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ABSTRACT

This paper discusses the various educational technology movements and initiatives currently underway in China and the impact they may have on the literacy rate of the Chinese people. Topics addressed include: (1) China's political history and its impact on the educational system, including China under the rule of Mao Zedong, Deng Xiaoping, and Jiang Zemin; (2) learning theories, including Modes of Learning Theory, Transformational Learning Theory, and Critical Reflection Theory; (3) adult literacy and educational technology; (4) economic theory and the economics of China, including privatization and employment; (5) educational technology initiatives and programs of government organizations in China, including initiatives related to adult literacy, distance education, education of women, higher education, self study, special education, vocational education, statistical information, and the Internet; (6) educational technology initiatives and programs of non-government organizations, including the Massachusetts Institute of Technology China Educational Technology Initiative, World Bank Institute Web Based Instruction, Xinlong Technical Training Center for Women, Rural Community Learning Centers in Education for Poverty Alleviation, and the Microsoft Research Institute; and (7) topics for further research. The paper also contains a glossary. (Contains 46 references.) (MES)

# From The Abacus To The World Wide Web: An Analysis of The Educational Technology Movement And Its' Impact Upon Adult Literacy In The People's Republic of China

As Researched and Authored By:

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## 1. Paper Objective

The objective of this research paper is to inform the reader as to the various educational technology movements and initiatives currently underway in China and the impact they may or will have upon the literacy rate of the Chinese people. The findings of this paper have been framed in three educational theories, namely: Modes of Learning Theory, Transformational Learning Theory, and Critical Reflection Theory. The economic and literacy impact of these movements and initiatives are framed within the context of the Human Capital Theory of Economics.

## 2. Disclaimer and Validation of Information and Resources

While most of the historical information and facts contained in this document are verifiable via numerous sources, some of the statistical information may not stand the tests of verification and validation.

Where possible those sources thought to be reasonably accurate such as the United Nations (UN) and any of it's affiliated organizations, U.S. Census Bureau, and the International Council for Adult Education (ICAE) were relied upon for verification of certain statistical data and information.

As a result of the complete absence or scarcity of some and certain available data and information, various State sponsored web sites, which are controlled by the Government of China, were utilized and quoted within this paper. As in any other research report, the use of Internet information should be viewed by the reader with some skepticism and could conceivably be anywhere from suspect to highly suspect depending upon the motives and interests of the web-site sponsor.

## 3. Glossary of Terms

**Adult Literacy** — Fundamentally, adult literacy is defined as the ability to read and write. In a broader sense literacy is the ability to understand and employ printed information in daily activities, at home, at work, and in the community in order to achieve one's goals, and to develop one's knowledge and potential. Differences in levels of literacy matter both economically and socially. Literacy affects, *inter alia*, labor quality and flexibility, employment, training opportunities, income from work and wider participation in civic society.

**CAE** — An acronym, representing Computer Aided Education

**CBI** — An acronym, representing Computer Based Instruction

**CETI** — An acronym, representing the Massachusetts Institute of Technology initiative in China, namely the China Educational Technology Initiative

**CPC** — An acronym, representing the Communist Party of China (Also see State)

**Cultural Revolution** In 1966, discontent young people culminated in massive protests at the universities. Chairman Mao Zedong exploited these protests in order to eliminate his opponents within the party. Politicians, intellectuals, and artists fell victim to the terror of the dogmatic Red Guards. Essentially the movement was to rid China of the Four Olds: Old Ideas, Old Culture, Old Customs, and Old Habits. This politically motivated movement, officially named The Great Proletarian Cultural Revolution, eventually pushed China once again into chaos and very close to a civil war in 1976.

**Educational Technology** Is concerned with the overall methodology and set of techniques employed in the application of instructional principles.

**EPIE** An acronym, representing Educational Product Information Exchange

**GDP** An acronym, representing Gross Domestic Product

**GNP** An acronym, representing Gross National Product

**GO** An acronym, representing Government Organization

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| **Great Leap Forward** | In 1958 Chairman Mao Zedong pronounced and propagated the Great Leap Forward. This movement was to place China on an equal footing with economically advanced countries, by moving from an agrarian to a production-oriented society. By 1961 the Great Leap Forward proved a failure as it ended in disaster with more than an estimated 20 to 30 million deaths due to starvation. |
| **ICAE** | An acronym, representing the International Council on Adult Education |
| **Matthew Effect** | In literacy education, the concept that the rich become richer while the poor become poorer |
| **MSRI** | An acronym, representing the MicroSoft Research Institute, located in China |
| **NGO** | An acronym, representing Non-Government Organization |
| **Neo Literate** | The new literacy. The ability to perform certain technical tasks such as being able to operate and function within a personal computer environment, or reading a blue print. |

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| **PRC** | An acronym, representing the People's Republic of China |
| **Privatization** | In China, the process of loosening State control and ownership of business. It includes the ability of business to diversify ownership by taking on domestic institutional investors, issuing stock, or allowing foreigners to acquire stakes. |
| **Semi-Literate** | Literacy to some extent, but not in totality |
| **State** | The Communist Party in China, which is also the governing party (Also see CPC) |
| **Tertiary** | The level of education that follows and is above the secondary level. Usually denotes trade or vocational schooling as well as college and university study. |
| **UNDP** | An acronym, representing the United Nation's Development Program |
| **UNECAP** | An acronym, representing the United Nation's Economic and Social Commission for Asia and the Pacific |

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| **UNESCO** | An acronym, representing the United Nation's Educational, Scientific, and Cultural Organization |
| **UNICEF** | An acronym, representing the United Nation's International Children's Education Fund |
| **WTO** | An acronym, representing the World Trade Organization |

## 4. China's Political History and Its' Impact Upon The Educational System

The People's Republic of China (PRC), hereinafter referred to as China, is the world's largest country in population and the third largest in area. With the longest continuous history of any present day nations, China for more than 3,000 years has been a center of civilization, and is today considered a major regional power in East Asia.

From early times, China has interacted with the outside world, exerting profound influence on neighboring countries, especially Korea and Japan. It has provided the world with such inventions as paper, printing, gunpowder, porcelain, and the compass, while absorbing various influences from abroad. These influences include Buddhism from India, food crops from the Americas, and more recently, modern Western science and technology. Mainly however, the Chinese civilization originated and developed on its own, a source of enormous pride for the Chinese people.

Weaknesses in the traditional political and social system were revealed in the 19th century by repeated military defeats by Western powers and Japan, which resulted in humiliating concessions. In response, new generations of Chinese intellectuals, and political leaders advocated abandoning some of the traditional practices and introduced Western science, technology, institutions, and values in order to restore strength and dignity to China as well as to bring its' society into the modern world. In modern times the impact of the West has generated unprecedented changes, many of which are still in progress.

In 1972 U.S. President Richard M. Nixon visited China. This historic visit commenced a period in which China would ever so slowly and methodically, but

eventually open itself to trade with western society. This potential opening was seen as an opportunity for economic growth and prosperity for both country's, however it was to be severely delayed until finally in 1979 when Deng Xiaoping succeeded Mao Zedong and visited the U.S. In order to fully understand the significance of this historic breakthrough one only need to review a very brief history of China under Chairmen Mao Zedong, Deng Xiaoping, and President Jiang Zemin.

## 4.1 China Under the Rule of Mao Zedong

In his book, *The Chinese,* Jasper Becker correctly states "The Chinese State is probably the oldest functioning organization in the world, dating back more than 2,000 years." Open to much debate however, Becker goes on to state "It is also possibly the most successful in history, controlling more people and more territory, and for longer periods, and exercising a tighter grip over its subjects than any other comparable government in the last two millennia." The operative verb in this debate is the use of the word "successful", especially when considered in the short-term period between 1945 and 2001.

After the Japanese surrender in 1945 ended World War II, the civil war in China resumed. The Communist regime was lead by Mao Zedong and Zhou Enlai against a familiar nemesis the Kunmintang (KMT). It was the KMT who in 1917 established a military government in Guangzhou, who eventually would be lead by Chiang Kai-shek. Essentially the civil war would decide the prevailing government ideology of either the Communist or the KMT party.

