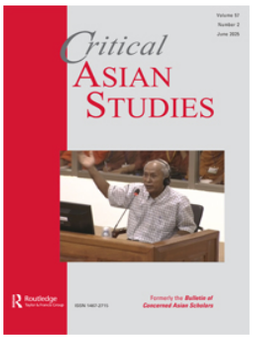

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The Rise and Fall of Factory-based Schools in China

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ABSTRACT

After 1949, the Chinese government built a massive adult education system—based largely in factories and rural communes—that at times enrolled more students than the entire regular education system for youth. This paper focuses on one part of this system—adult schools inside factories. These schools provided workers with education and technical training, but were also designed to train workers to replace incumbent factory managers, diminish class differences based on education, and reduce the gap between those who labored with their minds and those who labored with their hands. Mao Zedong emphasized these radical goals as he pushed for the rapid expansion of factory-based schools, especially during the Great Leap Forward and the Cultural Revolution. Although these radical goals were eventually abandoned, state-owned factories continued to run schools for employees well into the post-Mao era, until the industrial restructuring process that began in the 1990s. This paper considers the causes of the rise and fall of China's factory-based education system based on official publications and interviews with factory leaders and workers, including many who participated in these schools.

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China; adult education; Mao Zedong era; factory-based schools; Cultural Revolution

Introduction

On July 21, 1968, in the midst of the Cultural Revolution, Mao Zedong proposed a radical experiment that would upend how China's colleges and universities recruited students:

> We must still run colleges. Here I must stress that we should still run physics and engineering colleges, but the period of schooling ought to be shortened, the education revolutionized, proletarian politics put in command, and the way of training technical personnel from the ranks of the workers advocated by the Shanghai Machine Tool Factory adopted. Students must be selected from workers and peasants with practical experience, and after their study at school for several years they should return to practical production.[1]

Two years before Mao's pronouncement, college entrance examinations had been suspended, and following his pronouncement these were eliminated. This profoundly impacted China's secondary school system, which had been organized around training students to pass the exams, with the ultimate prize being a coveted spot in a top

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[1]Mao Zedong cited in: 中国共产党大事记 1968 年（*Zhōngguó gòngchǎndǎng dàshìjì 1968 nián*, Major Events of the Communist Party of China in 1968). Accessed March 25, 2025: http://cpc.people.com.cn/GB/64162/64164/4416085.html.

university. Under the new policies, which became known as taking the "July 21 Road," there was no direct path from middle school to college. Instead, all middle school graduates went to work, some in factories or other urban work units, and others in rural collectives. After two years, they became eligible to be recommended for further education. Under this recommendation system, a relatively small number of young people were selected by their urban work units or village collectives to attend regular colleges and universities. A far larger number, however, took classes in rapidly expanding schools connected to their own workplaces, including what became known as "July 21 workers universities" in factories.[2]

The Chinese Communist Party (CCP) leadership had long had an ambivalent attitude towards the entrance examination system. On the one hand, these examinations were a cornerstone of the country's education system, regulating entrance not only into college, but also into the upper grades of primary school, lower middle school, and upper middle school.[3] The exam system provided a centralized, rationalized, and in some ways fair and impartial means to select talented young people for higher levels of education. On the other hand, this system guaranteed that the classrooms of universities and the best middle schools would continue to be filled with children from old educated elite families, who were far better prepared for examination competition than were children of workers and peasants. The system, thus, facilitated social reproduction, contradicting the CCP's declared commitment to egalitarian class leveling, and hampering its efforts to train young people of more humble class origins, who were considered to be more politically reliable, to take over positions in the top echelons of society.

Most scholarship about the elimination of the college entrance exams has focused on the impact this had on regular colleges and universities.[4] This paper focuses on the impact on factories. I place this radical experiment in the context of a longer history: the rise and fall of factory-based education at all levels in the decades since the foundation of the PRC. The July 21 workers universities that were established during the Cultural Revolution (1966-1976) were part of a much larger system of adult education—both urban and rural—that was developed by the CCP after it took power in 1949. This system extended from literacy training and primary school to secondary and tertiary classes, and was massive: at some moments, there were more students enrolled in the adult education system than in all of China's regular primary, secondary, and tertiary schools combined.[5]

During the Mao and early post-Mao decades, the urban part of China's adult education system was largely based in factories and other workplaces. Despite the scale and importance of factory-based education in China, it has received relatively little scholarly attention. Factory-based schools have been largely overlooked in both scholarship about the Chinese education system and scholarship about Chinese industry. Presumably part of the reason for this neglect is that these schools do not fit into the traditional confines of either of these two fields, the first of which focuses on regular

[2]Andreas 2009. Also see, for example, *People's Daily* (1974c), *People's Daily* (1976a), and *People's Daily* (1976b).
[3]During this period, Chinese primary and secondary education was generally divided into lower primary school (grades 1-4), upper primary school (4-6), lower middle school (7-8), and upper middle school (9-12).
[4]Andreas 2009; Chen 1981; Pepper 1996.
[5]Of course, many adult education programs were part-time, while the regular education system for youth involved full-time study.

society-based schools, and the second of which is oriented by conventional understandings of industrial development and industrial relations.[6]

Even in the scholarship specifically about the history of China's adult education system, factory-based schools have not received adequate attention and many scholars have treated the Mao era in a relatively cursory fashion.[7] Moreover, it is common in the Chinese-language scholarship, as well as in much of the English-language scholarship, for scholars to dismiss the Cultural Revolution as a period of chaos when adult education was shut down. For instance, Guo (1996) asserts that during the entire decade, "adult education, like all other education, came to a standstill."[8]

The limited scholarship that has included significant discussion of factory-based adult schools can be divided into works published before and after the restructuring of industry that began in the 1990s, which resulted in many of these schools being closed and most of the rest being spun off by the enterprises that had sponsored them. Two works written during the earlier period, a dissertation by Vincent Tsing Ching Lin (1963) and a master's thesis by Dongyi Wang (1991), provide substantial information about factory-based schools as part of broader examinations of China's adult education system.[9] These accounts are largely matter of fact and descriptive, rather than evaluative. In contrast, retrospective studies published more recently are not only evaluative, but are highly polarized. Songmin Guo (2015) and Andrea Piazzaroli Longobardi (2018) extol the radical policies of the "July 21 Road," while Angyi Wang (2015) denounces the poor quality of these schools and argues that the idea of locating schools in factories was inappropriate.[10] This polarization reflects wider scholarly debates about the restructuring of Chinese industry between those who lament the elimination of the social functions that had been the responsibility of Chinese factories in the past and those who argue that these social functions had diverted industrial enterprises from focusing on production and efficiency.

