a resurgence of the century-long debate on writing reform. For intellectuals who favor a basic reform in the Chinese language—the realization of a Latinized orthography—the computer presents arguments that it is time for the Chinese language to move to a phonetic writing system. This paper, employing a communicative perspective, examines various arguments in two major language reform journals.

## Introduction

The use of the computer and its dependency on an alphabetic language, particularly English, has made this invention not only a technological device, but also a strong cultural force that reshapes the global cultural landscape. The dominance of English over other languages and its ascending role as a new lingua franca has met with strong reactions on a global scale. While countries such as

France and Germany with alphabet-based systems of writing are primarily concerned with the invasion of English words into their languages, the computer presents a challenge of more magnitude to those countries whose writing systems are not alphabetic. Even though these non-alphabetic countries are able to develop their own programs and/or software that are compatible with the computer, the question of the validity of their languages is raised. Never before has the world seen and invested such an interest in language and its social implications as in the age of computers.

The issue of language concerns the Chinese intellectual society, too. Long before the inception of the information age, the question of language had already confronted generations of intellectuals and social engineers. For over a century accompanying the history of modern China, reform of the Chinese language was seen as a prerequisite for China to fulfill her modern dreams (e.g., DeFrancis, 1950; Chang, 2000b). For example, in the 1910s and 1920s during the New Culture Movement, Chinese intellectuals came to the conclusion that the fundamental solution to Chinese problems was the creation of a new culture by way of adopting the vernacular (*baihua*). In the 1940s and 1950s, to change language in order to mobilize the masses more effectively became part and parcel of the socialist revolution.

However, no arguments seemed more fitting for the change of the Chinese language than the information age occasioned by the computer. In the context of global alphabetic dominance and domestic modernization efforts, China witnessed a resurgence of the century-long debate on writing reform. For intellectuals who favor a basic reform in the Chinese language—the realization of a Latinized orthography—the computer offers an excellent argument that it is time for the Chinese language to move to a phonetic writing system.

This paper examines the arguments on writing reform in the last two decades. Much of the discussion and debates appeared in two important journals: *Yuwen xiandaihua* [Language Modernization] and *Yuwen yu xinxi* [Language and Information]. [1] The irregular journal *Yuwen xiandaihua*, first issued in 1980, was launched as a research serial for its "scholarly, informative, and experimental" nature. After publishing eight lengthy issues from 1980 to 1986, it ceased publication due to financial reasons. *Yuwen yu xinxi,* an e-journal, sponsored by the Association in America for the Promotion of Chinese Language Reform, began publication in the mid 1990s. It is in a certain sense a continuum of *Yuwen xiandaihua*: its argument echoed the one in *Yuwen xiandaihua;* many who wrote for *Yuwen xiandaihua* contributed to this e-journal. By the end of the year 2000, *Yuwen yu xinxi* had published sixteen issues.

## Language Reform and Modernization

### *The Four Modernizations and Language Modernization*

In the period right after the death of Mao, China embarked upon a new era characterized, for the sake of a general understanding, by economic reform. The Chinese Communist Party, as a result of a strong campaign by a rehabilitated Deng Xiaoping, shifted its focus from an ideologically driven class struggle to reforms in economics and production; the formulation of four modernizations[2] was raised again and set as an economic goal and the primary task of the country.

Intellectuals wanted to take advantage of the social context for their plea for writing reform. They immediately saw a connection between language reform and the four modernizations. "To realize the four modernizations," Hu Yuzhi (1980), vice-chairman of the National Political Consultant Association of China, commented, "reforming writing and effecting *pinyinization* of characters is the basis….Without such a basis, it is almost inconceivable to enhance greatly the whole nation's scientific and cultural level in about twenty years" (Hu, 1980: 10). Lu Shuxiang (1980), a well known Chinese linguist, expressed his support in similar terms: "The key to the four modernizations is the modernization of science and technology. To achieve the modernization of science and technology, our language must be first modernized, that is, must be *pinyinized*" (Lu, 1980: 12).

