OPEN ACCESS

Journal of Advanced Research in Social Sciences

ISSN 2538-919X

School Education and the Transformation of Traditional Knowledge Structures in Late Qing China: A Focus on Curriculum Design

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ARTICLE INFO

Keywords:

Curriculum Design,
Knowledge Structure,
School Education,
Western Learning

ABSTRACT

The late Qing period (1840-1912) was a significant era of transition for Chinese society from traditional to modern forms. Following the Opium Wars, when the Qing government was compelled to pay indemnities and open treaty ports, the influx of Western natural sciences impacted China, disrupting the Confucian ethical and moral foundations that shaped the traditional academic structures of late Qing China. Under the influence of the eastward transmission of Western learning, China's traditional knowledge structure—long centered on Confucian classics and historical texts—was reshaped and diversified as Western disciplinary systems, introduced through new schools, brought new subjects and methods. This study analyzes historical documents on the late Qing school curricula to examine how educational subjects were used to organized and classified Chinese and Western knowledge. It further investigates the evolution of discipline-centered education within modern academies and traces the broader transformation of China's knowledge structure, ultimately revealing how it gradually integrated into the modern epistemic system.

1. Introduction

The Late Qing period (1840–1912) marked a critical juncture in China's transformation from a traditional to a modern society. The extensive influx of Western natural sciences exerted a profound influence upon Chinese society, profoundly unsettling the intellectual foundation centered on Confucian ethics and moral teachings, and shaking the roots of the established knowledge structure of the time. The classical system of learning, long grounded in the canonical texts of history and the Confucian classics, gradually revealed a crisis of adaptation when confronted with the Western disciplinary categorization.

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Cite this article as:

Wang, L. (2025). School Education and the Transformation of Traditional Knowledge Structures in Late Qing China: A Focus on Curriculum Design. *Journal of Advanced Research in Social Sciences, 8*(3): 157-174. https://doi.org/10.33422/jarss.v8i3.1637

The term 'knowledge structure' usually signifies the framework and composition of knowledge possessed by a social group within particular historical and spatial contexts. This study focuses on the traditional Chinese knowledge structure, unlike Western epistemologies grounded in philosophy and social sciences, which was not organized into modern disciplines but followed the classical fourfold schema of *Jing* (Classics), *Shi* (History), *Zi* (Masters), and *Ji* (Collections). This system had a clear hierarchy, with *Jing* and *Shi* at the core. *Jing* referred to Confucian canonical texts, *Shi* to historical records, *Zi* to philosophical and practical writings, and *Ji* to literary forms such as poetry and prose, which together constituted a classical knowledge structure centered on *Tongxue* (generalist learning). The *Siku Quanshu* demonstrates this by categorizing knowledge into four traditional divisions—*Jing*, *Shi*, *Zi*, and *Ji*—with specific subcategories, offering a systematic interpretation of traditional Chinese knowledge.

The formation of China's traditional knowledge structure was closely linked to the imperial civil service examination system, which lasted for over 1,300 years. By promoting the educational ideal that "those who excel in learning should serve as officials", this system integrated the cultural and intellectual elite with the bureaucratic class, thereby sustaining the feudal order while laying the institutional foundation for China's bureaucratic society. In the context of late Qing school education, which functioned as a medium for transmitting Confucian ideology, one can observe structural changes in the way knowledge was disseminated and received. As Wang Erh-min noted, "*The transformation of Late Qing scholarship first required crossing the threshold of practical experience—recognizing the utility of Western script, calendrical science, shipbuilding, navigation, artillery, surveying, etc.—which gave rise to institutions such as the Tongwenguan, Fuzhou Naval School, Torpedo School, Telegraphy School, and Military Academy*" (Wang, 2006). This perspective underscores the pivotal role of school education in the transmission of knowledge, while the reform trajectory of late Qing school education reflects Chinese intellectuals' engagement with and contemplation of Western science. The ultimate outcome of the late Qing educational reforms was the abolition of the imperial civil examination system, which released traditional education from its long-standing orientation toward officialdom. At the same time, it retained the principle of equity embedded in selective examinations and the pursuit of fairness in education, which subsequently influenced the modern Chinese examination system and helped sustain the social demand for mobility (Yuan & Zhang, 2025).

This study takes curriculum design in the school education as its point of departure and is structured into three main sections. The first and second sections examine, respectively, the Western-style schools established by missionaries and those modern institutions founded under the auspices of the Qing government during the Late Qing period. Through an analysis of curriculum design and examination questions, the study identifies the fundamental characteristics of instructional content and knowledge classification in these institutions. The third section further explores the profound impact of Western-style education on the transformation of China's knowledge structure in the Late Qing era. By tracing the evolution of school curricula across three critical historical phases—the Opium Wars, the Self-Strengthening Movement, and the Hundred Days' Reform—this study offers an in-depth analysis of the reorganization and gradual transformation of knowledge structures during this pivotal period.

2. Literature Review

The transformation of knowledge in the late Qing period (1840-1912) constitutes a central theme in modern Chinese intellectual history. Contemporary scholarship on this subject

generally follows two main trajectories. First, from the point of view of cultural transmission, scholars explore the dissemination of Western learning and its impact on China's evolving knowledge system. Wang Jienan analyzes how Western thought influenced Chinese cultural life, while Feng Tianyu provides a detailed examination of the profound impact of the eastward spread of Western learning on the transformation of Chinese culture (Feng, 2010; Wang, 2009). Benjamin A. Elman traced the development of science in early modern China, highlighting how western scientific knowledge challenged classical epistemologies. Second, bibliographical and philological studies investigate the evolution of traditional textual classifications and their relationship to modern academic paradigms (Elman, 2016). Zuo Yuhe examines the historical evolution of the classification methods of Chinese classical texts and points out how this system influenced the construction of the modern Chinese knowledge framework (Zuo, 2004a). These studies offer valuable perspectives and theoretical support for understanding the transformation of the knowledge structure in the late Qing period.