Chiang Kai-shek eventually lost in his efforts to purge Communism in China. On October 1, 1949 Mao Zedong declared the People's Republic of China, while the KMT, lead by Chiang Kai-shek fled to Taiwan. This single victory would forever change the fate of the Chinese people.

Between the period of 1949 and 1957 China remained quite unstable and war like under Chairman Mao Zedong's rule. In 1950 China invaded Tibet. Also in 1950, when hostilities broke out between North and South Korea, China sent "volunteers" to assist North Korea. Because the U.S. supported South Korea, China's involvement in supporting North Korea indirectly pitted China against the U.S.

Between 1949 and 1952, all out efforts were made to restore educational order, to reorganize schools on all levels and to prepare for the fast expansion of educational facilities. Also during this period however, all schools with foreign connections were taken over by the state and the "old intellectuals" were subjected to intensive thought remodeling.

The period of 1953 to 1957 was a period of educational consolidation and expansion, during which substantial gains were realized on all fronts including literacy classes in rural areas to postgraduate programs in major universities. The hiring of teachers from the Soviet Union, who brought their own pedagogy and programs to the classroom, stimulated this movement.

In 1958, in an attempt to create a socialist Utopia, Chairman Mao Zedong launched the Great Leap Forward. The purpose of this program was to place China on equal economic grounds as advanced countries. Initially the peasant farmers were

promised a better life, lead by a higher standard of living, if they abided by the government directives to increase non-agrarian production.

By the end of 1961 the Great Leap Forward had become a disaster. The promises to the peasant farmers never came to fruition. They worked harder, had less, and in actuality their standard of living decreased. Because of the mass movement from an agrarian to an industrialized society the peasant farmers were incapable and inadequately prepared to labor on a variety of State construction projects such as dams, bridges, and buildings. Additionally, because of the mass exodus of the peasant farming community, China suffered one of the worst famines in world history with an estimated 20 to 40 million deaths due to starvation.

During the years of 1958 to 1961, China no longer followed the Soviet model of education due to the adoption of a political ideology, which emphasized self-reliance. As a result, education was subjected to more stringent control by party cadres and to greater demands for manual labor on the part of both teachers and students.

In 1961 the moderate faction within the Communist Party strove to restore a sense of normality to the schools by encouraging teachers to resume full-time professional work and by reducing the amount of labor required of students.

Eventually in 1965, with a long, sustained effort, the Chinese economy recovered from the Great Leap Forward and returned to it's 1957 economic state, which was now at best, dramatically further below those of other modernized societies.

In 1966, discontent of young people culminated in massive protests at the universities. Chairman Mao Zedong exploited these protests in order to eliminate his

opponents within the party, and to restore his authority after the failure of the Great Leap Forward.

Chairman Mao Zedong initiated the Great Proletarian Cultural Revolution, herein after referred to as the Cultural Revolution, whose purpose and intent was to "attack" the four olds. The four olds were considered to be old ideas, old culture, old customs, and old habits. Compliant rebellious students were incorporated into the ruthless Red Guard, essentially once again moving China into yet another civil war. This civil war ensued due to Chairman Mao Zedong's political motivation to eliminate qualified political and ideologically contrary competition. The elimination of political competition would afford him the power to unilaterally rule China.

It was during this time that politicians, intellectuals, actors, and artist fell victim to the Red Guard. Hundreds of thousands of victims were terrorized, tortured, and murdered merely because they were considered the intellectual elite of Chinese society. Schools were closed for years, while artistic expression was strictly forbidden. Buddhist temples and archeological sites were defaced and/or destroyed. Any and all references to the intellectual elitist of the past were removed from the Chinese culture.

## 4.2 China Under the Rule of Deng Xiaoping

In 1976, Chairman Mao Zedong died, affording the opportunity for Deng Xiaoping to become Party Chairman. With the death of Chairman Mao Zedong, a loose form of democracy began to be openly demonstrated and deployed at a grass roots level in China.

In 1979 Chairman Deng Xiaoping ushered in the economic reform program termed the Four Modernizations, which included embracing agriculture, industry, national defense, and science and technology. Between 1979 and 1983, Chairman Deng Xiaoping instituted various economic reforms. These reforms included the open-door policy by which special economic zones were established to stimulate economic growth, and to provide for free markets and entrepreneurship. These reforms began to provide the much required modest economic growth for China and its' people.

With his rise to prominence, Chairman Deng Xiaoping brought finality to the various previously failed economic and educational reforms. Chairman Deng Xiaoping brought a "New Era" of pragmatism to the educational system, with the intention to complete the overall modernization of China. An entirely new picture of education emerged, culminating in the formation of a State Education commission to replace the Ministry of Education in 1985.

## 4.3 China Under the Rule of Jiang Zemin

As a result of the death of Chairman Deng Xiaoping in 1997, Jiang Zemin was the natural successor as was one of the most trusted political associates of Chairman Xiaoping.

Under General Secretary & President Jiang Zemin's leadership China has enjoyed explosive economic growth, booming foreign investment, rising exports, and declining inflation. President Jiang Zemin's most difficult economic challenge has been the reform of inefficient state-owned enterprises. At the 15th Chinese Communist Party Congress in 1997, he committed the party to the privatization of most of these

enterprises, although he retained former Chairman Deng Xiaoping's slogan of "building socialism with Chinese characteristics." China's economy is a combined form known as "market socialism." The government directs economic activities, but permits some aspects of a free-market economy. It remains unclear which aspect of this economic model President Jiang Zemin intends to stress now that he is free of former Chairman Deng's supervision. It is reasonably certain that he will continue the various economic and educational reform initiatives, while also urging the advancement of science and technology.

## 5. Learning Theory

This paper utilizes three learning theory's to frame its' thesis as well as one economic theory. The three learning theory's utilized are The Modes of Learning Theory, Transformational Learning Theory, and Critical Reflection Theory. These three theories are discussed immediately below, while the single economic theory is discussed within the "Economics" section of this paper.

### 5.1 Learning Theory – Modes of Learning

Rumelhart & Norman (1978) proposed that there are three modes of learning: accretion, structuring and tuning. Accretion is the addition of new knowledge to existing memory. Structuring involves the formation of new conceptual structures or schema. Tuning is the adjustment of knowledge to a specific task usually through practice. Accretion is the most common form of learning. Structuring occurs much less frequently and requires considerable effort. Tuning is the slowest form of learning and accounts for expert performance.

Restructuring involves some form of reflection or insight (i.e., meta cognition) and may correspond to a plateau in performance. On the other hand, tuning often represents automatic behavior that is not available to reflection (e.g., learning procedures).

Rumelhart & Norman (1981) extended their model to include analogical processes: a new schema is created by modeling it on an existing schema and then modifying it based upon further experiences. This is a general model for human

learning, although it was originally proposed within the specific context of learning a language.

Norman (1982) discusses the example of learning Morse code. Initial learning of the code is the process of accretion. Learning to recognize sequences or full words represents restructuring. The gradual increase in translation or transmission speed indicates the process of tuning. In order for this type of learning to occur the following two principles must be in place:

1. Instruction must be designed to accommodate different modes of learning and,

2. Practice activities affect the refinement of skills but not necessarily the initial acquisition of knowledge.

## 5.2 Learning Theory – Transformational Learning

The emphasis on experience as a defining feature of adult learning was expressed in Lindeman's frequently quoted aphorism that "experience is the adult learner's living textbook" (1926) and that adult education was, therefore, "a continuing process of evaluating experiences". This emphasis on experience is central to the concept of andragogy that has evolved to describe adult education practice in societies as diverse as the United States, Britain, France, Hungary, Poland, Russia, Estonia, Czechoslovakia, Finland and Yugoslavia (Savicevic 1991; Vooglaid and Marja, 1992).

Adult educators of every conceivable ideological hue currently cite the belief that adult teaching should be grounded in adults' experiences, and that these experiences represent a valuable resource, as crucial. Of all the models of experiential learning that have been developed, Kolb's has probably been the most influential in prompting theoretical work among researchers of adult learning (Jarvis, 1987). But almost every textbook on adult education practice affirms the importance of experiential methods such as games, simulations, case studies, psychodrama, role-play and internships and many universities now grant credit for adults' experiential learning. Not surprisingly, then, the gradual accumulation of experience across the contexts of life is often argued as the chief difference between learning in adulthood and learning at earlier stages in the lifespan. Yet, an exclusive reliance on accumulated experience as the defining characteristic of adult learning contains two discernible pitfalls.