In sum, the existing scholarship on factory-based schools in China leaves us with a discontinuous and disjointed history. It is not possible to understand the July 21 schools established during the Cultural Revolution without looking into the institutions that came before them, and it is just as problematic to skip over or simply denounce the education policies and practices of the Cultural Revolution. Because the existing scholarship is so fragmented, it fails to reveal not only the radical changes but also the profound continuities in China's adult education system and it is unable to adequately explain the shifts between more radical and more conventional approaches.

In this paper I examine the development of factory-based adult education programs in China during the five decades that followed 1949, from the 1950s through the early 2000s, and consider the reasons for their massive expansion and subsequent decline. A major part of this explanation is structural, as factory-based schools rose and fell along with the socialist work unit (*danwei*) system of industrial organization; these schools served

[6]This includes my own work; my first book, *Rise of the Red Engineers* (Andreas 2009), deals with tertiary education, and my second book, *Disenfranchised* (Andreas 2019), deals with factories and industrial relations, but in neither do I analyze factory-based education.

[7]Cf. Duke 1984; Guo 1996; Hunter and McKee Keehn 1985; Jin 1993; Li 1998; Min 1987; Sun 2008; Wang 2014; Yan 2019; Zhang and Stephens 1992; Zhou 2020.

[8]Guo 1996, 22.

[9]Lin 1963; Wang 1991.

[10]Guo 2015; Longobardi 2018; Wang 2015.

the work units with which they were affiliated and were dependent on these communities. Because the work unit system was based on permanent employment, investments in in-house training programs were attractive to both factory leaders and workers, and the decline and demise of the system of permanent employment with industrial restructuring led to the decay and dissolution of factory-based education programs.

Even during the decades that the work unit system existed, however, the development of these educational programs was highly volatile and had shifting objectives. To analyze the causes of these shifts, I identify distinct types of goals that inspired CCP leaders to develop factory-based education (Figure 1). Conventional goals were similar to those of adult education programs in many countries; these were not intended to alter existing social hierarchies. But radical goals harnessed factory education to an agenda of radical political and social change. China's factory-based education endeavors can also be divided into those designed to train a select group of elites and those designed to educate the masses.

At the elite level, factory-based education programs were designed to train a select group of workers to become enterprise leaders, managers, and technicians. To the extent that the aim was simply to promote workers to gradually supplement the ranks of incumbent factory leaders, this was a conventional endeavor. As a revolutionary party, however, the CCP intended to replace or subordinate existing leaders whom it did not trust, and for this purpose it trained politically sympathetic workers to take over these positions. It pursued this radical goal more aggressively at some moments than others, particularly when it took over factories from former owners and managers

	Conventional goals	**Radical goals**
Elite education	Train workers to supplement the ranks of incumbent factory leaders, managers, and technicians.	Train politically sympathetic workers to replace incumbent factory leaders, managers, and technicians.
Popular education	Raise the general education level of factory workers.	Eliminate social hierarchies based on education and diminish the differences between mental and manual labor.

Figure 1. Goals of factory-based education in China.

in the 1950s and when it replaced incumbent factory leaders (including veteran Communist Party officials) during the Cultural Revolution.

At the popular level, factory education programs were intended to raise the educational level of the broader workforce. This was in many ways a conventional goal, one which progressive managers of capitalist enterprises might also embrace under amenable conditions. The CCP, however, was committed to eliminating the differences between mental and manual labor. The socialization of private property in the means of production was only the first step toward achieving a classless society, which Marxist doctrine maintained would ultimately require closing the gap between mental and manual labor. This more radical goal could not be satisfied by simply providing workers at the bottom with a modicum of education; instead, it required eliminating the vast educational differences in factories and in society. Factory-based education was a critical element of this endeavor. This more sweeping agenda came to the fore during the Great Leap Forward and the Cultural Revolution, moments when Mao pursued more radical objectives.

My analysis in this paper spans the entire era in which Chinese enterprises were organized as work units, from the 1950s through the early 2000s. While factory-based school systems for adult employees is my main focus, I also examine the CCP's school system for children and young people and analyze how changes in both impacted hiring and promotion in factories.[11] The paper is divided into three chronological parts. The first part describes the development of factory-based education between the CCP's seizure of power in 1949 and the beginning of the Cultural Revolution in 1966. The second part analyzes the changes brought about by Mao's "July 21 Road" policies, which upended the regular education system and profoundly impacted workplace-based education as well as hiring and promotion practices in factories. The third part examines the reorganization of factory-based education following Mao's death in 1976 (and the subsequent restoration of the entrance exam system in the regular society-based school system) through the restructuring of industrial enterprises, which fundamentally altered the relationship between factories and their employees and undermined the foundations of factory-based school system by the early 2000s.

I rely on three types of primary sources: documentary materials, statistical data, and personal interviews, most of which is part of a broader study about industrial management and politics in Chinese factories from 1949 to the present.[12] The documentary materials include policy statements by political leaders, laws, and regulations, factory gazetteers, and contemporary periodicals and pamphlets. I found most of the statistical data in collections published in the 1980s, including historical numbers compiled during the Mao era.[13] Finally, I interviewed scores of workers and cadres who were employed in Chinese industrial workplaces at some point during the five decades examined in this paper, including many who taught or studied in factory-based adult schools.[14]

[11]In this paper I do not examine the primary and secondary schools that many enterprises built for the children of their employees.

[12]See Andreas 2019.

[13]Thomas Rawski (2000), a leading analyst of Chinese statistical data, has concluded that while data published during the Great Leap Forward is notoriously problematic, data published before or after those years (pre-1958 and post-1961) is reasonably accurate (including revised data for 1958 to 1961). See also Rawski 1976.