From the perspective of scholarly development, researchers have examined how traditional Chinese scholarship evolved into its modern form. Wang Erh-min explores the rise of practical learning in the Late Qing and its interplay with classical learning, revealing how intellectual thought adjusted between practice and rational inquiry (Wang, 2006). Similarly, Zhang Shouan argues that the orthodox paradigm of Qing scholarship, under the impact of Western learning, gave way to a more pluralistic and reconstructed academic order (Zhang, 2006). Wang Xianmin provides an in-depth examination of how traditional Chinese scholarly culture underwent transformation and reconstruction in response to the impact of Western learning, analyzing how it gradually moved toward integration and innovation in the process of modernization (Wang, 2000). These studies collectively offer a valuable framework for understanding the complexity and multidimensionality of academic change in the Late Qing period.

While existing scholarship has broadly traced the transformation of knowledge in the Late Qing period, relatively few studies have focused directly on the domain of classroom education. Bi Yuan and Xiong Yuezhi present rich insights into the sociocultural transformations of modern China from the perspective of textbooks and school education (Bi, 2010; Xiong, 1994). Although both adopt education as a point of entry, they seldom focus directly on the modern transformation of traditional knowledge structures. In fact, during the Late Qing period, the school served as a crucial channel for the dissemination of Western knowledge. Its curriculum design and examination content reflect contemporary methods of classifying and organizing knowledge, revealing how traditional knowledge frameworks were restructured under the logic of disciplinary differentiation. Building upon these earlier studies, this paper further concentrates on the Western-style school established by missionaries and the Qing government. Through a systematic analysis of their curriculum structures, it seeks to uncover the concrete pathways and practical strategies by which traditional knowledge structures were transformed into modern forms, thereby deepening our understanding of the internal mechanisms of knowledge transformation in Late Qing China.

3. Methodology

This study adopts a qualitative historical analysis approach to investigate the transformation of traditional Chinese knowledge structures in the late Qing period through the lens of school curriculum design. The research primarily draws upon historical materials including curriculum tables, examination records, and educational regulations from both missionary schools and Qing government-sponsored academies. These institutions were selected because they represent the two major channels through which Western knowledge entered China: first,

through schools established by foreign missionaries during the Opium War and Self-Strengthening periods, and second, through government-founded modern academies that emerged in the subsequent reform era. The materials are organized around three key historical turning points: the period of the first Opium War, the era of the Self-Strengthening Movement, and the juncture of the Hundred Days' Reform. Organizing the study around these pivotal junctures clarifies shifting educational objectives and reveals how Chinese intellectuals' perspectives on Chinese and Western knowledge evolved over time.

The analytical method involves a close reading and comparative examination of curricula and examination materials to trace the evolution of knowledge classification. Missionary schools, as early mediators of Western learning, introduced natural sciences and modern disciplinary categories, while Qing government academies increasingly adopted specialized and practical subjects under the influence of the Self-Strengthening Movement and the New Policies reforms. By analyzing how different subjects were arranged, combined, or redefined across institutions and historical stages, this study reconstructs the pathways through which Western disciplinary logic reshaped China's traditional knowledge structure.

Despite the richness of the sources, several limitations remain. First, both missionary schools and government-sponsored academies were numerous—over 400 missionary schools and many professional academies—so this study focuses on representative institutions with significant historical influence, which may introduce a degree of selection bias. Second, certain materials inevitably reflect the perspectives and intentions of their compilers, whether foreign missionaries advocating Western learning or Chinese reformers interpreting traditional knowledge, thus embedding potential ideological or personal biases. Nonetheless, the chosen sources remain highly valuable for tracing the macro-level transformation of knowledge structures during the late Qing period.

4. On Church Schools Established by Missionaries in the Era of the Opium War and the Self-Strengthening Movement (1840–1894)

The establishment of modern schools was a distinctive historical phenomenon in the process of the eastward transmission of Western learning in the Late Qing period. However, this did not mean that China had lacked educational institutions. Traditional schools, known as *Shuyuan* (academies), originated in the Tang dynasty and primarily offered instruction in the classics and histories. More specifically, their curricula centered on the Four Books and the Five Classics—namely, the *Great Learning*, *Doctrine of the Mean*, *Analects*, and *Mencius*; as well as the *Classic of Poetry*, *Book of Documents*, *Book of Rites*, *Book of Changes,* and *Spring and Autumn Annals*. Through the recitation of the Confucian classics, the academies cultivated scholars in Confucian moral knowledge, while the imperial civil examinations assessed their ability to interpret the teachings of the sages, master the classical and historical canon, and compose essays.

Western-style schools did not appear on a significant scale until the Late Qing period. Their curricula mainly comprised Western disciplines—physics, chemistry, mathematics, biology, and medicine. These schools were initially founded by foreign missionaries, who introduced Western culture and educational models alongside their efforts to spread Christianity. In both faculty and teaching content, these schools differed markedly from traditional academies. Subjects such as physics and biology, which were absent from classical Chinese education, signaled a new epistemic paradigm. The emergence of Western-style schools gradually altered the traditional Chinese knowledge structure to a certain extent.

This chapter selects three representative missionary schools from the Opium Wars (1840–1860) and the Self-Strengthening Movement (1861–1894) for analysis. By examining their

curricula and exam materials, it explores how disciplines were classified and how Chinese and Western knowledge systems were configured and integrated.

4.1 The Opium War Period (1840–1860): The Morrison School

Before 1840, within the traditional Chinese knowledge structure, the notion of knowledge was frequently equated with practical wisdom, knowledge that served to resolve real-world concerns in governance, livelihood and statecraft. This conception reflected the ideal of practical learning for governing the world, a hallmark of classical Chinese epistemology. During the Opium War period, Chinese society found itself mired in both internal turmoil and external threats. A central concern of the time was how to transcend traditional conceptions and structures of knowledge by introducing Western systems of thought, thereby providing the intellectual resources needed to confront the national crisis.