First, experience should not be thought of as an objectively neutral phenomenon, a river of thoughts, perceptions and sensations into which we decide, occasionally, to dip our toes. Rather, our experience is culturally framed and shaped. How we experience events and the readings we make of these are problematic; that is, they change according to the language and categories of analysis we use, and according to the cultural, moral and ideological vantage points from which they are viewed. In a very important sense we construct our experience. How we sense and interpret what happens to us and to the world around us is a function of structures of understanding and perceptual filters that are so culturally embedded that we are scarcely aware of their existence or operation.

Second, the quantity or length of experience is not necessarily connected to its richness or intensity. For example, in an adult educational career spanning 30 years that same one-year's experience can, in effect, be repeated thirty times. Indeed, one's experience over these 30 years can be interpreted using uncritically assimilated cultural filters in such a way as to prove to oneself that students from certain ethnic groups are lazy or that fear is always the best stimulus to critical thinking. Because of the habitual ways we draw meaning from our experiences, these experiences can become evidence for the self-fulfilling prophecies that stand in the way of critical insight. Uncritically affirming people's histories, stories, and experiences risks idealizing and romanticizing them. Experiences are neither innocent nor free from the cultural contradictions that inform them.

## 5.3 Learning Theory – Critical Reflection

Developing critical reflection is probably considered one of the most profound for many adult educators who have long been searching for a form and process of learning that could be claimed to be distinctively adult. Evidence that adults are capable of this type of learning can be found in developmental psychology, where a host of constructs such as embedded logic, dialectical thinking, working intelligence, reflective judgment, post-formal reasoning and epistemic cognition describe how adults come to think contextually and critically (Brookfield, 1987, 1991).

As an idea, critical reflection focuses on three interrelated processes; (1) the process by which adults question and then replace or reframe an assumption that up to that point has been uncritically accepted as representing common sense wisdom, (2)

the process through which adults take an alternative perspective on previously assumed ideas, actions, forms of reasoning and ideologies, and (3) the process by which adults come to recognize the hegemonic aspects of dominant cultural values and to understand how self-evident renderings of the natural state of the world actually bolster the power and self-interest of unrepresentative minorities.

Writers in this area vary according to the extent to which critical reflection should have a political edge, or the extent to which it can be observed in such apparently a-political domains of adult life as personal relationships and workplace actions. Some confusion is caused by the fact that psychoanalytic and critical social theoretical traditions co-exist uneasily in many studies of critical reflection.

The most important work in this area is that of Mezirow (1991). Mezirow's early work focused on the idea of perspective transformation, which he understood as the learning process by which adults come to recognize and re-frame their culturally induced dependency roles and relationships. More recently he has drawn strongly on the work of Jurgen Habermas to propose a theory of transformative learning "that can explain how adult learners make sense or meaning of their experiences, the nature of the structures that influence the way they construe experience, the dynamics involved in modifying meanings, and the way the structures of meaning themselves undergo changes when learners find them to be dysfunctional" (Mezirow, 1991, p.xii).

Applications of Mezirow's ideas have been made with widely varying groups of adult learners such as displaced homemakers, male spouse abusers, and those suffering ill health, though his work has been criticized by educators in Nigeria, the

United States, New Zealand and Canada for focusing too exclusively on individual transformation (Collard and Law, 1989; Ekpenyong, 1990; Clark and Wilson, 1991).

## 6. Adult Literacy and Educational Technology

In its simplest form literacy is the ability to read and write. The level of ability has been defined in many ways, depending upon the culture and time in any given region of the world. In the late 19th century, the U.S. government considered literacy to be the ability to read and write one's name. Today, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) classifies literacy as understanding and producing a simple statement on everyday life. Other proposed definitions involve even more complex skills. Whatever the definition, the extent of literacy and illiteracy reflects social, economic, and educational conditions and outcomes.

Today there are considered to be three principle types of functional literacy: cultural literacy, critical literacy, and workplace literacy. Cultural literacy is the ability to read in order to express oneself, solve problems, and participate in educated society. Critical literacy is reading not just for information but also to evaluate information. Workplace literacy involves such characteristics as verbal communication skills, how to operate a computer, reading blueprints, and using mathematics to fulfill the various functions and responsibility's of employment.

Levels of literacy correlate with gender, race, ethnicity, income, school facilities, parent education, home environment, and power. Poorer people and minorities are less literate than others by a ratio of two to one. Educators often refer to the "Matthew effect" in literacy – that is, "the rich become richer and the poor become poorer."

Aside from the specialized area of technology, there is little information about adult literacy in general. The lack of systematic assessment and evaluation in literacy programs is a repeated theme in literacy literature (Beder, 1991; Sticht, 1988). The lack

of development of adult literacy as a separate field in education, with its own theories, research base, and accepted standards, compounds the difficulty of applying technology.

Some of the technology research conducted in K-12 classrooms has informed the area of adult literacy. Likewise, valuable resources such as the Educational Products Information Exchange (EPIE), and software guides developed for children have been used to benefit decision-making in adult literacy programs. Journals, books, and studies, such as *Power On!,* have also had an impact on adult literacy instruction. Focused research on the use of technology in adult literacy programs is so limited that it is almost non-existent.

The use of technology in adult literacy programs has grown so rapidly that research and literature usually associated with the development of a new educational specialty have not appeared. Research on technology cannot be considered apart from the larger issue of the paucity of research in adult literacy in general. An often-cited study by Darkenwald (1986) identified 236 journal articles on adult literacy but stated that less than a dozen qualified as genuine research. Sticht (1988) concluded that, "The history of adult literacy education reveals a 'crisis mentality' toward literacy education of adults that has hindered the development of a cadre of professionals trained in adult literacy education and a body of research-based knowledge about the development of literacy in adulthood." More recently, Beder (1991, p. vii) describes adult literacy research as, "fragmentary and even contradictory."

Apart from the difficulties of conducting research in adult literacy, technology research has suffered from limitations as well. Early studies of computer-assisted

education (CAE) and computer-based instruction (CBI) measured gains of learners through controlled studies following experimental design models. Most of the studies conducted were on children and the technology was mainframe computers. Studies conducted on adults were from populations who were incarcerated or in the military. Other studies which projected cost comparisons of traditional instruction versus computerized instruction have been found to be woefully inadequate, as indicated by Patton (1987), who decried "the paucity of systematic evaluation data for literacy programs in general and technology-based literacy programs in particular."

For purposes of this paper we shall not debate the many and various definitions of educational technology. In fact we will utilize a very simple but concise definition as referenced in the 2nd Edition of Anglin's text entitled *Instructional Technology, Past Present and Future.* Anglin defines educational technology as being concerned with the overall methodology and set of techniques employed in the application of instructional principles. I have intentionally selected this particular definition due to its' very simplicity, and therefore my ability to research and demonstrate varying levels of involvement of educational technology for purposes of this paper.

## 7. Economic Theory and the Economics' of China

This paper is based in part upon the economic theory of Human Capital. As stated in David A. Wagner's book *The Future of Literacy In A Changing World* (pp 373-374), The economic magic of literacy is widely accepted within developing countries. Whether speaking to a rural Nepalese peasant or a Third World political leader, many claim that literacy holds miraculous power in providing upward mobility for the individual and in boosting economic development for a nation. Human capital theorists have formalized this faith by offering empirical evidence suggesting that the young individual often does benefit economically from increased levels of schooling within developing nations.

The world is now being shaped by the forces of globalization, democratization and knowledge-based economies faces grave dangers if whole societies, or substantial groups of citizens within nations, are systematically excluded from meaningful participation in economic, social, political, cultural and other forms of human activity. When critical masses of persons are marginalized, society becomes polarized and unstable.

In such a context adult education can help to build mutual respect and understanding between peoples and cultures. Adult learning that strengthens local expertise constitutes a powerful tool for development. National, regional and global networks can be built to promote the sharing of information and the building of professional skills and other capacities.

The cost of adult learning must be seen in relationship to the benefits that derive from it. Payoffs from investment in enhancing the competency of adults through

education include not only higher economic productivity but also social benefits such as better health, nutrition, family planning and environmental quality. Furthermore, as countless studies have documented, the education of adults contributes importantly to the education and educability of children.