[14]For details about my interview methods and a list of the people interviewed, see Andreas 2019. I assigned pseudonyms to all my interviewees. Factory-based education was an important element of my broader study; of the 128 workers and

Developing two parallel school systems (1949-1966)

When the CCP took control of Chinese factories in the late 1940s and early 1950s, some seventy percent of workers were illiterate and others only had a few years of education.[15] The majority had been recruited from villages, where there were few schools, and even working class children in urban areas seldom attended more than a few years of primary school. Access to education was limited by the exclusive nature of the school system, which was organized as a steep pyramid, with admission at each step determined by entrance examination scores as well as by the means to pay tuition and other expenses.

During the 1950s and early 1960s, the CCP greatly expanded the country's public school system. Particular attention was given to expanding access to basic education, especially in rural areas, and by 1965 four times as many children were attending primary schools as in 1949 and eleven times as many children were attending secondary schools. The number of students enrolled in higher education grew by six times (Table 1). Private schools were brought into the public system and tuition was kept very low, with no tuition at the college level.[16] The CCP also built, largely from scratch, an adult education system based in workplaces. These policies greatly enhanced access to education, yet contributed to the continuation of social stratification.

Upper middle schools, colleges, and universities only accommodated very small proportions of graduates from lower-level schools, and access continued to be determined by highly competitive entrance examinations. Moreover, key middle schools were established to prepare the most successful students for the national college entrance exam, while most students were funneled into general and vocational schools. At the top, colleges and universities were also steeply stratified, with more resources directed to the most elite schools. The system was designed to provide basic education for all children, while selecting a relative handful for elite training. The more elite schools were largely populated by students from the old educated elite classes.[17]

Thus, the primary and secondary education system continued to function as a central mechanism for social stratification and class reproduction, as it had before 1949. In fact, the stratifying role of formal education was enhanced as the new regime expanded the education system, centralized entrance examinations, nationalized all enterprises and other places of employment, and rationalized employment and promotion policies, in part based on educational qualifications.

As noted above, the CCP built a parallel adult education system for those unable to test into the secondary and tertiary levels of the regular system. Based largely in workplaces, this system was primarily remedial and vocational. By the mid-1950s, tens of millions of urban and rural adults were taking literacy classes and millions more were enrolled in primary, secondary, and tertiary adult schools, many of which were

cadres I interviewed as part of that study, 71 provided information that was important for the analysis contained in this paper.

[15]Although Chinese data is far from perfect, it has widely been regarded as reasonably accurate. See Wang 1991, 57.

[16]Pepper 1996.

[17]Andreas 2009.

Table 1. Regular Education in China, 1949-1983 (Enrollment in thousands).

Year	Tertiary schools	Secondary schools	Primary schools	Kindergartens	Total
1949	117	1,268	23,683		25,068
1950	137	1,566	24,391	140	26,234
1951	153	1,964	28,924	382	31,423
1952	191	3,145	43,154	421	46,911
1953	212	3,629	51,100	430	55,371
1954	253	4,246	51,164	481	56,144
1955	288	4,473	51,218	562	56,541
1956	403	6,009	53,126	1,081	60,619
1957	441	7,081	63,466	29,501	100,489
1958	660	11,198	64,283	21,722	96,863
1959	812	12,903	86,403	29,331	129,449
1960	962	14,873	91,179	2,896	109,910
1961	947	10,344	93,791	1,446	106,528
1962	830	8,335	75,786	1,472	86,423
1963	750	8,378	69,239	1,589	79,956
1964	685	10,195	71,575	1,713	84,168
1965	674	14,318	92,945		107,937
1966	534	12,968	116,209		129,711
1967	409	12,545	103,417		116,371
1968	259	14,051	102,243		116,551
1969	109	20,253	100,363		120,725
1970	48	26,483	100,668		127,199
1971	83	31,494	105,280		136,857
1972	194	36,167	112,112		148,743
1973	314	34,947	125,292	2,450	163,003
1974	430	37,137	135,704	2,638	175,909
1975	501	45,368	144,814	6,200	196,883
1976	565	59,055	150,941	13,955	224,516
1977	625	68,488	146,176	8,968	224,257
1978	856	66,372	146,240	7,877	221,345
1979	1,020	60,249	146,629	8,792	216,690
1980	1,144	56,778	146,270	11,508	215,700
1981	1,279	50,146	143,328	10,562	205,315
1982	1,154	47,028	139,720	11,131	199,033
1983	1,207	46,347	135,780	11,403	194,737

Source: Department of Planning, Ministry of Education 1985, 27-28

established by factories. Then, during the Great Leap Forward (1958-1960), participation in the workplace-based adult system surged, with enrollment nearly reaching that of the regular system (which was also growing rapidly). The numbers dropped sharply during the post-Leap crisis, but gradually recovered in the early 1960s (Table 2).

These parallel systems were described as "walking on two legs," and this approach was initially endorsed by party leaders, including Mao. In many ways, this approach was consistent with the two broad conventional goals of CCP education policies: elite training to produce scientists, engineers, and other specialists with the expertise required to help rapidly modernize the country, and mass education to quickly elevate the educational level of the entire population.

The development of distinct elite and popular systems, however, was at odds with the party's egalitarian principles and class-leveling goals, as children of working class and peasant families continued to be slotted into manual labor positions and children of more educated families into positions that required higher levels of education. Even factory-based schools faced this conundrum.

Table 2. Adult Education in China, 1949-1983 (Enrollment in thousands).