The limitations of the traditional Confucian knowledge system became increasingly evident in the face of national peril. In Qing scholarship, although Han Learning, Song Learning, and New Text Confucianism all upheld the ideal of "practical learning to govern the world", each had limitations. Han Learning emphasized textual exegesis but lacked real-world applicability; Song Learning focused on moral self-culturing, offering limited practical solutions. New Text Confucianism aimed to link Confucian texts with state affairs, promoting a more utilitarian turn in scholarship. Consequently, previously sidelined fields within the Siku system, especially history and philosophy, regained prominence for their practical value in areas like economics, military, and law, and the traditional knowledge structure gradually evolved into a dual system of "Classical Studies and Moral Principles" and "Historical and Philosophical Learning as Practical Knowledge". This transformation opened intellectual space for the modernization of knowledge and laid both the conceptual foundation and practical impetus for the introduction of western knowledge systems led by foreign missionaries.

Indeed, by the late Ming and early Qing periods, Jesuit missionaries had already begun introducing Western knowledge into China. Their translations included not only religious and humanistic texts, but also over a hundred works on the natural sciences, covering mathematics, astronomy, geography, biology, medicine, linguistics, philosophy, and education. These translations laid the groundwork for later missionary schools. Between 1842 and 1860, Protestant missionaries founded around 50 schools in treaty port regions like Hong Kong and Shanghai, enrolling over a thousand students (Zuo, 2004b).

The Morrison School, founded in 1839 in Macau by British missionary Wanstall and American missionary Samuel Robbins Brown, was the earliest institution devoted to the dissemination of Western knowledge in China. The Morrison School's syllabus was split into English and Chinese sections. The English section included astronomy, geography, history, arithmetic, algebra, geometry, elementary mechanics, physiology, chemistry, music, and composition, while the Chinese section preserved the classical tradition with the Four Books and Five Classics. Generally, missionary schools functioned at an elementary or preparatory level, aiming to introduce practical and utilitarian knowledge integral to social roles into the Eastern intellectual realm. By teaching fundamental mathematics, foreign languages, history, and geography, students were exposed to a new knowledge system that not only provided technical skills but also introduced Western customs and institutions, aiding in the gradual intellectual acceptance of Western ideas.

Table 1. Curriculum Design of the Morrison School

English Subjects	Chinese Subjects
Astronomy, Geography, History, Arithmetic, Algebra, Geometry, Elementary Mechanics, Physiology, Chemistry, Music, Composition	The Four Books (*Great Learning*, *Doctrine of the Mean*, *Analects*, and *Mencius*), The five Classics (*Classic of Poetry*, *Book of Documents*, *Book of Rites*, *Book of Changes,* and *Spring and Autumn Annals*)

The Morrison School, as a new-style missionary academy, adopted a bilingual pedagogical model in which it retained traditional Chinese instruction, which included the recitation of the Four Books and training in classical composition, while placing strong emphasis on English as a gateway to Western knowledge. Most students were youths, and Chinese instruction aimed to reinforce their foundational literacy. In the *Annual Report of the Morrison Education Society*, Samuel Robbins Brown noted that students devoted more effort to Chinese than English studies, attributing this to the complexities of Chinese characters, including semantic repetition and intricate word formations, and while acknowledging the mnemonic value of memorizing Confucian texts, he questioned their relevance in modern pedagogy (Brown, 1842). Despite his concerns, the school maintained its Chinese curriculum, adjusting faculty according to student numbers and preserving its dual focus on Eastern and Western instruction.

It is evident that missionary schools during the Opium War period introduced foundational knowledge from modern Western disciplines, marking the initial transmission of "disciplinary classification" into China. Given the deep roots of traditional Chinese learning, these schools sought to retain classical elements in their curricula; and despite certain reservations about traditional instruction, which relied heavily on rote memorization and the complexities of character composition, they did not abandon it. Instead, they appointed Chinese instructors to provide detailed exegeses of the classics, thereby facilitating students' comprehension and preserving continuity with the classical tradition. In this arrangement, both Western knowledge and traditional Chinese learning were effectively preserved, while traditional categories of knowledge began to be reclassified and integrated for practical use.

4.2 The Self-Strengthening Movement (1861–1894): The Tengchow College and the Shanghai Polytechnic Institution

After 1860, the Qing government established the *Zongli Yamen* (Office for General Management of Foreign Affairs), marking the beginning of the Self-Strengthening Movement. During this time, Western missionaries continued to found schools across China. Beyond Christian doctrine, these institutions adopted Western curricula and taught contemporary scientific subjects. Compared to earlier mission schools like the Morrison School, those of the Self-Strengthening era reached deeper into China's interior and developed more extensively. By the First National Missionary Conference in 1877, there were 462 such schools with over 8,000 students. The curriculum had also advanced to the level of modern secondary education. However, because the schools were numerous, their approaches varied widely: some strictly required passing Bible courses for promotion, while others de-emphasized religious instruction or did not teach English at all. Representative institutions of this period included the Zhenjiang Girls' School, the *Dengzhou Wenhuiguan* (Tengchow College) , and the *Shanghai Zhongxi Shuyuan* (Shanghai Anglo-Chinese School).

Taking the Tengchow College in Shandong as an example, which was established in 1864 by the American Presbyterian missionary Calvin Wilson Mateer (1836–1908) and his wife. The curriculum included religious instruction, secondary-level general education, and modern Western scientific knowledge. The list of courses offered is presented in Table 2.