The relationship between language reform and the four modernizations having been established, what then was meant by language modernization? Liu Zexian (1980) offered a definition. Even though the Chinese would continue to use characters, they could greatly enhance their efficiency if a *pinyin* orthography was used in a supplementary manner in certain areas of science and technology. In his view, language modernization meant to make possible and official a *pinyin* orthography.

Reformers maintained that in the previous technological phases of human society, language was not a critical issue, but the information age had forged an intrinsic link between language and technology.  They articulated the adverse relationship between Chinese script and information process in the computer age. They stunningly described with accuracy the world of computers that would ferment a global cultural organism, something resembling the World Wide Web. With the recognition that the computer was no longer limited in scope to mathematical computing, but was "expanding and penetrating into every facet of national economy and daily life," Chen (1980) argued that the major role for the computer was "information processing," and language processing in particular.  He warned:

> Facing this unprecedented and all-embracing cultural revolution, how should our 960,000,000 Chinese who use the Chinese language respond? Should they hold on firmly to the Chinese characters and refuse industrialization, or should they welcome modernization and proceed with

writing reform?  The computer is forcing us to make a final decision. (Chen, 1980, p. 58. Italics original)

### The History of Writing Technologies

Many scholars argued that the Chinese language reform is not only mandated by the four modernizations but reflects a historical trend as well.  Chen (1980) outlined four major revolutions in the history of civilization since the invention of writing: the paper technology over 2,000 years ago and the printing technology over 1,000 years ago were the first two revolutions; the alphabetic typewriter as well as the linotype press, which brought writing into the mechanical age, represented the third revolution.  The computer signaled the fourth revolution that gave birth to the information age.  Chinese characters, in Chen's view, had served the Chinese people well by recording and spreading the great civilization of the East.  But as a cultural tool for the third (mechanical) and fourth (information) ages, Chinese characters "are more and more inadequate to express, transmit, and communicate [ideas]" (Chen, 1980: 59).  The reason for this inadequacy was that the cultural tools in the mechanical and information ages required that the language structure have a small unit.  A *pinyin* orthography, which uses twenty-six alphabetic letters and is developed further from the current *pinyin* planning, would be a perfect choice.

Ma Xiwen (1986) argued that each reform was related to certain technological advances, or to the emergence of new writing tools.  With the emergence of the woolen brush, there came "scribe characters" (li shu) and "standard characters" (kai shu); with the emergence of the printing culture, there appeared "Song-styled characters" (song ti); with the pencil, "revised Song-styled characters" (fang song ti).  It goes without saying that Chinese writing has to be changed with the computer on the scene. "To be specific," Ma described, "the writing in the future should be made by a limited number of parts that form the character" (Ma, 1986: 34).

Political discourse was also introduced into the debate.  Fu Yonghe (1981) evoked Marx's idea: "In the course of reproduction, not only does the objective condition change (e.g., the rural into the city, waste land into arable land), but the laborer himself changes: due to production, he develops himself, constructs himself, cultivates a new power, new ideas, a new communicative style, new needs, and a new language" (Fu, 1981: 25).  Similar to the Marxist view, Hu Ruichang (1995) pointed out was that the modernization of language and script was to adapt them to the demands of society.  Employing a simplistic analysis, Hu argued that language emerged as a result of the communicative demand from society.  The creation of writing transcended space and time limited by language.  But as a social phenomenon, language and writing had to be parasitic to society, and "when a society developed, language had to develop, too" (Hu, 1995).[3]

# Technical Matters: Characters and Letters

### Characters and Letters

Rethinking the zigzag road language reform had taken throughout Chinese history, Wang Li, one of the leading linguists and reform advocates, expressed his concern that even though writing reform had had a history of more than ninety years, there were still many misunderstandings among the people. In order to carry out language reform smoothly, Wang (1981) suggested that more "research on writing reform that employs scientific methods truthfully" be necessary to persuade the public. (Wang, 1981, p. 6)