As a developing nation, China seeks to compete in a global market, which is anxious to embrace China as an equal trading partner. The demographics of China are stunning. Currently the population of China is 1.3 billion, which represents about 22% of the world population. In 1992, 72% of the population lived in rural areas. The under-5 mortality rate was 43 deaths per 1,000 live births, while the life expectancy is 71 years. The under-16 population numbered 313 million. The enrollment rate in elementary schools was reported to be 100%. As of 1995 the literacy rate was 81.5%, which is a significant improvement from the previously reported literacy rate of 73% in 1985.

As referenced earlier in this paper, in 1978 China created special economic zones in an effort to attract capital and technology from abroad. The majority of these new zones are located in the eastern provinces. Expansion and diversification of economic activities now under way will serve to perpetuate high population density in these costal provinces in order to accommodate this economic expansion.

In accordance with Chairman Deng Xiaoping's program of building socialism with Chinese characteristics, the 13th National Congress of the Communist Party of China (CPC), held in 1987, adopted the strategy of three stages for China's economic construction:

First, doubling the GNP of 1980 to end shortages of food and clothing, which was basically completed at the end of the 1980s; and second, quadrupling the GNP of 1980 by the end of the century, which was achieved in 1995, also far ahead of schedule.

As a result of this remarkable economic progress, the Chinese government formulated the Ninth Five-Year Plan for National Economic and Social Development and the Long-Term Objectives for the Year 2010, which promulgated revised objectives. Objectives for the Ninth Five-Year Plan (1996-2000) as follows:

1) Complete the second phase of the strategic plan for the modernization drive in an all-round way and quadruple the per capita GNP of 1980 in 2000, when the population will have increased by about 300 million over that of 1980;

2) Raise the people's living standard to that of a fairly comfortable life, with poverty practically eradicated; and expedite the formulation of a modern enterprise system that initially establish the basis of a socialist market economy;

3) Realizing modernization in the mid 21st century, the overall GDP per capita should reach the same level of moderately developed countries. The specific objective for the year 2010 is to double the GNP of 2000 so that the people will enjoy even more comfortable lives, and bring about a more or less complete socialist market economy.

With the fulfillment of these goals, China's productive forces, overall national strength, and the people's living standards will have significantly and positively progressed, while the country's social and economic aspects will have undergone historic changes, laying a solid foundation for the realization of modernization.

## 7.1 Privatization

Before the introduction of the policies of economic and educational reform and the opening to the outside world, China had a unitary public ownership economy, which while stable lacked vitality. Implementation privatization reforms however, has further encouraged the Chinese government in the development of diversified economic elements, while also now insisting upon the primacy of public verses State owned enterprises.

As a result, both the individual and private economies have developed rapidly. By the end of 1998, the registered industrial and commercial enterprises of individual and private ownership amounted to 32.4 million, with 78.24 million employees. Chinese-foreign joint ventures, Chinese-foreign cooperative enterprises, and foreign ventures numbered 325,000, absorbing 265.6 billion Yuan of foreign direct investments. The development and expansion of these enterprises have played important roles in many of the socioeconomic spheres such as increasing the standard of living, providing for massive infrastructure improvements and development, and introducing advanced technologies and management from abroad.

At the same time that the privatization efforts and reform initiatives were being employed and instituted, the control of the public ownership economy was also

strengthened. In 1999, the increased value of state-owned enterprises and industrial enterprises above a certain scale made up 24.7 percent of China's total GDP. With the gradual and mutual development pattern of diversified ownership coupled with the public ownership economy as the mainstay, China is progressing into a more western style of socioeconomic ideology. This ideology will manifest itself with less dependence and reliance of business and people upon government, while providing assistance for the transition from primarily a socialist communist socioeconomic model to a capitalistic socioeconomic model.

## 7.2 Employment

China has an enormous population with modest consumption therefore adequate employment is a serious problem. In an effort to solve this problem, beginning in 1993 the Chinese government permitted the natural market dynamics to function as the basic lever for the allocation of labor. This allocation process has been framed by an economic philosophy characterized by a State macro controlled labor services market policy. This policy provides for the following:

1) Public access to more employment opportunities

2) Autonomy for enterprises in recruiting workers

3) Autonomy for individuals when seeking employment

4) Market regulation of supply and demand

5) Establishment of a nationwide social services agency for employment

As a result of this economic reformation, labor and skill markets have been established in the urban area of China.

In recent years, due to the readjustment of the industrial structure, workers laid off by state-owned enterprises have been reemployed. The Chinese government has implemented a large-scale reemployment project, with some private enterprises founding reemployment centers in order to provide training to otherwise under or unqualified and/or displaced workers. In 1999, this reemployment project accomplished significant achievements. Through various channels, 4.92 million laid-off workers were reemployed, in effect reducing the unemployment rate to 3.1 percent.

Since the inception of the modernization program along with the adoption of the various economic reform programs and initiatives, the number of people employed in China has been growing steadily and rapidly. At the end of 1999 nearly 706 millions people were gainfully employed in China, which is an increase of more than 525 million since 1949, and an increase of more than 304 million since 1978.

## 8. Educational Technology Initiatives and Programs – Government Organizations (GO's)

There is certainly no doubt whatsoever as to the aggressiveness of China's vast, timely, and monumental investment into various educational and training programs throughout all regions of the country. In order for China to fulfill the objectives established by Chairman Deng Xiaoping the education and subsequent mobilization of its' labor force is tantamount to the economic future of China.

When one reviews the combined totality of the information contained in this section as well as the section entitled "Educational Technology Initiatives and Programs – Non Government Organizations (NGO's)", it is very clear that China has no doubt initiated various programs to attain and then to subsequently sustain its' economic well being via the educational process.

Because nearly all of the information on this movement is controlled by the State, it is difficult to verify, and therefore may even be suspect to a certain extent. In order to alleviate some of this suspicion I have chosen to include actual excerpts from various publications within China as evidence of this vast and diversified movement. I have taken the liberty of also including the date and the name of the publication where the excerpts originally appeared. This will hopefully aid others in their research efforts. Additionally I have sorted the various articles by major subject category in descending date order so that the reader may gain an appreciation of each of the overall initiatives as well as the scope of elapsed time from one initiative to the next. Please note that the excerpts included below in paragraph numbers 8.1 through 8.9 are available on the Internet at:

http://www.hku.hk/chineaed/chinaed_news/chinaednews_index_adulted.htm

http://www.hku.hk/chinaed/chinaed_news/chinaednews_index_highered.htm

## 8.1 Adult Literacy

***(Beijing Daily, June 3 1999)*** China Education Daily reported that a team from the Ministry of Education finished the assessment of Literacy Work in Shaanxi Province. The Team said the province became the 22nd province to realize the literacy objectives. Shaanxi Province is also the first province in Northwest China to wipe out illiteracy among young and middle aged people.

***(The Ministry of Education - Education Development Bulletin 1998)*** 3.2 million more adults became literate and another 2.8 million adults studied various courses in 465 thousands of adult educational institutions

## 8.2 Distance Education

***(China Education Daily, Sep 1, 2000)*** The Ministry of Education approved 5 higher education institutions to be "pilot colleges for distance education". Now there are 31 pilot colleges for distance education in all, including those 26 colleges approved last year. All the institutions are approved to establish Internet colleges and to develop on-line courses. Among the 31 institutions are Peking University, Tsinghua University, Beijing Normal University and Shanghai Jiaotong University, etc.

## 8.3 Education of Women

***(People's Daily, Jan 9, 2001)*** In order to meet demand, develop education in various ways and improve the quality of women workers in Shanghai, the Shanghai Trade Union has established a "Women Workers Weekend School". Since its establishment in 1996, there have been over 700 branches in factories, communities and rural areas, with over 650,000 women workers trained for re-employment. An Internet Branch was also established.

## 8.4 Higher Education

***(China Education Daily, October 11 1999)*** The Ministry of Education has approved 34 higher vocational education colleges in the last few months. Over half of them were originally adult higher education colleges, and others have been upgraded from key specialized technical secondary schools.