Year	Tertiary schools	Secondary schools	Primary schools	Literacy classes	Total
1949	0.1			13,268	
1950	0.4			23,138	23,138
1951	2			51,080	51,082
1952	4	256	1,375	31,904	33,539
1953	10	405	1,523	18,810	20,748
1954	13	946	2,088	25,047	28,094
1955	16	1,362	4,538	79,329	85,245
1956	64	2,799	5,195	51,426	59,484
1957	76	3,302	6,267	52,352	61,997
1958	150	5,643	26,000	90,000	121,793
1959	300	11,162	55,000		66,462
1960	793	19,740	76,160		96,693
1961	410	3,760	3,200		7,370
1962	404	3,480	2,052		5,936
1963	418	5,581	4,043	5,871	15,913
1964	435	8,480	7,906	6,299	23,120
1965	413	8,540	8,237		17,190
1966					
1967					
1968					
1969					
1970					
1971					
1972	17	810	18,248		19,075
1973	146	1,235	32,979	60,000	94,360
1974	214	2,396	46,976	33,045	82,631
1975	729	3,858	95,915	29,231	129,733
1976	2,629	3,252	127,302	30,521	163,704
1977	1,739	2,359	96,407	23,926	124,431
1978	1,408	2,989	46,605	18,077	69,079
1979	1,722	6,105	4,870	16,363	29,060
1980	1,554	8,045	4,252	12,209	26,060
1981	1,346	8,207	3,523	6,213	19,289
1982	1,173	10,804	3,606	3,960	19,543
1983	1,128	9,748	2,885	5,288	19,069

Source: Department of Planning, Ministry of Education 1985, 4

(NOTE) Despite the lack of data for the years 1966 to 1971, other sources indicate that adult schools functioned during this period. For instance, one source reported that forty-nine July 21 workers universities were established in Shanghai alone during the years 1968 to 1970 (Wang 2015, 98).

Building China's factory-based school system

The factory-based school system was supposed to train a select group of workers to become managers and technicians while raising the education level of the workforce as a whole. Both goals were connected to, and made possible by, the CCP's restructuring of industrial employment. As the new regime transformed factories into socialist work units, it turned unstable jobs into permanent positions and precarious workers into permanent work unit members. This gave both factory leaders and individual workers reasons to value workplace training programs designed to give workers more responsibility for factory affairs.

Formal and informal factory-based education

The formal adult education system, like the regular school system, was composed of a pyramid-like structure with basic literacy, primary, secondary, and tertiary levels. By

1958, some ninety million adults were enrolled in literacy programs and by 1960 over seventy-six million were enrolled in adult primary schools, almost two million in adult secondary schools, and 793,000 in adult universities (Table 2). Many of these schools and programs were based in industrial enterprises. Factories began operating colleges for employees in 1956 and by 1958 about 150,000 workers and staff members were taking classes in 265 workers' colleges. Factories also offered lower-level classes and by 1960 some seventeen million workers were enrolled in training programs.[18]

Some factory-based programs were part-time, offering evening classes, while others were full-time. All classes were free and workers received their salaries while attending classes. Factory-based schools provided formal degrees, which allowed workers to continue to higher grade levels. They typically offered the same basic curricula as regular schools, while also providing vocational training. Wang Miaoxin, who began working in a Beijing electronics factory in 1956, described the formal program instituted by his enterprise. "The factory ran many night schools, from primary school to university." Workers, he explained, had to take a test to get into the middle school program. "They gave you formal degrees, just like regular schools. … I went to high school classes; I chose to study math and literature."[19]

When the Communist Party took power, it dispatched a small number of party cadres to individual factories. Because party leaders did not trust the old factory managers, it recruited and trained sympathetic and capable workers and placed them in positions of leadership at all levels. Many early party publications focused on concrete problems involved with training workers to take on managerial responsibilities so they could oversee incumbent managerial and technical leaders.[20]

This emphasis on what the party called "red over expert" continued through the early decades of the PRC. Newly hired college graduates (most of whom continued to be from old elite families) were assigned technical work, but were not placed in leadership positions, which were reserved for workers or demobilized military officers (who were typically of peasant origin).[21] "The cadres were all promoted from among the workers," Chen Zhongfa, who had been a shift leader in a textile mill, told me in an interview. "They used working class people, people without education, to manage people with education."[22] Deng Zhiwen, who worked in an electronics factory, echoed this, explaining, "university graduates became technical employees; they never became workshop directors. They were not assigned to positions where they managed people."[23] By the late 1950s, as the CCP consolidated its control over factories, it moved even more aggressively to place sympathetic workers in positions of power in order to further marginalize and subordinate the leaders and technical personnel inherited from the old regime. This made factory schools even more important.

When new factory leaders organized schools to train workers, the most difficult problem they faced was finding qualified teachers. They brought in middle and even primary school students as volunteers to teach adult literacy classes, and used factory

[18]Wang 1991, 41, 57.
[19]Interviewee A2.
[20]Anshan Steel Company Education Department 1955; Cheng Ze 1954; Northeast People's Publishing House 1953.
[21]Andreas 2019.
[22]Interviewee H25.
[23]Interviewee B5.

engineers and other technical employees to teach classes. They also enlisted regular workers who had relatively high levels of education. When Zheng Chengyi started working in a Beijing electronics factory in 1956, he had an upper middle school diploma, and he soon began taking classes after work in the factory's recently established university. Given his relatively high level of education, Zheng was asked to teach primary school classes in the evenings for workers recruited from nearby villages. I asked Zheng if he was paid. "No!" he replied, "there was not that kind of thinking then."

In addition to formal schools, which enrolled only a minority of workers, factories also organized popular education campaigns and short term programs that encompassed the entire workforce. During the early years after the new regime came to power in 1949, articles about popular education in factories emphasized the practical importance of increasing the level of literacy and basic educational knowledge among the workforce. Over the course of the next decade, however, publications increasingly emphasized eliminating the differences between mental and manual labor. During the Great Leap Forward, Mao pushed for more radical education policies, declaring in 1958 that "education must be combined with labor."[24] He also insisted that "schools should operate factories and factories should operate schools."[25]

The Great Leap Forward was intended to bring about a massive learning boom. A wave of articles about factory-based schools stressed the importance of elevating the educational level of the entire workforce, with authors criticizing the assumption that culture was an elite domain and scornfully criticizing the maxim attributed to Mencius that "Those who labor with their minds govern others, while those who labor with their strength are governed by others."[26]

All workers were expected to join in some kind of study and classes were scheduled on a rotating basis so that all workers could participate. "Workers had to participate in study," Wang Miaoxin recounted. "Three times a week, two hours a day. They had to go, but they were also willing. You were also expected to have a hobby—sports, or literature and art, or writing. If you didn't study and have a hobby, you were considered backwards, not active."[27]

With the economic collapse of the Great Leap Forward in 1960, however, the learning boom that had accompanied it also collapsed and classes in many factories were abruptly cancelled. Nevertheless, adult education classes soon resumed, albeit on a smaller scale, and gradually expanded until 1966 (Table 2).