One sign of the scientific method in the investigation of language reform was the publication of research papers employing social scientific methodology and with quantitative data. Differences between an alphabet language and the Chinese language were presented with concrete data. According to Liu (1985), in countries with a phonetic script, children achieve the ability to read and write in about one year. In China, however, those abilities aren't achieved even after spending ten years on the Chinese language and writing. Because of this disadvantage, Chinese children gain much less information than their peers in other countries. Liu provided an example. Russian textbooks for children below the fourth grade have 730,000 characters when translated into Chinese, while Chinese textbooks for children at the same level use only about 120,000 characters. The ratio is 6:1. This difference becomes a huge concern when it comes to the content area. The Russian textbooks contain many original works from nearly one hundred Russian and Soviet Union writers. But in Chinese textbooks, there isn't even one single original piece from the literary masters. As a result, "A huge gap in early education has occurred between countries with Chinese characters and countries with a phonetic script" (Liu, 1985: 5).

While Liu addressed the difference between the Chinese writing and alphabetic languages, other scholars focused more on the insufficiency of the Chinese language in the computer age. In more technical terms, Zhang and Li (1980) explained that a typical Chinese typewriter, instead of using twenty-six alphabetic letters, was composed of boxes of characters and was heavy and costly. To illustrate the difficulty in handling Chinese characters by the computer, the author used the following table:

*character input device      Computer      character output device*
*Chinese character dictionary*

The difficulty was associated with each of the three aspects. There were over one hundred input devices or designs for Chinese characters. The problem of connecting a keyboard based on twenty-six letters to thousands of characters was a daunting task. Another problem came with the output. A Latinized letter or Arabic number may be produced with 5 x 7 =35 dots or 7 x 9 = 63 dots respectively, but for publishable quality, a character needs 100 x 100=10,000 dots. Therefore, to output

a character would require ten to one hundred and fifty times more information than a Latin alphabet.  Lastly were the problems of computer storage and the translation of Chinese characters.   For 10,000 characters plus a dozen fonts, the total information required would be over twenty gigabytes.

### *Entropy and Redundancy*

The explanations about technical matters were straightforward and support from the public was easily garnered.  However, in some ways, using characters in the information age seemed superior.  For example, with a dozen or more character-inputting schemes developed and available to the public, using characters would in some cases be more efficient.  In several schemes, fewer keystrokes were required to input the same phrases in Chinese than in English. Whereas the phrase "language reform" requires fourteen keystrokes in English, it could be done with as few as two strokes when using a "stroke system" or "*pinyin* system" in Chinese.[4]   These situations prompted a group of different scholars to say that the twenty-first century is a century of Chinese writing.

Reformers felt compelled to let the public know what goes on inside a computer, or how information processing works.   They found Shannon and Weaver's (1949) concepts of "entropy" and "redundancy" particularly useful in their arguments for a *pinyin* orthography in China.

Entropy, a concept borrowed from physics, is analogous in most communication systems to audio or visual static—that is, to outside influences that diminish the integrity of the communication and distort the message for the receiver.  Redundancy—the repetition of information—is the antidote for entropy.   Most written and spoken languages, for example, are roughly half-redundant.  Redundancy is apparently involved in most human activities, and, because it helps to overcome the various forms of entropy that turn intelligible messages into unintelligible ones, it is an indispensable element for effective communication.