Table 2. Curriculum of Tengchow College

Educational System	Grade	Religious Courses & Chinese Classical Studies		Science Courses
		Western Studies	Chinese Studies	
Beizhai (early primary school in traditional China)	1	Matthew Chapter 6 (New Testament of the Bible), Mandarin Catechism (Christian Doctrine)	Mencius (Part 1), Selected Readings from the Book of Songs (Parts 1 and 2)	Mental Arithmetic, Written Arithmetic(Part 1), Mathematics
	2	Bible Overview (Part 1), Ephesians and Colossians	Mencius (Part 2), Selected Readings from the Book of Songs (Parts 3 and 4), Selected Tang Poems	Written Arithmetic (Part 2), Geography Overview, Introduction to Music Theory
	3	Bible Overview (Part 2), Selected Readings from Psalms (Bible)	The Book of Documents (Parts 1 and 2), The Great Learning, The Doctrine of the Mean, Composition and Poetry Writing	Written Arithmetic (Part 2), Geography Overview, Gravitational Studies
Zhengzhai (early secondary school in traditional China)	1	None	The Book of Documents (Parts 3 and 4), The Book of Songs, The Analects	Origins of the Heavenly Way, Essentials of Algebra
	2	The Pilgrim's Progress	The Book of Documents (Complete), The Book of Rites (Parts 1 and 2), Mencius	Essentials of Geometry, Geometry of Conics, Outlines of General History
	3	Wonderful Salvation	The Book of Rites (Parts 3 and 4), The Book of Songs, The Great Learning, The Doctrine of the Mean	Essentials of Eight Lines, Surveying, Gewu, Investigation of Things), Guide to Self-Reflection
	4	None	The Book of Rites (Parts 1, 2, and 3), Classics, The Zuo Tradition (Parts 1, 2, 3, and 4), Prose and Poetry	Land Surveying Methods, Navigation Methods, Investigation of Sound, Light, and Electricity, Geology
	5	The Epistle to the Romans (Bible)	The Book of Rites (Parts 4 and 5), The Zuo Tradition (Parts 5 and 6), Prose and Poetry, Abridged Compilation of the Twenty-One Histories	Algebraic Geometry, Physical Measurements, Chemistry, Botany and Zoology
	6	Psychology, Ethics	None	Calculus, Strategies for Enriching the Nation, Chemical Analysis, Astronomy Essentials

Tengchow College's curriculum design shows a notable increase in courses, covering missionary education, traditional Chinese learning, and Western sciences. English courses were deliberately absent to ensure focus on classical Chinese literature. While advancing religious teachings, Tengchow College adopted Western education methods, retaining a respect for traditional Chinese learning and accepting students from regular backgrounds, showcasing inclusivity. Unlike this, the Shanghai Anglo-Chinese School did not enforce strict doctrinal constraints, allowing students to attend sermons freely, appealing more to elite families and extending the school's reach. These cases exemplify how missionary schools of the period tailored their offerings to student's needs, strategically differentiating in religious and language instruction to effectively disseminate Western scientific thought among various social levels of late Qing society.

Another prominent Western-run institution was the *Shanghai Gezhi Shuyuan* (Shanghai Polytechnic Institution), which was founded in Shanghai in 1874 by the British missionary

John Fryer (1839–1928) in collaboration with leading figures of China's new learning, including Xu Shou and Wang Tao, who jointly undertook teaching duties. Its mission was to facilitate a systematic study of Western sciences, industrial methods, and technological innovations with the goal of preparing skilled individuals for future state needs (Shenbao, 1873, March 25). Curriculum structure and examination types are summarized in Table 3.

Table 3. Classification of Examination Topics at the Shanghai Polytechnic Institution Note. From (Shang, 2001).

Exam Question Categories	Number of Exam Questions	SUM
Gezhi Category (Introduction to *Gezhi*, Astronomy, Calendar Calculations, Meteorology, Physics, Chemistry, Medicine, Surveying, Earth Sciences)	5+1+2+2+4+2+3+2+3	24
Language and Writing	2	2
Education and Talent Development	7+6	13
National Prosperity and Governance (Introduction to Prosperity and Strength, Industry, Steamships and Railways, Trade Rights, Postal Services, Agricultural Irrigation, Social Welfare)	2+3+3+15+1+6+3	33
Military Defense (Border Defense, Navy)	4+3	7
Politics (International Affairs, Parliament)	7+1	8
Others (Criminal Law, Donations, Education Administration)	2+1+2	5

John Fryer crafted the curriculum for the Shanghai Polytechnic Institution, encompassing over 100 courses divided into six key areas: mining, electricity, surveying, engineering, steam machinery, and manufacturing. As China's inaugural institution for the organized teaching of Western modern science, its curriculum reflected the conceptual features of Western "disciplinary division" and "specialized education," exerting a profound influence on contemporary Chinese scholars' understanding and acceptance of Western notions of disciplinary classification. After the establishment of the Shanghai Polytechnic Institution, learners from across China came to study subjects such as arithmetic, natural sciences, mining, and engineering, receiving targeted instruction that allowed them to acquire the knowledge they sought.

The statistical analysis of exam questions from the Shanghai Polytechnic Institution reveals that the content covered most major natural science disciplines, with a focus on *Gezhi* (the investigation of things) and *Zhiguo* (governing the state). Natural science topics appeared 19 times, reflecting the academy's emphasis. Within governance-related content, nearly half concerned commerce and fiscal matters, likely tied to the contemporary trade context. Despite the broad subject range, the curriculum lacked clear disciplinary categorization, relying instead on practical, application-based knowledge dissemination.

Notably, the Shanghai Polytechnic Institution's emphasis on "specialized education," which set aside the religious courses typical of other missionary schools as well as traditional Chinese classics, exerted a strong impact on contemporary Chinese society and became a key factor in reshaping Chinese perceptions of the Western knowledge system. Wang Zuocai, a student at the Shanghai Polytechnic Institution, noted that Western scholarly traditions placed emphasis on empirical experimentation over speculative reasoning. He observed that the rise of *Gezhi* studies, comprehensive in their scope, had effectively replaced the confusion and verbosity of ancient learning with a more systematic integration of Chinese and Western knowledge (Xiong, 1994).

Overall, from the Opium War to the Self-Strengthening Movement, missionary-run schools in China expanded in both curricular depth and institutional scale. To accommodate different audiences, the imported curricula underwent localized adaptation and targeted adjustment.

However, even as Western knowledge became increasingly complex, it did not yet reflect the mature disciplinary classifications characteristic of Western academia, indicating that missionary education in China remained in an exploratory phase. Nonetheless, these efforts marked the starting point of modern scientific education in China. Chinese intellectuals gradually came to appreciate the empirical and pragmatic nature of Western learning and began to adopt the idea of disciplinary differentiation. The traditional Chinese educational philosophy gradually began to disintegrate, as schools no longer aimed to cultivate individuals versed in the teachings of Confucius and Mencius, but instead sought to train a new type of talent capable of engaging with the Western knowledge system. By the later years of the Self-Strengthening Movement, there was growing recognition that Western knowledge, whether in *Gezhi*, *Xizheng* (Western governance), or *Xiyi* (applied Western technologies), held practical value for China. This broader acceptance contributed not only to the legitimation of Western knowledge in Chinese society, but also to the late Qing government's reforms in curriculum and school design.