Radical education policies of the Cultural Revolution (1966-1976)

The Cultural Revolution began in 1966 with the suspension of entrance examinations and the closing of all schools. Many, especially at higher levels, remained closed for years, seriously setting back educational goals for individuals and for the country. By the end of the Cultural Revolution in 1976, however, both the regular and the adult systems had been massively expanded (Tables 1 and 2).

[24]Mao Zedong 1958.
[25]Cited in Wu 2022.
[26]East China Normal University 1958; Liu Jie 1960; People's Education Publishing House 1959; Zhengzhou Textile Machinery Factory 1958.
[27]Interviewee A2.

At the outset of the Cultural Revolution, Mao harshly criticized the existing education system as elitist and called for a "revolution in education."[28] Although primary and secondary schools reopened the following year, Mao did not come up with a plan for reorganizing tertiary education until he issued his July 21, 1968 directive, inspired by a report about engineering training classes for workers at the Shanghai Machine Tool Factory.[29] What subsequently became known as the "July 21 Road" entailed a radical break with previous education policies and also transformed hiring and promotion practices.

The regular education system during the Cultural Revolution

From 1966 to 1976, entrance examinations at all levels of the regular education system were eliminated. The educational hierarchy—key schools for those with top exam scores and general education and vocational schools for those who did not test as well—was also eliminated. All schools were formally designated to be of equal status, and teaching personnel and other resources were redistributed in accordance with this agenda.

The July 21 Road policies were intended to reshape the regular education system so that instead of resembling a pyramid it would be flatter and much larger. All children, both rural and urban, were supposed to complete middle school, which meant nine or ten years of education.[30] Between 1965 and 1976, the number of children attending primary schools increased from about ninety-three million to over 150 million, making primary school nearly universal. Universal secondary school education was only partially accomplished, but enrollment numbers grew rapidly, from approximately fourteen million in 1965 to nearly sixty million in 1976 (Table 1).

Given the radical egalitarian ethos of the Cultural Revolution, reopening regular colleges and universities was a much more controversial endeavor, as there was no possibility of making tertiary education universal. Although some colleges and universities began to reopen in 1970, by 1976 enrollment had only reached 565,000, less than the 1965 figure of 674,000 (Table 1). To replace entrance examinations, a recommendation system was developed in which quotas were assigned to urban workplaces, rural communes, and military units to recommend worker-peasant-soldier students. Young people with at least two years of manual labor experience were eligible for recommendation; if accepted as students, they were expected to return to their workplaces after graduation. Degree programs were cut from six to three years, and colleges and universities developed a variety of shorter training programs.[31] Curricula were revised to put greater emphasis on combining theory with practice and on practical learning. Schools sent teachers and students to learn in factories, and many schools built their own small factories.[32]

Hiring and promotion practices also changed radically. Before the Cultural Revolution, factories had received a steady stream of new employees with advanced education and technical training from universities, vocational colleges, and vocational secondary

[28]Andreas 2009, 58.
[29]Shi Ke 2019.
[30]Before the Cultural Revolution, completing upper middle school had required twelve years of schooling.
[31]Andreas 2009; Pepper 1996.
[32]Andreas 2009. Also see *People's Daily* (1974a); *People's Daily* (1974b).

schools. Now this stream was cut off. Instead, virtually all managerial, political, and technical positions had to be filled from within by promoting workers.[33] In order to provide workers with more advanced education and technical training, factory leaders had two choices. On the one hand, they could recommend young workers for admission to colleges and universities, after which these workers were expected to return to their work units. However, the quotas that factory leaders received for recommending students were small. On the other hand, they could further develop their own schools. Under these conditions, the number and size of factory-based schools, including July 21 workers universities, multiplied and became much larger.

Factory-based schools during the Cultural Revolution

During the later years of the Cultural Revolution, the adult education system grew much more rapidly than did the regular education system for youth. This growth reflected not only a radical push to popularize education, but also a need to provide remedial training for new hires who had missed out on months or years of primary and secondary school education due to Cultural Revolution disruptions. Between 1965 and 1976, nationwide enrollment in the public school system grew from approximately 108 million to over 224 million, while enrolment in adult education programs increased from 17.2 million to 163.7 million.[34] By 1976, over thirty million workers and peasants were enrolled in literacy programs, while over 130 million more were taking classes in adult primary and secondary schools (Tables 1 and 2).

The most unprecedented growth in adult education was at the tertiary level. Although by 1976 the number of students in regular colleges and universities had reached 565,000 (close to the pre-Cultural Revolution number), nearly five times that number (2.6 million) were enrolled in adult tertiary schools (Tables 1 and 2). This included 1,485,000 workers who were studying in classes organized by 33,374 factory-based July 21 universities.[35] Because factory leaders were being pushed to create these schools rapidly, some were rudimentary, but the trend was sharply upward.

The rapid growth of factory-based schools at all levels, and July 21 universities in particular, was due to wide support from above and below. At the top, the drive to build factory-based schools was supported by both the more conservative wing of the CCP leadership, led by Zhou Enlai and Deng Xiaoping, and the more radical wing, led by the so-called Gang of Four. The former were most concerned with conventional goals, as they sought to rejuvenate higher education, especially technical education, in order to rebuild China's corps of technical experts in the wake of the Cultural Revolution. "After Deng Xiaoping came back [in 1973], he wanted to improve education," explained Wang Miaoxin, who had been a conservative stalwart during the Cultural Revolution. "He promoted production, economic accounting, and cultivating talent (*péiyǎng réncái*)." Wang followed politics closely and he believed Deng's initiative was not his alone. "Zhou Enlai and Mao Zedong also agreed," he said.[36]

[33]A small number of new cadres were demobilized military officers of village origins.
[34]The enrollment numbers in regular and adult schools are not entirely comparable, as many adults only took part-time or short-term classes.
[35]China Education Yearbook Editorial Department 1984.
[36]Interviewee A2.