One of the problems that frustrated Chinese information experts was the processing of Chinese characters, which in many cases lack a clear concept of word and a clear demarcation of words.   Consequently, they confront information scientists and computer technicians with enormous obstacles.  Chinese characters have extraordinarily high entropy.  The entropy for an average Chinese character is 9.65 bits in comparison with 3.98 bits for one letter in French, 4.00 bits for one letter in Italian, 4.02 for one letter in Spanish, 4.03 bits in German, 4.12 in Romanian, and 4.35 in Russian (Feng, 1989; Feng, 1992; Lin, 1980; Ma, 1980; Mair, 1994; Maomao, 1980; Zhang, 1996a; Zhang, 1996b; Zhang, 1999).  One of the two terms used for rendering entropy in Chinese was "information content." Since the Chinese character enjoys much higher information content, one might say that the Chinese character is a better, more efficient system for the computer. However, the opposite could be true.  According to Feng Zhiwei, a researcher in Chinese writing:

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> Such great entropy of the character is extremely disadvantageous for communication technology and character information processing. According to Shannon's theorem for cybernetic channel codes, in an unexpanded information source without memory, the average length of code letter cannot be smaller than the entropy of the information source. Because the entropy value of the characters is large, the average length of their corresponding letter codes will also be large. Even with the best communication code system, the average length of its letter code ought at least to be equal to the entropy of the characters; this will naturally influence the efficiency of the communication. In character information processing, the inputting and outputting of the characters is a key question. Because the entropy value of the characters is large, this causes great difficulties for the inputting and outputting of the characters. (Quoted from Mair, 1994, p. 94, with revision.)

In connection with entropy is the concept of redundancy. Researchers held that redundancy for Chinese characters is too small to be acceptable in the information age. An average Chinese character has a redundancy of 56-74% compared to 67-80% of an average English letter. The issue is the adequacy of redundancy. If a character or message is too redundant, the character or message is not efficient; if it lacks enough redundancy, the character or message is too ambiguous and lacks information, too.[5]

From a global perspective, to stick to Chinese characters without using a *pinyin* orthography asks the world to pay a price. Mair (1994) observed: "In order to prop up a system that will inevitably collapse—just as Egyptian hieroglyphics and the Sumerian and Hittite picto-ideographs did over two millennia ago when they confronted the alphabet—the supporters of the sinographs [characters] are now asking the rest of the world to pay the costs" (Mair, 1994: 95). Mair explained that the Unicode, devised with the primary purpose of accommodating the sinographs, a 2-byte/16 bit code, was twice as expensive and half as fast as the ASCII code, a 1-byte/8-bit code, which was just fine for English, French, Russian, and so forth.[6]

The concept of entropy was one major weapon reformers took to defend their position. Using the German experience in language reform as an example, Peng Xiaoming (1999) attacked Chinese language reform on many fronts. Peng argued that not only were the previous reform efforts wrong but that it was also unnecessary to have a reform in order to accommodate communication with a machine. In Peng's opinion, the German language was not very compatible with computers and suffered from problems similar to the Chinese language. But the German people held on to their tradition and resisted any temptation to make adjustments in their language under the pressure of the computer. In a lengthy rebuttal of Peng's thesis, Phillip Zhang (1999) pointed out that Peng's premise was flawed, for the fundamental difference between the German language and the Chinese language, from the standpoint of entropy, made any comparison impossible.

The entropy of the German language is almost the same as that of English and there was no pressure at all to force the German language to change in the information age. But Chinese writing was another story. Zhang pointed his finger at Peng, who used culture and nationalism for emotional appeal: "It doesn't matter by whom or when these languages are used; nor does it matter what nationalistic feeling the user has. The entropy is entropy" (Zhang, 1999).

## The Deterministic View: Language and Science
### Language and Science

In the early 1980s, Alfred Bloom published a book based on his study of the Chinese language and mind, employing the theoretical framework of the Sapir-Whorf hypothesis. In studying linguistic patterns and their relationship to the mind among American Indians, Sapir and Whorf suggested that language functions not simply as a device for communicating facts and experience, but also, and more significantly, as a way of defining experience for its speakers. In comparing the linguistic patterns and their psychological impacts of both English-speaking students in North America and the Chinese language-speaking students in Taiwan, Bloom (1981) found that the Chinese language-speaking respondents in general had difficulty in counterfactual schemes. Bloom suggested that a series of Chinese linguistic structures contribute to the lack of counterfactual schemes in the mind of the Chinese and that, accordingly, the Chinese language had difficulty to convey truth in an abstract sense as the English language does.