***(China Education Daily, September 23 1999)*** The "Self-study Higher Education Examination" is the largest form of higher education in China. It originated in 1980 with the State Council's Approval of the Ministry of Education's Report on the Establishment of the Self-study Higher Education Examination. There are 226 majors offered in 31 provinces, and in 1999 over 36 million students took part in self-study programs, of which 2 million graduated with bachelor degrees or Higher Education Certificates.

The scale of adult higher education has grown in recent years. Up to 1997, 860 institutions of higher education launched programs for adults, which enrolled 2.7 millions students. In 1998, the number of institutions of adult higher education reached 962, including:

Radio and TV Universities (45)
Vocational Colleges (567)
Agricultural Colleges (3)
Management Cadres' Colleges (153)
Education Colleges (190)
Independent Distance Learning Colleges (4)

Pursuing a higher education qualification through self-study examinations (zixue kaoshi) has been popular in recent years, with over 30 million participants. In 1998, 12 million candidates took the exam and 354 thousand were issued academic credentials. In the spring of 1999, 6.5 million candidates took self-study examinations.

***(China Education Daily, September 22 1999)*** In the first half of this year 6,590,475 people took the National Self-study Higher Education Examinations in various majors. The National Self-study Higher Education Examination has become the most popular approach to higher education in China.

***(China Youth Daily, June 25 1999)*** The State Planning Commission and the Ministry of Education declared that the recruitment of regular higher education institutions would increase freshman enrolment by 227 thousand this year to a total recruitment of 1.53 million. This is a 42% increase over last year's 1.08 million. Also, recruitment to adult higher education institutions increased by 100,000, bringing total recruitment to over 1 million, the largest increment in higher education recruitment since Liberation.

***(People's Daily, Overseas Edition, June 17, 1999)*** Regarding the June 13 Decision, the People's Daily, Overseas Edition noted that: (1) By 2010, the proportion of the relevant age group in higher education will be expanded from the present nine percent to 15 percent. (2) The current vocational colleges, independently established adult higher education institutions, and some of the specialized universities will go through a reform to become vocational-technical institutes. (3) Distance education, continuing education and vocational qualification forms of education will be further developed.

***(Education News Online, Ministry of Education, June 15 1999)*** The Ministry of Education declared that adult higher education institutions will increase their recruitment by 100 thousand this summer. Thus, the total student recruitment this year will be one million. It is a part of the enlargement of higher education scale of the nation.

***(Online Education News, Ministry of Education, May 9 1999)*** The Ministry of Education reported that 2.3 million people attended the National Adult College Entrance Examination in April. The recruitment of freshmen this year will be around 900,000, which is 38.7% of the examinees. The Ministry of Education will continue to expand enrolment in adult higher education.

***(The Ministry of Education - Education Development Bulletin 1998)*** There were 1,022 regular higher education institutions, and 1.08 million freshmen were recruited. Regular student enrollment was 3.41 million and 823 thousand students graduated in 1998.

***(The Ministry of Education - Education Development Bulletin 1998)*** There were 962 adult higher education institutions. The total enrollment in adult higher education institutions was 2.8 million. One million freshmen were recruited. Here were 10.9 million

adults who studied various accredited "Self-study Courses", and 319,000 adults obtained a bachelor or higher education certificate in 1998.

## 8.5 Self Study

***(China Education Daily, Feb 17, 2001)*** The National Self-study Higher Education Examination System has worked for 20 years. Over 100 million adults took the examination and among them 2.9 million people obtained higher education certificates and degrees, and 0.4 million adults won certificates of senior secondary technical education. Now the examinations cover 11 disciplines and 239 majors, contributing to 2.5% of the 11% of higher education gross enrollment ratio. The Self-study Examination System was proposed by the Government Report in 1978, and it was officially established through the *Provisional Regulations of Self-study Higher Education Examination* issued by the State Council in 1981.

***(Guangming Daily, November 17, 2000)*** In order to meet the manpower needs of the Great Development of the West and to push the development of Self-student National Examination in rural area, the National Committee of the Self-study Examination and the Chinese Charity Foundation decided jointly to generate 80 million Yuan to cultivate 10,000 primary school teachers in 12 Western provinces, provide them the study and examination chances and help them to promote their educational level in the coming 8 years. The action was named as "Candle Light Project".

***(China Youth Daily, March 1, 2000)*** In the past 20 years 90.48 million people took part in the National Self-study Examination. Among them 2.44 million people graduated and won the bachelor degrees through the self-study system, and 0.39 million people won the Senior Secondary Specialized Education Certificates. In the first half year of 1999, 1.42 million took various higher education Self-study Examinations. The Ministry of Education said the Self-study Examination System would further develop in the coming decade as an important channel to meet the demand for higher education of millions of people.

***(People's Daily, February 16, 2000)*** Zhejiang Province will launch a pilot self-study postgraduate education program in September. The National Self-study Examination. System currently offers no postgraduate education component. Zhejiang educational authorities have already selected several majors and institutions for the pilot program.

***(Guangzhou Daily, May 18 1999)*** The Ministry of Education has modified the examination contents for the subject of politics in the National Self-study Examination (Zikao). From academic year 2000, the new subject will be composed of Marxist Philosophy, Introduction of Deng Xiaoping Theory, Mao Zedong Thought, Basic Knowledge of Law and Ethics, and Marxist Political Economics. Current Affairs and Policies will constitute 10% of the Deng Xiaoping Theory component. The existing politics subject has three parts: Marxist Philosophy, History of Chinese Revolution, and Marxist Political Economics. The number of teaching hours will remain the same.

## 8.6 Special Education

***(China Education Daily, Feb 18, 2001)*** Experts in over 10 higher education institutions including East-China Normal University gathered together in Beijing and held the first national conference on special education and instruction. The main theme of the conference was to discuss the macro development of special education. The conference also discussed recruitment of students with disabilities and specialized courses for those students.

## 8.7 Vocational Education

***(China Education Daily, September 22 1999)*** The director of the Ministry of Education's Adult Vocational Education division believes that vocational education is far from

satisfactory. There are total 21,299 schools, out of which 3234 are specialized secondary schools, each enrolling approximately 1200 students. Despite this, the others, mainly vocational senior secondary and technical schools, only enroll about 500 students per school, with some as low as 300 students per school.

***(The Ministry of Education - Education Development Bulletin 1998)*** The total student enrollment was 24.5 million, and 14.8 million students (60% of senior secondary enrollment) studied in technical and vocational schools.

## 8.8 Miscellaneous

***(Specific Source Unknown – Obtained from Internet)*** In order to facilitate China's entry into World Trade Organization, the agricultural and education departments of Zhejiang Province have jointly organized a training program that aims to increase the knowledge of the large farming population in the province. During the Tenth Five Year Plan, the province will nurture 1 million peasants and turn them into leaders of wealth creation. Zhejiang Province has also planned to strengthen the adult education system in farming areas, to increase training for communication networks and other training activities as well. The funds that are spent to improve the agricultural development, education and technology must include a certain percentage for labor trainings. The town, city and provincial governments will work together. The agricultural and science and technology departments are responsible for suggesting key training programs, the education department is responsible for building infrastructure, the city and town governments are responsible for writing the training programs, whereas the villages are responsible for good operation of schools, and training people well.

***(The Ministry of Education - Education Development Bulletin 1998)*** 9-year compulsory education covered 73% of the population of the country. There are 2,242 counties that have universalized 9-year compulsory education. By the end of 1998, there were 610,000 primary schools with 139.5 million pupils, equivalent to 98.9% of the age population. There were 65.4 thousand junior secondary schools with 54.5 million students. There were 50.7% of junior secondary graduates who entered senior secondary schools.

## 8.9 Statistical Information

***(China Education Daily, November 10 1999)*** The Ministry of Education reported that there are now 333 higher specialized colleges, 101 higher vocational colleges, and 962 adult higher education colleges. The total enrollment of the three kinds of colleges is 3.95 million students (excluding self-paid students and students in non-government colleges). The enrollment is equal to 63.5% of the total student population in higher education.

***(China Education Daily, November 1999)*** The Ministry of Education and State Statistics Bureau issued the statistical bulletin of Education Finance Expenditure in China 1998. The national education expenditure in 1998 was 294.9 billion Yuan in all. It increased 16.48% compared to 1997. State financial investment was 203 billion Yuan, an increase of 9.12% from that in 1997.