Members of the radical wing of the CCP were particularly strong proponents of factory-based schools, which they saw as a means of advancing their political and social goals. Both the pre-1949 factory leaders and engineering staff and the new leaders who had taken the reins after 1949 were targets of the radical wing of the party and rebel workers during the early upheavals of the Cultural Revolution. Radical leaders saw factory-based schools as sites for training a new generation of working class leaders to replace distrusted incumbents. In terms of popular education, they were the foremost proponents of Mao's vision of diminishing the differences between mental and manual labor, a goal stressed in a wave of publications promoting the July 21 university model.[37] The fundamental purpose of educational programs for workers and peasants, from this perspective, was to break "the monopoly of culture and science by the privileged few."[38]

At the base, factory leaders had their own compelling reasons to develop the capacity to train workers in technical fields. July 21 universities grew especially rapidly in 1975 and 1976. One reason for this growth was that factory leaders were disappointed that many of the workers they had recommended to attend regular colleges and universities had failed to return. As factory leaders could no longer rely on the regular education system to send new technical personnel to meet their need for technical expertise, they invested in their own in-house training programs.[39]

As a result of July 21 Road policies, the differences between regular and workplace-based tertiary schools diminished. Both systems trained worker-peasant-soldier students recommended by their workplaces. As noted above, regular colleges and universities eliminated postgraduate education, cut the years required for an undergraduate degree from six to three years, and offered shorter-term training programs. Moreover, all schools were expected to combine theory with practice and send teachers and students to factories and farms to learn from and teach workers and peasants. For all these reasons regular universities were no longer able to offer highly elite education.[40] At the same time, factories took advantage of increased resources and a more educated workforce to expand and improve factory-based tertiary education. In both the regular and factory-based systems, much of the curricula was highly politicized, especially during periods when and in places where pro-Mao radicals held sway. Nevertheless, the main purpose of factory schools continued to be the provision of conventional education and technical training.

Some workers who went to July 21 universities insisted that they were as good or better than regular universities. Zhu Longwen, who started working in a railroad car factory after finishing high school in 1975, recalled:

> They had technical classes in the evening. I attended those classes and studied drafting. The workshop recommended me because I was a new worker. Our workers university sent graduates back to the factory well-trained and ready to work. The graduates were better than university graduates. The drawings of the university students were not as good as

[37]People's Education Publishing House 1975; Shanghai People's Publishing House 1975; Shanghai People's Publishing House 1976; *People's Daily* 1974c; *People's Daily* 1976a; *People's Daily* 1976b.
[38]*Peking Review* 1975, 8.
[39]Cf. Jilin Province Gazetteer Compilation Committee 1996, 301.
[40]Andreas 2009; Bratton 1979; Chen 1981; Pepper 1996.

> ours. … After [the workers university] graduates returned, they played a big role; they helped the factory develop.[41]

Other workers were more circumspect when comparing July 21 universities to regular colleges and universities. Pan Wencai, who began working in an electronics plant after graduating from high school in 1969, recalled that his factory opened a July 21 university, which enrolled two or three hundred of the factory's four thousand workers. "The best students became teachers at the school, others became cadres, and some returned to the workshops as regular workers," he said. Many of those who attended the school, however, only had a lower middle school education. In his assessment, "It was not really at a university level, it was more like a high school." While Pan thought the school did not measure up to university standards, he did appreciate the value of the training programs the factory developed:

> Starting in the mid-1970s, the workshops began organizing technology classes. The purpose was to raise the workers' culture and technical understanding. They taught the theory behind the manufacturing processes we used. The classes were taught by the engineers and other technical staff. All the workers participated in rotating groups. Classes were held during working hours, two to three hours a week. Everyone was happy to participate. The younger workers had to take tests, the older workers didn't. This was a very good program; it was good for workers to understand the principals behind the production process."[42]

There was a great deal of variation among July 21 universities. Some programs consisted of evening classes, while others were half-work/half-study or full-time. Some adopted standard college curricula, while others used middle school materials. Some required workers to have upper middle school diplomas, while others accepted lower middle school diplomas or required some kind of admissions test. Many also offered other educational programs that were open to all employees. All programs were free and workers were paid to attend. Programs that involved release from work typically required a recommendation from a worker's workgroup or factory leaders. As with worker-peasant-soldier students who were recommended to attend regular colleges, the recommendation process inevitably reflected personal relations with co-workers and supervisors to some degree.[43]

Closing the July 21 Road after 1976

Soon after Mao's death on September 9, 1976, the CCP abandoned the radical class-leveling goals that had animated education policy during the Mao era and moved to fundamentally shift education priorities, curtailing popular education and expanding elite education. The entrance examination system was restored, closing the "July 21 Road."

Reforming the regular school system

Restoration of the entrance examinations in 1977 immediately transformed the regular education system, bringing back the selection logic and orientation of the pre-Cultural

[41]Interviewee W2.
[42]Interviewee A4.
[43]For a detailed discussion of how the recommendation system functioned from the perspective of a regular society-based university, see Andreas 2009, 188-210.

Revolution years. Restoring entrance exams was the very first item on Deng Xiaoping's post-Mao agenda. "This year," he declared in the spring of 1977:

> … we must make up our minds to restore direct enrollment of middle school graduates through entrance examinations and stop the practice of having the masses recommend candidates for admission to colleges and universities … it is necessary to establish key primary schools, key secondary schools, and key colleges and universities. It is necessary to bring together, through stiff examinations, the outstanding people in the key secondary schools and the key colleges and universities.[44]

Mao's flat education system was quickly reshaped into a steep pyramid, with entrance exams and key schools at every level, and preparation for the college entrance exams once again came to orient middle school education.[45]

Deng and the education reformers in his camp contended that popularization had gone too far, and that the base of the regular education system had expanded too rapidly, especially in the countryside. Resources, they figured, would be better spent on elite education. Over the next several years, from 1976 to 1983, kindergarten enrollment was cut from nearly fourteen million to just over 11.4 million, primary school enrollment was cut from over 150 million to 136 million, and secondary school enrollment was cut from over sixty-eight million in 1977 to a little over forty-six million by 1983. Meanwhile enrollment in regular colleges and universities more than doubled, from 565,000 to 1,207,000 (Table 1).

The gradual decline of factory-based schools

In the adult system, the same basic logic of curtailing popular education prevailed, but with somewhat different results. Between 1976 and 1983, the number of workers and peasants enrolled in literacy programs fell from over thirty million to just over five million, enrollment in adult primary schools fell from over 127 million to under three million, and enrollment in adult colleges and universities was cut by more than half, from more than 2.6 million to just over 1.1 million. However, enrollment in adult secondary schools almost tripled, from 3.3 million to 9.7 million. These contrasting numbers reflect the historical context as well as sharp changes in the policy goals of the post-Mao leadership.