Not until very recently has Bloom's thesis been associated with Chinese language reform and this association has since moved the debate of language reform in another direction. This association started with an article entitled "Science and Scientists in China" by one of China's top scientists in observation of the 150th anniversary of the American Association for the Advancement of Science. In the article, Tsou (1998) attributed the lack of scientific development in the Chinese society to the dominance of Confucianism in the past several thousand years. Tsou maintained, "One of the great tenets of Confucianism[,] the need for each individual to know his or her place in the social hierarchy, contributed much to the continuation of Chinese civilization through the dynasties. But knowing one's place also militates against curiosity and creativity" (Tsou, 1998: 24). In response to Tsou's thesis, Lang (1998), who had been writing extensively in the area of culture and science, argued that geographical and ecological factors, rather than cultural matters, should be held accountable.

The English version of Lang's article was distributed in the electronic journal *Hua Xia Wen Zai* [China New Digest], one of the most comprehensive, visited, and influential electronic journals about China. The Chinese version also appeared in this electronic journal. To refute Lang's view, Zhang Juli (1998) took up Bloom's theory that the reason for the lack of science resided in the use of Chinese characters.

The system of writing provided the answer to many questions of Chinese culture, mind, and society. Zhang argued that the lack of abstract thinking in the Chinese mind was due to Chinese writing. In the West, abstract concepts such as "point" in geometry and "commodity" in political philosophy "are very frequent in Western philosophies and thoughts, but relatively rare in Chinese thought." Even though some terms such as "tao" capture the abstraction, the concept is different from the Western sense, because the *tao* "is very mysterious, defies a concrete definition, and belongs to no scope of knowledge." Zhang reasoned that the abstract *tao* was not a result of "abstract thinking." Zhang therefore moved on to a more general observation:

> Writing is the mirror of a language. It is through writing that the human being realizes the relationship between sound and meaning in a language. The Chinese character and the pinyin orthography provide [us] with different mirrors: the character reflects only a concrete relationship, not an abstract one. When we explore and observe the relationship in things, we can only see the concrete relationship. (Zhang, 1998)

From Zhang's point of view, the Chinese language explains many crucial aspects of the Chinese civilization. The explanation for the reason why, among many old civilizations, the Chinese civilization remained and repeated itself without remarkable development had something to do with writing, for Chinese writing didn't equip the Chinese with a linear mind, instrumental for scientific development. Zhang went so far as to say that writing explained the social pattern in China as well: in order to sustain the relative social stability, the Chinese are constantly adjusting relationships among individuals in a family, among families in a community, among family clans, and even among all social strata in a society.

### *Language and Civilization*

Zhang's appropriation of Bloom's view that the Chinese language is inadequate for scientific development was very close to a traditional thesis that languages alone accounted for the difference in civilization between the East and the West. [7] More recently, holding a technological view of phonocentrism, McLuhan opened his *Gutenburg Galaxy*: "the abstracting or opening of closed societies is the work of the phonetic alphabet, and not of any other form of writing or technologies" (McLuhan, 1962: 8). Comparing different writing systems, McLuhan argued that no pictographic or ideographic or hieroglyphic mode of writing had the detribalizing power of the phonetic alphabet.

Reformers all embraced this seemingly outdated, Western view. Wu Wenzhao (1998) actually followed this argument, as he stated in "The Oceanic Culture and the Alphabetic Script":

> Script is the carrier of culture, but it at the same time influences and shapes culture. A Western scholar's view that "the medium is the message" reflects exactly this reciprocal relationship [between language and culture]. Some

scholars believe the foundation of Western culture is the alphabetic script; the non-alphabetic writing explains the slow development of Chinese society and the lack of science. (Wu, 1998)

Wu simultaneously reformulated and mediated the opposing views of Lang and Zhang by advancing a thesis that the oceanic culture accounted for the origin of alphabets and under the latter's influence the development of other continental places in Europe was possible. In Wu's imagination, China at the end of the twentieth century stood as Europe did at the eve of its development, propelled by the alphabet: with its surrounding countries migrating in one way or another to an alphabetic language, "China sooner or later will adopt an alphabetic language" (Wu, 1998).