## 8.10 Additional Statistical Information Provided By The Ministry of Education – Education Development Bulletin 2000

- 9 year compulsory education covered 73% of the population.
- 10,000 primary schools with 139.5 million pupils, equivalent to 98.9% of the age population.
- 65,400 junior secondary schools with 54, 500 students.
- 50.7% of junior secondary graduates entered senior secondary schools.
- Senior secondary enrollment was 24.5 million.
- 14.8 million students (60%) studied in technical and vocational schools.
- 1,022 regular higher education institutions
- Regular student enrollment was 3.41 million.
- 962 adult higher education institutions.
- Total enrollment in adult higher education institutions was 2.8 million.

## 8.11 The Internet in China

This paper could not be considered complete without at least some mention of the Internet in China. Perhaps a comparison of the number of Internet service providers will provide the reader with some of the insights that will follow in this brief discussion.

Based on the World Education Report 2000, the United States enjoys a total of 7,569 Internet service providers, in comparison to China's single Internet Service Provider.

While China does indeed have a somewhat suitable infrastructure to allow for additional Internet service providers, I suspect that due to China's need for the control and distribution of certain and various information, the Internet like a variety of other media venue's, is thought of in the same controlled respect as newspapers, radio, and television, all of which are State controlled. So long as China continues to fear promulgation of information from sources other than the State, it is highly likely that there will always be a State controlled Internet service provider. Of course one could also argue that due to a comparatively low number of personal computer's in China, all that is required or indeed needed is a single Internet service provider!

Regardless of ideological reasoning, logic, or opinion, the Internet does indeed exist in China. China does make Internet domains available to a variety of sources such as schools, government agencies, and businesses, however the approval for domains must stand the test of scrutiny of the CCP.

While conducting research for this paper, I noted that advertising literature that would indicate that there were numerous Internet service providers in China. When I attempted to make a connection to these very plentiful providers, I was either taken to a product-advertising page or an expired link. Using the "Google" search engine and utilizing the Boolean search expression of China+Internet I was provided with the China.org site that is obviously a government funded site. This web site promulgates various news topics, white paper reports by the CCP, and political leaders' biography and history.

There is also a government organization referred to as The China Internet Network Information Center (an affiliate of the Ministry of Information Industry), which publishes a semi-annual report on the use of the Internet. This report provides a plethora of information, including graphs on user and usage characteristics.

This report indicates that of a total of nearly 129,000 registered domain names in China, approximately 1,200 are educational domains, while nearly 100,000 of the domains are registered to commercial enterprises.

With the exception of those circumstances, programs, and technological initiatives as reported within this paper, I was unable to determine if the Internet in China is used for any additional educational purposes. Interesting however was that the above referenced report did indicate that 18.3% of the Internet users accessed the world wide web from schools, while 4.3% of the users indicated they utilized the Internet for "learning computer and other new technologies", with 32.8% of the users indicating that the primary information gathered from the Internet was electronic books.

*For further, more detailed, and specific information on the China Network Information Center Semiannual Survey Report on the Development of China's Internet (2001/7), refer to the Appendix to this document.*

## 9.0 Educational Technology Initiatives and Programs – Non-Government Organizations (NGO's)

There are various government organizations (GO's), non-government organizations (NGO's), private enterprise, non-profit, and community based initiatives and programs involving the implementation and improvement of educational technology in China. In order to minimize duplication, as well as to more succulently identify and enumerate the successes of certain specific programs and initiatives only a limited number of programs and initiatives were identified, and consequently will be reported upon in this paper. Below please find those programs, which are not necessarily associated with the State programs, which are included in the first previous section of this paper entitle "Educational Technology Initiatives and Programs – Government Organizations (GO's)".

### 9.1 The Massachusetts Institute of Technology China Educational Technology Initiative *(Non-Profit with funding provided by private enterprise)*

In 1995 the Massachusetts Institute of Technology (MIT) initiated a program to improve educational technology in China. This program came to be known as the China Educational Technology Initiative (CETI) and was initially funded by the Freeman Foundation through the MIT International Science and Technology Initiative. Additional support and funding was provided by Anixter Inc., Cisco Systems, Eastman Kodak Company, Microsoft, and Sun Microsystems.

While the stated purpose of this initiative was to bring the Internet to Chinese schools, there were tremendous secondary benefits to the participants as well. The initiative itself provided the opportunity for MIT students to spend six weeks in a team of two or three people at a Chinese high school. Each team was given maximum flexibility in designing and developing their projects.

As a result of this project 14 different high schools in China were the benefactors of various technology required in order to utilize the Internet in their educational process, which would have not materialized any time soon, if it were not for this program. Particular accomplishments and major program achievements included:

1) Establishment of the first web server in a high school in China

2) Connection of a school's computer system to the Internet via wireless technology

3) The design of a web based instructional program to bridge the culture gap between students in China and their counterparts in the U.S.

4) The design of an instructional program to teach the use of the Internet to Chinese students

5) The development of various school related and student web sites

6) The organization of China Net Day

7) Web conference hosting in order to "connect" students, teachers, and government officials via the world wide web

A more noble, yet a considerable benefit to the MIT students was the ability to foster understanding between the American and Chinese cultures by bringing together their generation through technology. Secondary benefits of the MIT CETI Program are best conveyed by the words of the MIT students themselves:

> "...It had everything to do with the incredible sense of entrepreneurship we experienced and the opportunity to learn more about the Chinese people. In the process of working with students and teachers at the high school, we realized we had built more than just a connection to the Internet – we had built friendships."

> "It taught us that, to understand more about China, you have to understand its people."

> "...The experience changed me."

> "Our overall experience in the MIT-CETI program can be summed up with one emphatic sentiment: awesome...As we look back on how we were able to share our knowledge of technology and American culture with our students, how much we learned from them about Chinese pop culture, and how we left China with 30 new friends, we can proclaim with great confidence and pride that our mission was fulfilled."

*For further, more detailed, and specific information on the MIT CETI program, refer to the Appendix to this document.*

## 9.2 World Bank Institute Web Based Instruction: The China Distance Learning Programs *(NGO)*

The World Bank Group provides a variety of web based instructional programs to anyone who may have access to the Internet. Essentially there are two separate and distinct programs: a China-Based Program, and a Non-China Based Program.

There is an obvious distinction between the China-Based and the Non-China Based Programs. The China-Based Programs are particular and unique to a specific segment or interest group within China, while the Non-China Based Programs are more general in nature and could be utilized in any variety of venues inside or outside of the geographic region of China.

The China-Based program consists of 9 instructional modules entitled:

1) China Commercial Bank Training Program

2) China: Poverty Analysis, Monitor and Evaluation

3) Global Integration and WTO accession: Challenges and Opportunities

4) Integrating Sustainable Development and Technology Into The Classroom: Training of Teachers

5) Linking Ningxia with the Global Distance Learning Network

6) Pension Reform and Modeling Training in China

7) Senior Policy Seminar on Regional Health Planning in China

8) Sustainable Agriculture and Rural Livelihoods

9) Sustainable Urban Development and Management

The Non-China based curriculum consists of a total of 12 instructional modules entitled:

1) Corporate Governance & Strategy

2) Environmental Economics for Development Policy

3) Environmental Inspection and Compliance

4) Frontier on Infrastructure Finance

5) Health Sector Reform and Sustainable Financing

6) Improving Training Quality through Peer Learning and Distance Mentoring

7) Insurance Supervision

8) Intergovernmental fiscal Relation and Public Expenditure Management

9) Introduction to Program Evaluation

10)Microfinance for Non-Specialist Distance Learning Course

11)Pension Reform Modeling

12)Poverty Planning high-Level Roundtable

While clearly these programs are aimed at those personnel who have a certain degree of formal higher education, the programs themselves can be used as "stepping stones" in order to influence those personnel in China who may be responsible for the design, implementation, and successes of a variety of other educational programs and/or initiatives.

Each of the World Bank Institute's training modules includes a specific program strategy and instructional objectives, which are expectedly as varied, as are the titles of the modules.