Enrollment in the remedial adult education system (literacy programs and primary schools) declined partly due to the intensive efforts during the preceding years to develop basic education. Among workers, illiteracy had fallen from an estimated seventy percent in 1949 to about five percent in the years immediately after Mao's death. By 1976, most new factory hires had completed at least lower middle school in the greatly expanded regular school system.[46] While these accomplishments diminished enrollment at the lower levels of the adult system, they resulted in a spike in enrollment in adult upper-middle school programs, as large numbers of workers who had recently completed lower-middle school classes, either in regular schools or in factory-based schools, were now ready for the upper-middle school classes offered in factories (Tables 1 and 2).

[44]Deng 1984a, 53-54.
[45]Andreas 2004.
[46]Andreas 2004, 18; Wang 1991.

Despite this increased enrollment in factory-based upper-middle schools, the July 21 workers universities that had been established over the previous decade became a particular target of the post-Mao leadership. Between 1976 and 1978, their number was cut by almost ninety percent, from 33,374 to 3,477, and enrollment declined from 1,485,000 to 103,000.[47] This sharp contraction was in part connected with the systematic purge of party radicals that followed Mao's death. Radicals had been particularly strong in factories and had played an important role in the expansion of July 21 universities.[48] Rather than renounce the idea of industrial tertiary schools, CCP leaders under Deng derided the quality of these schools. In subsequent years, the system was consolidated and rebuilt, but with entirely conventional goals. This ideological shift was reflected in the renaming of the Bureau of Workers and Peasants Education to the Department of Adult Education. By 1986, enrollment had rebounded to 1.8 million, but there were far fewer schools—only 952 in the entire country—reflecting a shift to larger, more centralized schools.[49]

The schools that survived this shakeup became more standardized. At the tertiary level, the "July 21" moniker was dropped in 1984, and reorganized workers universities adopted a uniform curriculum similar to that in specialized colleges. In addition, workers were required to have upper-middle school diplomas and pass an entrance exam to enroll. These schools nevertheless retained some of the basic features of the factory-based tertiary schools of the Mao era. Workers continued to receive their salaries while enrolled in courses and were expected to return to their factories after completing their training. Moreover, these schools continued to receive most of their funding from the industrial enterprises with which they were associated, and they often used factory facilities and machinery for training.[50]

Nevertheless, the market reform agenda of Deng Xiaoping and other CCP leaders, and the priority they gave to elite education, did not bode well for workers universities or for factory-based education in general. Now that the exam system had been restored, the new leadership was much more interested in developing regular colleges and universities. Deng declared that although it was necessary to operate various types of schools, including adult schools and vocational schools, the central task had to be "concentrating forces and strengthening key colleges and universities and key primary and secondary schools, thus raising their level as quickly as possible."[51]

Although some factories continued to run their own schools, the prestige and importance of these schools steadily declined. Factory leaders had less incentive to develop factory-based education programs, as they were once again receiving graduates with technical training from secondary and tertiary schools. In the past, factory leaders had distrusted these graduates, who were disproportionally from families that were part of the pre-1949 educated elite, but after Deng's ascension go power the party leadership began to embrace intellectuals of all class origins.

In the early 1980s, the state began codifying formal education requirements for all cadres, whether technical, managerial, or political. This particularly impacted two

[47]Li 2020, 147-148; 261-263.
[48]Andreas 2019.
[49]Wang 1991, 43.
[50]For descriptions of workers' universities in the 1980s, see Duke 1984; Wang 1991, 60-68.
[51]Deng 1984b, 124.

groups of factory employees. One group was made up of worker-cadres (*yǐ gōng dài gàn*) who had been promoted in the 1960s and 1970s to positions that entailed responsibilities conventionally assigned to managerial, political, or technical cadres, but who had never been promoted to formal cadre status. They were now required to pass exams that determined whether they would be accorded formal cadre status or be demoted. The other group was made up of older employees, including veterans of the 1949 revolution and workers recruited in the 1950s, who had formal cadre status but did not have the educational credentials required by the new cadre policies. Members of the latter group were encouraged to retire, as the party now preferred cadres with different credentials. In 1980, Deng declared, "We should see to it that our cadres are younger on the average, better educated, and better qualified professionally."[52]

There was no longer a route from the shop floor to upper levels of management. Workers were still promoted to shop floor managerial positions, but generally not above the level of workshop director. With the pipeline from regular colleges and universities reopened, higher-level managerial, political, and technical positions were increasingly reserved for individuals with college degrees. While in the past, managerial and political leadership positions in Chinese factories had been dominated by revolutionary cadres with rural origins and workers promoted from below, these positions were now increasingly filled with college graduates. "Before 1980, most cadres were promoted workers. … From the workshop director to the factory head, to the party secretary, they all came from the workers," recalled Lin Zheyang, a small group leader in a roller bearing factory. "Now they require cadres to have degrees."[53]

The radical goals that had spurred the growth of factory-based education during the Mao era were no longer of interest to the post-Mao leadership. Not only were they no longer interested in replacing incumbent leaders and technicians with workers, they had also abandoned the communist vision of diminishing the differences between mental and manual labor. Slogans associated with this goal, such as requiring "cadres' participation in manual labor" and insisting on "workers' participation in management," disappeared after Mao's death. The handful of references in subsequent years typically involved criticism of the radical faction for having misused these slogans during the Cultural Revolution.[54]

Immediately after Mao's death, CCP leaders moved to elevate the respect, social status, and compensation accorded to those who performed mental labor. "The erroneous attitude of not respecting intellectuals must be opposed," Deng declared in 1977, adding, "All work, be it mental or manual, is labor."[55] Differences in material compensation grew slowly at first, but took off in the late 1990s, with privatization and industrial restructuring. "The wage levels of key management and technical positions and positions that require high quality and scarce talents," declared a 2001 State Council directive, "must be raised."[56] The highly condensed range of wages and benefits of the past grew immensely. By the early years of the new century, the industrial labor force had become highly differentiated, not only in terms of compensation but also in terms of

[52]Deng 1984c, 308.
[53]Interviewee H15.
[54]Andreas and Liang (forthcoming).
[55]Deng 1984a, 54.
[56]State Council of the PRC 2001.

the social distance between higher-level managers and engineers who occupied enterprise offices and workers on the shop floor.