Scholars came to the conclusion that what China needed was not any violent revolution or even drastic political reform. In fact, the political reform in the last one hundred years in China was more violent and thorough than in many other countries; countries such as Great Britain and Japan still have some form of imperial power. What China needed was to enhance the efficiency of language, develop education, improve the quality of people, and to advocate scientific spirit. Wu (1999) made a further connection that, without an alphabetic system, students from Mainland China and Taiwan were already going to other countries in large numbers to study and to do research.

Wu's position was in line with the one held by Mair, a distinguished scholar in Chinese language and culture. Mair (1994) also made the case that the complexity of Chinese characters had put China in an inferior position in modern business, science and technology: "Perhaps this is why Chinese and Japanese scientists only win Nobel prizes when they come to the West to work in an alphabet environment" (Mair, 1994: 95).[8]

## Communication as Transmission

For intellectuals who favored a basic reform in Chinese writing, the critical function of language was not for communication with the human being, but with the machine—the computer. Rather specifically, the function was for the transmission of information. The turn from communication to transmission was presented in the arguments by several authors. Qian and Chen (1981; 1983) made the point that the theories and methods of linguistics had been instrumental for the automation of society at large. Using works of Shannon, Wiener, and even de Saussure, they held that the world was entering into a society of information, which would replace the physical and mental labor. "Thus," they argued, "language is not simply the basic tool for exchanging information between one human being to another, but will soon become the primary tool for exchanging information between the human being and the machine. The scope and function of language use is undergoing a new development and change" (Qian & Chen, 1981: 233).

The emphasis on information and transmission in the context of the machine was clearly stated by Xin Gongwan. Quoting Y. R. Zhao's *Linguistic Questions*, published in 1980, Xin (1986) argued that language may be defined as "a kind of sign that transmits information; the writing that denotes language is also a sign" and that language could no longer be defined as "the most important tool for communication for human beings" (Xin, 1986: 24). In light of this, language would have to be treated as a system resembling a machine or organism subject to technical control and analysis. From a sociolinguistic point of view, language was an invisible "neurosystem" that connected individuals together. This organic metaphor was followed by a direct quotation from Wiener's *The Human Use of Human Beings*:

> Information is a name for the content of what is exchanged with the outer world as we adjust to it, and make our adjustment felt upon it. The process of receiving and of using information is the process of our adjusting to the contingencies of the outer environment, and of our living effectively within that environment. The needs and the complexity of modern life make greater demands on this process of information than ever before, and our press, our museum, our scientific laboratories, our universities, our libraries and textbooks, are obliged to meet the needs of this process with adequate information. To live effectively is to live with adequate information. Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society. (Xin, 1986: 24; Wiener, 1954: 18)

Why should communication with machines take precedence over communication with human beings? Qian and Chen (1981) maintained that with the coming of the information age, linguistics had become a basic science as well as a leading science. Advances in linguistics were ready to be transformed into technology and to accelerate the move toward automation in every field. A connection was made between language modernization and productivity: "Language helps coordinate not only the relationship between human beings but that between human beings and machines" (Qian & Chen, 1981: 239). It can be said this later relationship makes language enter the realm of productive force, becoming a tool with which human beings conquer nature: in the course of production the technical level of the language being used is, in a certain sense, indicative of the degree to which human beings conquer nature.