5. Western Learning Institutions Founded by the Qing Court during the Self-Strengthening Era (1861–1894)

The Self-Strengthening Movement marked a brief respite for the Qing government, during which efforts were made to innovate without discarding tradition (Chen, 1992). This period preserved the central role of Confucian ideology, moral ethics, and political institutions, collectively referred to as *Zhongti* (Chinese learning as the essence), while simultaneously striving to incorporate elements of Western origin, including natural sciences, technologies, military systems, and mechanical institutions, which were designated as *Xiyong* (Western learning for application). Although Confucianism remained the principal source of sociopolitical and cultural legitimacy, it was inadequate for meeting the practical objectives of self-strengthening and wealth acquisition that characterized the movement. As a result, a key intellectual challenge of the time lay in determining how to extract utilitarian content from the traditional knowledge system and, through adaptation and localization, integrate Western scientific resources in a manner that could realize the ideal of *Zhongti Xiyong*.

As the Qing government drew inspiration from early Western-style schools, it began actively establishing its own modern educational institutions, which broadly fell into two categories: those centered on foreign language instruction and those focused on military-industrial training. A close analysis of their curricula reveals a clear shift from the classical model of *Tongxue* (generalist learning) toward an emerging structure grounded in the transmission of specialized knowledge.

5.1 The School of Combined Learning during the Self-Strengthening Movement

In 1862, the Qing government established the *Tongwen Guan* (School of Combined Learning) in Beijing, marking its first attempt to implement a Western-style educational framework. Prince Gong Yixin, in drafting the school's regulations, proposed a structure modeled on the Western principle of disciplinary division. He specified guidelines such as "assigning instructors to teach specialized subjects," "appointing supervisors with defined responsibilities," and "administering examinations at regular intervals to assess student diligence and progress." These provisions reflected a new emphasis on academic specialization and institutional management. Initially, the School of Combined Learning offered courses in English, French, Russian, and German, each taught by designated instructors, with the aim of cultivating practical talent for foreign service.

American missionary William Alexander Parsons Martin (1827–1916) played a pivotal role in the early development of modern education in China by serving as the chief instructor of

Western studies at the School of Combined Learning in Beijing. Building upon Western pedagogical models and principles of disciplinary classification, Martin designed a comprehensive and systematic curriculum that extended well beyond basic language instruction. The program incorporated a wide array of academic subjects, including chemistry, general science, international law, political economy, strategies for national enrichment, geography, and economics, reflecting the Qing government's increasing openness to Western knowledge systems. To accommodate different levels of study and training objectives, the curriculum was structured into two distinct tracks: a more extensive eight-year program and a shorter five-year program, offering flexibility while maintaining academic rigor. These curricular frameworks are summarized and compared in Table 4.

Table 4. Curriculum Structure of the Five-Year and Eight-Year Programs at the School of Combined Learning in the Capital

Grade	Eight-Year Curriculum Content	Five-Year Curriculum Content
Year 1	Literacy training, writing practice, basic sentence explanation, interpretation of primers	Mathematics initiation, Nine Chapters on the Mathematical Art, Algebra
Year 2	Primer explanation, grammar drills, translation exercises	Euclidean Geometry, Plane and Spherical Trigonometry
Year 3	Introduction to geography of nations, historical overviews, selected translation readings	Introduction to Physics, basic Chemistry, Elementary Surveying
Year 4	Mathematics initiation, Algebra, translation of official documents	Calculus, Navigation & Surveying, Astronomy & Calculation, Mechanics
Year 5	Physics, Elements of Geometry, Plane and Spherical Trigonometry, translation drills	International Law, National Wealth Strategy, Astronomy, Geology & Mineralogy
Year 6	Mechanics, Calculus, Navigation & Surveying, translation drills	—
Year 7	Chemistry, Astronomy & Calculation, International Law, translation drills	—
Year 8	Astronomy & Calculation, Geology & Mineralogy, Wealth of Nations, translation drills	—

Structured as five- and eight-year programs, these two curriculum tracks embodied the Western ideal of disciplinary specialization. Aside from limited instruction in classical Confucian texts, the focus shifted to Western subjects, including language, mathematics, astronomy, chemistry, natural philosophy, international law, and geography, which broadly aligned with modern disciplines such as mathematics, physics, chemistry, geography, and economics. This reflected the Qing government's deliberate effort to align educational practice with the disciplinary structure of Western academia.

In 1863, the School of Combined Learning in Shanghai was established under the supervision of Feng Guifen, who divided the curriculum into four main categories: Confucian classics, history, mathematics, and literary composition. This structure reflected a balanced integration of Chinese and Western learning, though with a greater emphasis on traditional subjects. Among the courses offered, in addition to Western languages, mathematics was especially valued as the foundation for acquiring technical knowledge from the West. Subsequent educational guidelines, including the"Ten Articles on Curriculum" and "Sixteen Regulations for the Establishment of Schools", further reinforced the principle of combining Chinese and Western learning, while offering more detailed curricular specifications. The classical curriculum began with the *Chunqiu Zuozhuan* (Zuo Tradition of the Spring and Autumn Annals); historical studies included *Zizhi Tongjian* (Comprehensive Mirror for Aid in Government), *Tongjian Waiji* (Outer Records to the Comprehensive Mirror), and *Xu Tongjian* (Continued Comprehensive Mirror); elementary instruction began with *Yangzheng Yigui* (Posthumous Rules for Nourishing Rectitude) and *Zhuzi Xiaoxue* (Zhu Xi's Elementary Learning*)*, progressing to Jinsi Lu (Reflections on Things at Hand) *and Xingli Jingyi* (Essential

Doctrines of Neo-Confucianism). Mathematics began with the basic four operations and root extraction, focusing on Western geometry and algebra while also covering knowledge of weights and measures.