*For further, more detailed, and specific information on the World Bank Institute Web Based Instruction: The China Distance Learning Program, refer to the Appendix to this document.*

**9.3 Xinlong Technical Training Center for Women** *(Community Based)*

While this particular program is certainly not a computer or web based instructional process it does indeed fall within the purview of educational technology in its most basic and fundamental form in that instructional design is a fundamental precept and premise of educational technology.

Xinlong Village is located in a poverty-stricken mountainous ethnic minority area in the Sanxi District of China. It is one of the most disadvantaged areas of China. This small self-sustaining village with a population of 1,228 is principally a farming community.

Prior to the implementation of this program, the previously existing educational process was far from meeting the needs of this community. Some school age children, especially girls, did not attend school or entirely withdrew from school. Adult women had few opportunities to obtain information, knowledge or skills to improve their lives, or those of their family.

Ms Shan Xiumin, who originally proposed and initiated this program, was herself raised within this region of China. As a result she fully understands and comprehends the necessity of training and education, as well as the benefits and opportunities that improved education provides to the village and its' economy.

The main target groups of this program are abused and disadvantaged women, the poor, ethnic minorities, youths in isolated areas, neo-literates, semi-literates, and those needing training in vocational and income-generating skills.

Training modules are diversified and are appropriate to the needs and convenience of the local community. Ms. Shan often visits individual farms one by one and trains people on site. Some of the training includes agricultural technology and techniques, sewing, and Chinese embroidery.

To date more than 500 trainees have benefited and have economically and socially advanced as a result of this "grass roots" training effort. As of this writing more than 90% of the trainees reached the stated instructional objectives as established by the center. Some of the trainees even have established their own business on the basis of the skills they acquired, while several other trainees have been hired to work in factories both within and outside of the region.

The Xinlong Technical Training Center for Women is now self-sustaining. The center employs two full time teachers who are graduates of the first two workshops held at the training center.

Today in the Xinlong community, you will find numerous and visible examples exuding the success of this program. Some of the achievements include the cultivation and rotation of diverse crops; stores selling locally produced products, and even a self-sustaining tailor shop! The quality of life of the entire village has improved as a result of this initiative, with all of the inherent socioeconomic benefits directly related to this particular program.

*For further, more detailed, and specific information on the Xinlong Technical Training Center for Woman program, refer to the Appendix to this document.*

**9.4 Rural Community Learning Centers In Education for Poverty Alleviation** *(Local Government Organization & NGO)*

Entrusted by The Chinese National Commission for UNESCO, the Pilot UNESCO Project of Rural Community Learning Centers on Education for Poverty Alleviation was undertaken in 1999 in various provinces and counties throughout China.

This particular project is responsible for the design and implementation of educational programs at county, provincial, township, and the local school levels. Once these community learning centers are established they organize and conduct a multitude of programs on cultural and technical education for farmers and villagers. The

overall objective of the program is to build and strengthen relationships between school development and local socio-economic development.

Following the recommendation of UNESCO studies that literacy should be used as a tool for empowerment of the poor, the activities of the community learning centers focus on literacy integrated with income-generating programs. Therefore the major task for the rural community learning centers is to improve the population's living conditions with the overall aim of totally eliminating poverty, through the increase of the rate of literacy.

Aiming at promoting the development of the local economy, the establishment of rural community learning centers, linked with primary schools as anchors, forms a new rural community educational system, which is therefore reinforced by science and technology.

Because the primary schools are associated within the instructional process, various educational resources that may not otherwise be made available to students are utilized during the instructional process. In certain areas this may merely be paper and writing instruments. There are occasions however when televisions, VCR'S, tape recorders, projectors, books and other printed materials are provided in order to enhance the educational process. In other areas it could also mean the use of a computer and an educational software program to learn a particular function.

The specific objectives of this particular pilot project are:

1) To assign an increased priority to education for construction and development in accordance with the national policy of vitalizing the nation through science and education

2) To upgrade the quality of the labor force by providing knowledge on vocational and technical skills

3) To transform traditional agricultural practices by incorporating increasingly modern techniques of agricultural production

4) To raise the standard and quality of life of villagers and farmers

5) To enhance farmers' abilities and capacities in maintaining and restoring sustainable development

Because each of the community learning centers caters to the local community population, training is customized and unique to that particular environment and locale. The learning center therefore provides very practical methods and devices for enhancing the educational process.

Some of the training workshops that have taken place as a result of this initiative include:

1) Agricultural Science and Technology

2) Health and Nutrition

3) Farming Machinery

4) Family Education (Birth Control)

5) Computer Training

6) Life Skills for Girls

7) Animal Husbandry

Various identifiable successes of these programs is best exemplified by the following examples:

In 1987 Madam Pan Jifeng participated in evening classes of literacy education and became literate in 1990. In 1992 she mobilized 24 other women to undertake literacy training who then also became literate by 1996.

In 1999 Madam Pan Jifeng once again mobilized the village women and encouraged them to participate in the additional training of Chinese culture, technology, farming, and literature. As a result of these efforts the families of these participants enjoyed and benefited from an accelerated financial means, while the local community also prospered.

In one particular community-learning center the enrollment reached an overall rate of 98.8% of the available population, with a 97.5% rate for females. Additionally the overall retention rate for this particular program was 98.7%, indicating the propensity, determination, and drive of the local population to accept and embrace these forms of training.

As a result of these educational efforts the status of women in the community was raised to a level not otherwise or heretofore possible. Some of these women were even elected to the membership of the local governments, where they were able to further influence the necessity and funding for this particular and very successful educational process for their constituents.

*For further, more detailed, and specific information on the Rural Community Learning Centers In Education for Poverty Alleviation, refer to the Appendix to this document.*

**9.5 Microsoft Research (MSRI) – China – The Pursuit of Technology of the Future**

*(For Profit)*

In 1998 Microsoft Corp. entered into an agreement with the National Research Science Foundation of China. This program established the Microsoft Research Institute (MSRI) in China. The overall objective of MSRI is to pursue technologies for use in the future, with specific concentrations in speech recognition, artificial intelligence, and three-dimensional graphics. It will also foster an educational exchange program between the U.S. and China.

The research institute has hired approximately 100 notable personnel from both China, and the U.S. to participate in this endeavor. Included on staff are acclaimed researchers, scientists, and writers to conduct research and development on the following specific projects:

- A next generation user interface, which will allow users to interact with a computer using speech, gestures, and expressions

- Next generation multimedia technologies, which will enable people to search for and be immersed in interactive and realistic online shopping, educational, meeting, and entertainment activities

- Chinese information processing improvements, which will make PC's and the Internet easier to use for China's 20 million computer users, and for the anticipated influx of future PC users

Significant and successful applications, which have already been developed, include:

- A statistical language model for the Chinese market that can be used in keyboard entry or speech recognition with high accuracy

- A new Chinese user interface that has earned top marks in usability studies

- A real-time visualization system called a "concentric mosaic," that enables browsing and walkthroughs in a three dimensional photo-realistic image-rendered environment.

- A multimedia compression algorithm that surpasses the performance of previous work.

MSRI has already made substantial technological contributions in China during its' short tenure. To date 49 patent applications have been processed from MSRI, while the staff has published a total of 28 international papers, and delivered 11 keynote speeches. Located in the Beijing Zhongguancun region, which is considered the Silicon Valley of China, MSRI China has also established a number of programs to develop relationships with academia and local industry:

- An internship program held this summer, which employed 40 computer science and electrical engineering Ph.D. candidates from China, the U.S., Hong Kong, and Canada

- A fellowship program designed to enrich Chinese Ph.D. studies by offering a monthly stipend, summer employment opportunities, and an

annual trip to an international conference. The first 11 recipients of Microsoft Fellowships were announced in June

- A donation program that supplied 10 Chinese universities with $1.9 million in software

- A visiting researchers program that brings prominent professors from both local and U.S. universities

- An exchange program that sends six MSRI China researchers to local universities as guest professors to directly supervise Ph.D. students in China.

- Efforts to establish joint research labs with four Chinese universities.

- A June symposium on "Computing in the 21st Century," attended by leading computer scientists, including Turing Award winners Butler Lampson and Raj Reddy.

The success of MSRI is best stated by the words of MSRI's Managing Director, Kai-Fuu Lee: "Today, we measure ourselves primarily by papers and patents. In four or five years, we will be measured by our strong contributions to the company and the wider computer science community."