The use of arguments about technology and reliance on technology didn't turn back the advocates of language reform, who were mostly specialized in humanities. Instead, a romantic picture had already been painted as part of modernization. Qian and Chen quoted Y. R. Zhao in reference to language as sign: "From the transmission of information to the control of activities, there resulted in industry, war, transportation all kinds of automatic control devices. In many of these areas they not only mechanize our wisdom but sometimes virtually give wisdom to the machinery" (Qian & Chen, 1981: 240). Reformers reiterated the point that one

reason that China lagged so behind in the area of information technologies was that Chinese writing processing in computers had not been solved due to serious obstacles caused by square characters.

## Concluding Remarks

Clearly, the dominant theme in recent discourse on language has been a scientific critique.  According to reformers, the information superhighway may be viewed as the "information highway that transmits languages and scripts at a high speed"; rather than a supplementary medium to represent reality, language becomes the *a priori* agent to define, validate, and even create reality, for "the existence of any material or any spirit is not to be grasped unless it is converted into language information" (Liu, 1995).  Since language plays such a critical role, China, for its lack of an alphabetic writing compatible with the computer, must embark upon a program of working out a language system just as the United States government initiated the Manhattan Project during the World War II (Wu, 1999).

When language enters a machine, its ability to function as a tool for human communication is measured in technical terms.  What problems will that process beget?  As stated earlier, the mathematical formula of communication neglects the human part of communication.  In Shannon and Weaver's model, no efforts are made to account for feedback, which modifies both the message and the communication situation, nor is there any acknowledgement of the importance of context—social, political, cultural—in influencing all stages of the process.  This neglect of human context contributes to a tendency that treats what is human as what is mechanical.   Shannon and Weaver's model was constructed mainly to tackle technical problems and the assumption was that to sort out technical problems by imposing encoding constraints would, almost automatically, likely lead to solutions to non-technical problems.  The picture painted by the extreme technical control was reflected in Wiener's (1954) *The Human Use of Human Beings*:

> When I give an order to a machine, the situation is not essentially different from that which arises when I give an order to a person.  In other words, as far as my consciousness goes I am aware of the order that has gone out and of the signal of compliance that has come back.  To me, personally, the fact that the signal in its intermediate stages has gone through a machine rather than through a person is irrelevant and does not in any case greatly change my relation to the signal.  Thus the theory of control in engineering, whether human or animal or mechanical, is a chapter in the theory of message. (pp.16-17)

To use technical advancements to improve human communication is legitimate, but to equate the communication of the human being with that of the machine is problematic. Henry Johnstone, a philosopher and communication scholar, explicated the problem of identifying communication with transmission.   In

studying issues of communication in technological society, Johnstone (1970) argued that communication is a distinctively human activity, and in a strict sense, communication with the machine is not communication at all. For communication requires the act of human consciousness: "As soon as we approach genuine communication, we depart from the world of the machine" (Johnstone, 1970: 121). Without an evocation of consciousness—the participation of the critical mind—the so-called communication is just a transmission of data between machine and machine, between people and machine, or between people and people. To develop this thesis, Johnstone (1981) argued that simply because humans can communicate, persuasion is possible, and imbedded in the very act of persuasion is what differs and defines the human being from the other living creatures.

Johnstone's argument might fail to persuade many users of Chinese characters who are constantly frustrated by the difficulties they face in the computer environment. To some, it seems justifiable to say that Chinese characters represent the old culture and old technology while the drive for modernization, for efficiency, and for globalization demands a phonetic orthography compatible with the computer. This concern essentially raises the question of cultural re-orientation on the path to modernity. This is a legitimate question, for studies on modernity (e.g., Habermas, 1984; 1987) show that a cultural change is necessary for a society to achieve modernity. Taking that as a starting point, the following questions have to be answered: What kind of cultural change is legitimate? Where is the source of warrantee for a writing system to be replaced by another system in order to *communicate* with the machine?