Meanwhile, the School of Combined Learning in Shanghai implemented a hierarchical classification of foreign disciplinary knowledge by establishing upper and lower classes, as shown in Table 5.

Table 5. Curriculum Structure of Upper and Lower Divisions at the Shanghai Tongwenguan

Division	Curriculum Category	Course / Content Description
Lower classes	Basic Courses in Western Learning	Foreign jurisprudence, public law, arithmetic, algebra, analytic geometry, geometry, mechanics, astronomy, geography, and other foundational knowledge.
Upper classes	Specialized Technical Disciplines	Survey land and refine various metals to prepare materials for manufacturing. Select metal materials to create machinery. Manufacture various wooden and iron products.

This curricular arrangement reflected a shift in educational objectives—from a previous emphasis on generalist foreign language training to a growing focus on cultivating specialized talents equipped with practical scientific and technological skills. While retaining Confucian classics, the curriculum separately designated foundational and technical courses in Western learning for Chinese students, thereby achieving a step-by-step progression. This structure illustrates the Qing government's rapid adaptation to the Western mode of disciplinary classification in the context of late imperial educational reform.

5.2 Military and Industrial Schools during the Self-Strengthening Movement

In the aftermath of the Opium War, the growing threat posed by foreign powers compelled Chinese intellectuals and officials to both comprehend the outside world and *Shiyi Changji* (learn from the West's superior techniques). This necessity gave rise to a new epistemological context for engaging with Western knowledge. Due to the direct impact of military defeats, the West was initially perceived as a formidable military adversary, and Western knowledge was thus primarily valued for its military applications. During the Self-Strengthening Movement, many officials regarded Western-style education as a means to enhance national strength through industrial and academic advancement. Accordingly, they prioritized technological development as central to national salvation, resulting in the rise of military and engineering academies that embodied the Qing government's selective appropriation of Western knowledge amid intensifying geopolitical challenges.

In 1867, to strengthen coastal defense, Zuo Zongtang established the *Fuzhou Chuanzheng Xuetang* (Fuzhou Naval Academy) founded the *Qiushi Tang* Technical Bureau as an affiliated training center for applied skills and engineering. Foreign instructors fluent in Chinese and Western languages were hired to teach English, French, mathematics, and drafting. The institution aimed to systematically study and produce Western machinery, particularly ships, enabling China to independently acquire and transmit technical knowledge. The curriculum required students to master English and French, excel in mathematics for technical drawing and engineering comprehension, and acquire navigation skills for naval operations. It marked China's first modern naval academy.

Table 6. Curriculum Structure of the Fuzhou Naval Academy Note. From (Wang, 2004)

Course Categories		Course Details
French School (Junior School)	Shipbuilding Program (5 years)	French, Arithmetic, Algebra, Functions, Geometry, Analytical Geometry, Trigonometry, Calculus, Physics, Mechanics, Factory Internship
	Design Program (3 years)	French, Arithmetic, Plane Geometry, Descriptive Geometry, Drawing, Design of 150 Horsepower Engines, and Workshop Internship
	Apprentice Program (3 years)	French, Arithmetic, Plane Geometry, Descriptive Geometry, Algebra, Drawing, Mechanical Illustration
English School (Senior School)	Navigation theory (3 years)	English, Arithmetic, Geometry, Algebra, Plane Trigonometry, Spherical Trigonometry, Nautical Astronomy, Navigation Theory, Geography
	Navigation practice (2 years)	Navigation Skills, Gunnery, Command
	Engine Room Management:	English, Arithmetic, Geometry, Mechanical Drawing, Shipboard Mechanical Operation Rules, Use of Indicators, Salinometer and Other Measuring Instruments, Assembly of 80 and 150 Horsepower Engines

The Fuzhou Naval Academy offered instruction in both French and English, focusing on maritime and mechanical training. The French School, also known as the Junior School, primarily trained personnel in ship design and construction, with instruction conducted in French; the English School, also called the Senior School, focused on training ship pilots and provided instruction in English. As shown in Table 6, the French School included three tracks: Shipbuilding (5 years), Design (3 years), and the Apprenticeship Program (3 years). Apprentices were selected from workshops and trained as foremen, while the Shipbuilding program focused on industrial management and the Design track emphasized production techniques. Both included extended internships to integrate theory and practice. Similarly, the English School offered a Navigation program with a five-year curriculum—three years of theoretical instruction followed by two years of maritime practice. The Marine Engineering program recruited experienced workers from Shanghai or Hong Kong and trained them to become senior engineers.

The curriculum design and training objectives of institutions such as the Fuzhou Naval Academy, and later the Tianjin Military Academy (1885) and the Army and Navy Academy (1887), demonstrate that due to the specialized nature of military and technical schools, the Qing government placed strong emphasis on professional division and personnel assignment when cultivating technical talent and absorbing advanced Western knowledge in shipbuilding and navigation. Specialized courses were tailored to different occupational roles, and students were often required to have relevant practical experience prior to admission. To ensure effective results, all programs incorporated extended periods of hands-on training. These measures reveal not only the Qing government's full acceptance of Western disciplinary classifications but also its growing recognition of the empirical and practical essence of Western knowledge, reflecting a broader acknowledgment of the Western intellectual system.

In sum, during the Self-Strengthening Movement, the late Qing educational system underwent a profound transformation from a traditional generalist knowledge structure toward a modern, specialized academic framework. Analyzing both language and technical academies of this period reveals that the establishment of Western-style schools posed a direct challenge to the classical Confucian knowledge order. From a curricular perspective, this transformation was not merely a superficial addition of Western scientific subjects to the existing system. More significantly, it marked a paradigmatic shift from a structure centered on Confucian classics

and historical texts to one organized around modern disciplines. This emerging disciplinary model reflected a conscious effort by Chinese scholars to reclassify traditional learning through the lens of Western academic categories and principles. Although the Qing government officially maintained the doctrine of *Zhongti Xiyong*, the professional educational reforms implemented during the Self-Strengthening Movement reflected a high level of acceptance of the Western knowledge system. The historical experience of constructing Western-style schools during this period has also prompted some modern scholars to reflect on the cultivation of "craftsmanship spirit" and the reform of standardized vocational examinations in the context of Chinese vocational education (Yang & Chia, 2023). The introduction of modern Western scientific knowledge decisively advanced the transformation of traditional Chinese learning into a modern academic form and catalyzed reforms in China's modern professional education, leaving a profound and lasting impact.