Industrial restructuring and the divestment of factory-based schools

The restructuring of industry that began in the mid-1990s, which entailed dismantling the work unit system, eliminating permanent job tenure, and laying off tens of millions of workers, brought about the definitive decline of factory-based education. As part of restructuring, industrial enterprises were pushed to spin off units that were not part of their core profit-making endeavors. In order to create a "modern enterprise system," a 2003 State Council directive declared, it was necessary to "separate enterprises from their social functions."[57] These included medical clinics and hospitals, housing blocks, primary and secondary schools, and schools for employees.[58] By 2005, Chinese authorities were insisting that factory-based tertiary schools be divorced from their sponsoring institutions and change their missions so that they aligned with those of regular schools.[59] A few large industrial enterprises and industrial bureaus continued to operate workers schools, but the number of employees enrolled was a tiny fraction of past numbers and continued to fall.[60]

In the past, when industrial work units had been communities of lifelong members, it made sense for factory leaders to be highly interested in educating and training their employees, but after industrial restructuring, enterprise leaders had much less reason to invest in educating their labor force. Deng Zhiwen, who had attended middle school classes organized by his electronics factory in the 1970s, wistfully contrasted the current situation with the situation when he joined the factory. "Back then, we all participated in classes. … The purpose was to raise the education level of all the workers," he recalled. "Today, study is everyone's private business."[61] The marketization of employment and adult education developed hand in hand. As jobs became more precarious, employees became more mobile. Enterprises had little commitment to their current employees, many of whom would be laid off if orders declined and most of whom were not expected to stick around long in any case.

As factory-based schools were severed from the factories that had established and supported them, some were closed, while others were taken over by local municipalities. Many were eventually privatized and all were expected to become "market-oriented," which often meant being converted into profit-making, tuition-extracting enterprises.[62] Many young people now find that attending some kind of vocational school is necessary to get an industrial job (or even temporary employment), but these schools are widely scorned for being more concerned about tuition than training. "Before, the evening university was free," recalled Zheng Chengyi, who had taken classes in his factory in the

[57]State Council of the PRC 2003.
[58]Oi 2004.
[59]Sohu.com 2005.
[60]By 2022, the number of individuals enrolled in workers' colleges had declined to 143,705 and most were in short cycle courses. While enrollment in adult technical education had expanded, by then it was mainly organized in various types of correspondence schools, most of which were private and for-profit businesses. See Ministry of Education of the PRC 2023.
[61]Interviewee B5.
[62]Li 2020.

1950s. "Now they want money. They are private. Not only do they want money, that's the main reason they exist."[63]

By the early 2000s, factory leaders had grown accustomed to finding new employees with various levels of educational and technical qualifications in the labor market, which had become highly differentiated, with distinct steams of potential employees produced by different types and levels of schools. By then, virtually all higher-level managerial and technical personnel were recruited from colleges and universities, and there was little reason to consider training workers for these positions. The hierarchy of positions within factories had become much steeper and the gap between those at the bottom and those at the top had grown to unprecedented proportions, in terms of compensation, working conditions, status, and social interaction.

Conclusion

For nearly half a century, from the 1950s through the early 2000s, Chinese factories operated a system of adult education that was remarkable in terms of its scale as well as its ambitions. Despite the importance of the system, however, it has received relatively little attention from scholars. Moreover, the existing scholarship is fragmented, with scholars examining different time periods, and some focusing on conventional characteristics of China's factory-based education system, while others have focused on the moments when more radical policies were implemented. Thus, the existing scholarship has provided only partial and one-sided understandings of the history of these schools.

In this paper I have offered a more comprehensive history, examining the entire work unit era, from the 1950s through the 1990s, during which industrial enterprises were expected to provide education for their employees. I have looked at both the conventional and radical aspects of these programs.

The main content of the training offered by factory-based schools during the entire era was always quite conventional, in that it was largely the same as the content offered in the state education system for children and young people, with added vocational components. The goals of these schools were also, for the most part, quite conventional, with elite education programs designed to train workers to supplement the ranks of factory leaders and engineers, and popular education programs designed to eliminate illiteracy and raise the cultural and technical level of the wider workforce. During the Mao era, however, adult education in factories was at times animated by more radical goals.

At the elite level, during two periods—during the 1950s and again during the Cultural Revolution—factory classes trained workers not simply to supplement incumbent leaders, but to replace them. Starting in 1949, the CCP used intensive factory-based classes to train sympathetic workers to help the party take over the administration of factories from old regime capitalists and managers, while during the Cultural Revolution radical party leaders used these classes to train a new generation of rebel workers to replace and supervise the earlier generation of party leaders who had taken over factory administration in the 1950s.

In terms of popular education, although the content of classes remained largely conventional, radical impulses during the Great Leap Forward and the Cultural Revolution

[63]Interviewee A1.

pushed enrollment to unprecedented levels. Mao and his radical followers harshly criticized the regular education system, and the examination system in particular, for reproducing social hierarchies based on educational qualifications. Thus, the aim of the massive expansion of factory-based schools during these periods was driven by an urgent imperative to diminish the differences between mental and manual labor and end the monopoly on knowledge held by educated elites.

Factory-based schools survived the purge of the radical faction that followed Mao's death in 1976, but the radical goals of the project did not. Deng Xiaoping and his supporters were not interested in the wholesale replacement of factory leaders or in eliminating social hierarchies based on education. Nevertheless, for the next two decades Chinese factories continued to operate a robust system of schools, as factory leaders continued to appreciate the conventional education and training that these schools provided for employees.

It was the industrial restructuring that began in the 1990s—which did away with the work unit system—that led to the demise of China's factory-based education system. Because it was based on permanent employment, the work unit system gave factory leaders a strong incentive to create education and training programs for their employees. With the end of this system (and permanent employment), factory leaders had much less reason to dedicate resources to employee education, especially as they were increasingly compelled to maximize profits.

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