Intellectuals championing for a basic reform for Chinese writing seemed to have provided an argument that was increasingly losing its strength in the contemporary discourse on modernity. As a matter of fact, the enduring interest in modernity arose from one particular concern arising from the Western experience: the alleged pathology of modernity as society is rationalized in an unbalanced fashion along the path of purposive action or instrumental reason. The extensive use of information theory in advocating language reform in China displayed one-sidedness insofar as linguistic transactions were narrowed to transmission rather than communication. To translate this from the perspective of modernity discussed earlier, it was scientism that over-stretched into other realms requiring different validity claims.

Obviously, the lifeworld has different modes of discourse. Should literary works and other works abide by the rule of scientific efficiency and theory of economy? Reformers seemed to take a positive position. This was well reflected in the article, "Business Writing Style is Changing in America," which appeared in *Language Modernization*. From his experience in taking a course on business writing in America, Wang (1983) argued that the criterion for good writing and good discourse was to abide by the rule of simplicity and practicality. He concluded his article with an anecdote of how a professor would have graded

Lincoln's Gettysburg Address, "as if it were done by a student." According to Wang's recollection:

> For example, the "four score and seven years ago" in the opening sentence should be more colloquial, and should be changed to "which year and which month," or "eighty seven years ago." And in the last sentence "the government…of the people…by the people…for the people shall not perish from this earth," the phrase "from this earth" is redundant and should be deleted.  Such and such, to think carefully, I found it very reasonable. (Wang, 1983: 258)

This one-sidedness in the conceptualization of culture and modernity made the reformer vulnerable.   In response to the debate on Chinese language reform based on this scientism, Peng (1999) challenged the narrow view of modernity. "Modernity," Peng argued, "by no means indicates the 'modernity' that everyone can jump on the web and play games," but "is the modernity that the majority of people can share and appreciate the thoughts and cultures of the past and present, and of China and of other cultures" (Peng, 1999).   In criticizing various deterministic views on language, Habermas (1991) perceptively pointed out that many recent theories of language emphasizing either structure of language or the practice of language have been deprived of a decisive dimension, "namely that of the intersubjectivity of possible understanding"  (Habermas, 1991: 320).

Notes

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[1] The Chinese journal, *Yuwen xiandaihua*, was translated as "Modernizing our Language" in its English table of contents by its editorial staff.  It is better translated as "Language Modernization," for one important reason: the term "language modernization" is derived from the political term "Four Modernizations" and is a conscious link to that catch word and the term "Yuwen xiandaihua" has the same structure as the term "sige xiandaihua."

[2] Originally coined by the late Chinese Premier Zhou Enlai in the early 1950s, the "four modernizations" include the modernization of agriculture, of industry, of national defense, and of science and technology.

[3] The e-journal, *Language and Information*, marks articles in each issue with a number for the purpose of citation.  Accordingly, instead of being marked with page numbers, the articles from the journal are indicated with a number in the bibliography. Retrieved on February 10, 2001 from http://sq.k12.com.cn/~hpwen\Ywxx.htm.

[4] Two major methods in inputting Chinese characters are "stroke approach" and "*pinyin* approach."  The former assigns each key with several strokes and treats each character as a combination of different strokes.   The latter

utilizes the *pinyin* system in which a Chinese character is directly inputted with its assigned phonetic letters.

[5] As Zhang (1999) explains: In a static state, the letters u and q, if put together, have an entropy of 0, because no relationship is involved.  In a dynamic state, such as in the word *quiet*, the letter u has entropy contribution to the letter q.  It is about 20%.  In a similar fashion, when Chinese synonyms are put together, each of these synonyms will have either 100% or 0% entropy, for a synonym will either represent the whole in itself, or represent nothing.

[6] Mair presented "ridiculous" proportions of the Unicode code-space allocations: 8, 192 code points for all alphabets in the entire world; a whopping 45,056 (!!!) code points for the characters.

[7] For a comprehensive study of this issue, see Chang (2000a).

[8] This article was translated into Chinese and published in *Language and Information*.  See Mair (1995).

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