6. Industrial and Higher Educational Institutions Established by the Qing Government (New Policies Period: 1895–1901)

Amid the Self-Strengthening Movement, the Western model of disciplinary specialization disrupted China's traditional generalist approach to knowledge. Guided by the principle of *Zhongti Xiyong*, the transformation of the traditional knowledge system proceeded gradually. However, the Qing government's defeat in the First Sino-Japanese War (1894) not only exposed the limitations of this strategy and marked the failure of the Self-Strengthening Movement, but also interrupted the slow, evolutionary process of intellectual reform. In the aftermath of the 1895 Treaty of Shimonoseki, reform-minded scholars such as Kang Youwei and Liang Qichao launched the *Gongche Shangshu movement* (Petition of the Examination Candidates), which led to the Hundred Days' Reform in 1898. While the reform was short-lived, it nevertheless ignited a wave of intellectual transformation, prompting the emergence of schools, societies, and newspapers. Key milestones such as the 1902 Authorized School Regulations and the abolition of the civil service examination system in 1905 marked a turning point, accelerating the shift in China's knowledge structure from gradual evolution to rapid transformation.

In the realm of natural sciences, *Gezhi* continued to be viewed as the most practically applicable form of knowledge. However, the signing of the Treaty of Shimonoseki (1895) and the Boxer Protocol (1901) led many Chinese intellectuals to recognize that China's weakness stemmed not merely from technological inferiority, but from flaws in its political system. As Guo Songtao noted in his *Proposals on Maritime Defense*, "Western nations possess both root and branch; technology and science are but the branch, while political and institutional structures are the root" (Guo, 1983). Consequently, the Qing perception of the West evolved from an initial emphasis on *Yiji* (Western technology), to *Xixue* (Western learning), and ultimately to *Xizheng* (Western governance). At the same time, the *Zhongti* retreated from encompassing political institutions to merely moral and social ethics, leading late Qing scholars to increasingly question the viability of the *Zhongti Xiyong* paradigm.

As a response to the epistemological shifts of the late Qing period, the idea that *Xue Wu Zhong Xi* (knowledge should not be divided into Chinese and Western), which was articulated not only in intellectual discourse but also embodied in curricular design in Industrial and Higher Educational Institutions, played a key role in reshaping the knowledge structure of the time. In 1898, Xie Yuanhong, in the *Preface to the Library Catalog of Xinghua Wenzheng Academy*, wrote: 'Scholarship today has become deeply fragmented. In the past, I was puzzled by the incompatibility between the Han and Song schools of thought. Now, with increased contact between China and the world, and the proliferation of foreign languages, knowledge has been

divided into Chinese learning and Western learning… Yet I believe there should be no such distinction—only the selection of what is useful.' (Li & Zhang, 1982). Xie's remarks challenged the rigid dichotomy between Chinese and Western knowledge, advocating instead for a pragmatic and inclusive view of learning. He argued that knowledge should transcend cultural boundaries and that any form of learning beneficial to the state and society should be embraced.

6.1 The Rise of Industrial Academies: The Transmission of Vocational Skills and Practical Knowledge

The Western-style schools established during the Self-Strengthening Movement laid the foundation for China's specialized industrial education, shifting the educational focus from traditional moral instruction to vocational training. The Hundred Days' Reform further accelerated this development. By 1908, the Ministry of Education mandated that each prefecture establish at least one intermediate industrial school and each county one elementary industrial school within two years. This policy marked the beginning of a systematic effort to align education with national goals of strengthening industry and prosperity, and it played a pivotal role in transforming China's knowledge structure from a Confucian-centered model to one oriented toward technical and practical skills.

Table 7. Curriculum Structure of Elementary Agricultural School Note. From (Qu & Tang, 1991).

Agriculture Courses	1.Soil, 2. Fertilizers, 3. Crops, 4. Agricultural Products Manufacturing, 5. Livestock, 6. Pests, 7. Climate, 8. Practicum. Subjects can be adjusted based on local conditions and combined to suit medium-level agricultural education.
Sericulture Courses	1.Silkworm Anatomy, 2. Physiology and Pathology, 3. Silkworm Rearing and Seed Production, 4. Silk Production, 5. Mulberry Tree Cultivation, 6. Climate, 7. General Principles of Agriculture, 8. Practicum.
Forestry Courses	1.Afforestation and Forest Protection, 2. Forest Utilization, 3. Forest Surveying and Civil Engineering, 4. Dendrometry and Forest Valuation, 5. Forest Management, 6. Climate, 7. General Principles of Agriculture, 8. Practicum.
Veterinary Medicine Courses	1.Physiology, 2. Pharmacology and Dispensing, 3. Farriery and Hoof Disease Treatment, 4. Internal and External Medicine, 5. Parasitology, 6. Animal Husbandry, 7. Hygiene, 8. Veterinary Epidemiology, 9. Obstetrics, 10. Necropsy, 11. Practicum.

The curriculum of industrial schools diverged significantly from the traditional educational system in two key ways. First, rather than centering on Confucian classics and historical texts, these institutions aimed to cultivate technically skilled professionals, emphasizing practical training and technical knowledge. Second, most courses incorporated hands-on practicum components, shifting the educational model from purely academic to vocational. This transformation not only enriched the curriculum but also accelerated the functional shift of education, laying the groundwork for the modern Chinese ideal of integrating learning with practical application.

6.2 The Establishment of the Imperial University of Peking: An Early Institution of Higher Education

As early as 1896, Minister Li Duanfen proposed the establishment of the Imperial University of Peking, and Sun Jianai subsequently drafted its institutional regulations, envisioning a disciplinary framework based on a ten-department structure. On 11 June 1898, as part of the Hundred Days' Reform, the Guangxu Emperor formally authorized the founding of the university. However, the Boxer Rebellion disrupted its initial planning and construction. It was not until 1901, when the Qing government launched the New Policies reform initiative, which prioritized the abolition of the imperial civil service examination and the establishment of modern schools, that the creation of the Imperial University of Peking, along with the formulation of its academic regulations, was reinstated as a key agenda item.

Table 8. First Curriculum Revision of the Imperial University of Peking Note. From (Peking University Archives Research Office, 1993)

Classical Studies	Chinese Classical Studies, Chinese Literature
Historical Studies	Chinese and Foreign History, Chinese and Foreign Geography
Natural Sciences	Chinese and Foreign Astronomy, Foreign Physics, Chemistry, Electricity, Mechanics, Optics
Political Science	Chinese and Foreign Political Science, Foreign Law, Finance, Diplomacy
Military Science	Foreign Military Strategy, Ordnance, Logistics, Military Medicine
Agricultural Science	Surveying, Cartography, Roads, Canals, Fortifications, Manufacturing, Ordnance and Explosives
Engineering	

The curriculum system of the Imperial University of Peking underwent two major revisions. The first took place in 1901, when Zhang Zhidong reorganized the university's academic disciplines into seven categories. Among these, only one was devoted to traditional Confucian classics and historiography, while the remaining five focused on subjects derived from Western knowledge. In table 8, this revised structure frequently employed comparative teaching methods—for instance, juxtaposing Chinese and foreign histories, astronomy, or political systems. Such design reflected the educational philosophy of *Xue Wu Zhong Xi*, aiming to modernize Chinese education by integrating Western disciplinary structures with indigenous knowledge traditions.

The second revision occurred in 1902, when Zhang Baixi formulated the *Imperially Authorized Regulations for the Imperial University of Peking* and the *Imperially Authorized Regulations for Higher Educational Institutions*. Drawing on the curricular model of Japanese universities, he further refined the university's programs into seven distinct disciplines, thereby advancing the institutionalization of academic subjects. This reform marked a critical step toward the formal establishment of a modern higher education system in China.

Table 9. Second Curriculum Revision of the Imperial University of Peking Note. From (Zhang, 1986)

Political Science	Political Science, Law
Literature	Classical Studies, History, Philosophy, Various Philosophers, Anecdotal Studies, Literature, Foreign Languages and Literature
Natural Sciences	Astronomy, Geology, Advanced Mathematics, Chemistry, Physics, Zoology and Botany
Agriculture	Agronomy, Agricultural Chemistry, Forestry, Veterinary Medicine
Engineering	Civil Engineering, Mechanical Engineering, Naval Architecture, Ordnance Engineering, Electrical Engineering, Architecture, Applied Chemistry, Mining and Metallurgy
Commerce	Accounting, Industrial Manufacturing, Business Languages, Commercial Law, Business History, Commercial Geography
Medicine	Medicine, Pharmacy

As shown in Table 9, all seven disciplines established at the Imperial University of Peking were modeled on Western academic categories, while traditional Chinese subjects such as Confucian classics and historical studies were placed under the category of literature. This arrangement disrupted the traditional hierarchical structure of knowledge, reflecting an effort to reconcile classical learning with modern disciplinary frameworks within the educational content.

*Table 10. F*irst Curriculum Revision of the Imperial University of Peking

Type of School	Discipline	Courses Offered
Higher School	Political Studies	Ethics, Economics, Philosophical Texts, Rhetoric, Mathematics, Chinese and Foreign History, Chinese and Western Geography, Foreign Languages, Physics, Logic, Law, Finance, Physical Education
	Liberal Arts	Ethics, Chinese and Foreign History, Foreign Literature, Mathematics, Physics, Chemistry, Botany, Geology and Mineralogy, Drawing, Physical Education

In 1902, Zhang Baixi, in the *Imperially Sanctioned Regulations for Higher Learning Institutions*, clearly divided institutions of higher learning into two categories: the Department of Politics and the Department of Arts. The former encompassed instruction in ethics, classics, the Hundred Schools of Thought, rhetoric and literary composition, Chinese and foreign histories, foreign languages, logic, jurisprudence, financial studies, physical training, mathematics, geography, and physics. The latter offered teachings in the *Analects*, Chinese and foreign literatures, foreign languages, physical education, mathematics, physics, chemistry, botany and zoology, geology and mineralogy, and drawing. Such curricular arrangements broke down the rigid boundaries between Chinese and Western subjects, embodying the educational philosophy that knowledge should not be judged by its origin, whether Chinese or Western, but by its practical utility.

In 1912, the government issued a new directive stating that universities would no longer be structured around Confucian classics and historical studies. Building upon Zhang Baixi's seven-discipline framework, Cai Yuanpei reorganized university curricula into seven major academic divisions: humanities, sciences, law, commerce, medicine, agriculture, and engineering. These initiatives marked the emergence of the prototype of China's modern school system. For the first time, they provided a systematically planned educational framework spanning from primary to higher education, laying the foundation for the early Republican China educational system and providing an institutional model for the contemporary "6-3-3" structure. Meanwhile, the reforms explicitly established specialized schools in agriculture, industry, commerce, and medicine, pioneering vocational and technical education, and providing the historical origins for today's secondary vocational, higher vocational, and application-oriented undergraduate programs. More importantly, these regulations promoted the nationalization and legalization of education, shifting the system from privately managed academies to state-led schools and creating a historical precedent for the Ministry of Education's unified governance and the promulgation of formal educational regulations.

7. Conclusion

A critical analysis of educational institutions across three pivotal stages of the late Qing era highlights the gradual transformation of China's traditional knowledge structures in the face of Western influence. This evolution can be categorized into three main stages: initially, the parallel operation of Chinese and Western knowledge systems; subsequently, the reorganization of traditional Chinese scholarship within Western disciplinary frameworks; and finally, the progressive integration and mutual adaptation of both systems. This process not only maps the path of educational reform but also demonstrates the intricate shift of China's knowledge system from a classical to a modern form.

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