## 10. Conclusion

The concept that knowledge is power is central to understanding the instructional needs projected for the information age. If knowledge is indeed power, literacy is empowerment! The decentralization and redistribution of power through technology is a key concept in many fields (Zuboff, 1988; Peters, 1988). For example, "knowledge does not simply foster wealth and power, in the age of knowledge **it is** wealth and power. By increasing our ability to master knowledge, we can each shape our individual destiny" (Kurzweil, 1991).

Modern educational technology does not flourish only in societies that favor democracy or free enterprise. These technologies emerge and grow where there is wealth and a willingness to invest in innovation, where intellectual work is encouraged and rewarded, and where an educational system exists that provides and develops the stimulus for engaging the educational process.

There is absolutely no question that China's task of creating a large and strong force of educated, cultured, technically and professionally competent populous is formidable. It would appear that the most important lesson for China to have learned from its' past history is that for the sake of the modernization of China to continue, revolutionary zeal is no substitute for human talents developed through the educational process.

Convinced that the national goal of modernization and industrialization cannot be reached without highly trained personnel, China's post-Mao leaders have made all-out efforts to correct earlier mistakes and to introduce new and effective measures, programs and initiatives.

Employment, promotion, wages, and other forms of material reward are at least partially determined by the level of education attained. The emphasis on knowledge and skill has had the effect of combating the earlier ultra leftist negation of education and of promoting educational enterprises through a variety of government and community efforts as well as a movement towards individual self-directed study.

Unfortunately, China faces unique but certainly not insurmountable problems in the reform of the educational process and system. Change is resisted by the older generation, who still regard the old teach-drill-teach method as a preferred way to learn. Old Chinese attitudes such as reverence for the past, and willingness to accept philosophical orthodoxy, creates an almost impenetrable attitude of tradition versus modern methodology. If China is to continue to progress in its' attempt to bring educational technology to the forefront of its' educational system, this attitude requires to be changed.

Furthermore, today's teachers are educating a generation of children who are the result of the one-child policy. These children, often doted on at home, have exhibited behavioral problems in school, which at times also impedes the process of educational reform.

In reviewing comparative statistics from the World Education Report of 2000 there are various indicators that China is well on its' way towards improvement in the it's literacy rate via the educational process.

The overall adult literacy of China in 1990 was 77.0%, which increased to 82.2% in 1997 and is forecast to improve dramatically to 87.3% by 2005. If the forecasted rates are indeed accomplished, the 15-year improvement in literacy will have been a stunning

13.4%! If we assume the current population of China is 1.3 billion this improvement in literacy translates to more than 1.7 million of China's previously illiterate population will enjoy the ability to read and write.

Equally encouraging is that the growth of literate women will have increased an astounding 20.2%, from 67% in 1990 to a forecasted 80.6% in 2005. This improvement is no doubt due to the numerous and plentifully designed and administered programs specifically intended to increase the female literacy rate. These increases in the literacy rate are quite impressive especially when we compare the forecasted improvement in China to that of the world population.

As an example between 1980 and 2005, the total literacy rate in China is forecasted to improve by 13.4%. This improvement in China alone far exceeds the improvement in the world literacy population, which is forecasted to be 8.8% during the same period of time. This comparison places China at a rate of improvement that is 65.7% greater than the rest of the world!

Also quite encouraging is that in China's efforts to bring about an increase to the women in its' society also far exceeds the rate of improvement of the world population. The forecasted world's increase in female literacy of 12% between 1990 and 2005 pales in comparison to China's forecasted increase during the same period of 20.2%. Once again China will far outpace the literacy rate of improvement for women as compared to the rest of the world by 68.3%. These comparisons can be seen in the table below:

***Literacy Improvement Comparison – China to the World By Gender 1990 to 2005***

| Segment | 1990 | 1997 | 2005 (Forecast) | % Increase China | World % Increase |
|---|---|---|---|---|---|
| **Total** Population | 77.0 | 82.2 | 87.3 | 13.4% | 8.8% |
| **Male** Population | 86.5 | 90.3 | 93.7 | 8.3% | 6.1% |
| **Female** Population | 67.0 | 73.7 | 80.6 | 20.2% | 12.0% |

Even though these statistics would indicate that China is well on its' way to increase the literacy rate of its' people, there are also some signs and issues of concern among the statistical evidence.

As an example the number of teachers per 1,000 people in China is at 14, while in North America the number of teachers per 1,000 people is 23. This concern is especially critical since between 1990 and 1997 all areas of education in China will have shown dramatic increases in enrollments as follows:

***Increase in Education Enrollment – China 1990 - 1997***

| Educational Level | 1990 Enrollment | 1997 Enrollment | % of Increase |
|---|---|---|---|
| Tertiary | 3.8 | 6.1 | 60.5% |
| Secondary | 52.4 | 71.9 | 37.2% |
| Primary | 122.4 | 140.4 | 14.4% |
| Pre-Primary | 19.7 | 25.2 | 27.9% |

Also of concern is that China lags tremendously in the percentage of its' GNP that it spends on education. In comparing China to the World, North America, and Europe, China's spending ranks last at only 2.3% while North America is first at 5.4%, followed by Europe at 5.3%, and finally the world at 4.8%. These comparisons can be seen in the table below:

***Comparison of Percentage of GNP Spending On Education By Geographic Area 1980, 1990, 1995, and 1997***

| Geographic Area | 1980 % of GNP | 1990 % of GNP | 1995 % of GNP | 1997 % of GNP |
|---|---|---|---|---|
| North America | 5.2 | 5.4 | 5.3 | 5.4 |
| Europe | 5.2 | 5.1 | 5.3 | 5.3 |
| World | 4.9 | 4.7 | 4.7 | 4.8 |
| China | 2.5 | 2.3 | 2.3 | 2.3 |

It is important to note and to realize that as China continues its' unprecedented and aggressive economic reforms, GNP will grow appreciably. As a result, while the percentage of spending on education may not change, the absolute dollars of investment will logically increase.

*For further, more detailed, and specific information on the World Bank Education Report 2000 Statistics (tables 1 through 14), refer to the Appendix to this document.*

When one juxtaposes the aggressiveness of the economic reform programs with educational reform initiatives and programs, it is very clear that China is investing in itself through its' people. As a direct result of these combined efforts the literacy rate of the population has dramatically increased as has the living standards for many. These trends are best exemplified by the following statistics:

Before 1949, China had a population of nearly 500 million, of whom 80 percent were illiterate. With the reforms of the educational system, the China saw steady gains the number of enrolled students in all areas and levels of the educational process. Currently, 91 percent of the country has instituted compulsory primary education, with nearly 99 percent of school age children are enrolled in schools.

Today the dropout rate has decreased and the illiteracy rate of young and middle-aged people has declined to less than seven percent. Since the initiation of the reform and opening policies in 1978, marked by the restoration of the higher-education examination system, China's education system is certainly on the road to accelerated

development. Occurring along with this refinement and developmental process will be the continual increase in the rate of literacy among its' population.

After reviewing the various educational technology programs researched and included within this paper as well as numerous others upon which there may not have been sufficient data or information to evaluate, I believe that I can state unequivocally, without any reservation whatsoever, that the introduction of educational technology in China during the last 8-10 years has, without a doubt, increased the educational opportunities otherwise not available to certain groups of people. As a result of these increased learning opportunities and options, the literacy rate in China has dramatically increased, which has in effect increased the economic opportunities available in China.

While not able to necessarily establish a statistical correlation between the introduction of educational technology and the improvement in the literacy rate of the people of China, I believe it a conservative, logical assumption to state that based on the qualitative information included herein, that as a direct result of the introduction, improvement and sustained and various educational initiatives of educational technology in China, the literacy rate indeed has been and will continue to positively influenced.

No longer will the Chinese people live in the pitiful shadows of infamy brought about by the Civil War, Cultural Revolution, and the Great Leap Forward, but in due course will be remembered and revered for their progressive educational technology movements and initiatives which will have had a long and lasting affect upon the life and livelihood of one of the world's oldest civilizations.

## 11. Topics and Subjects For Further and Additional Research

As a result of researching and writing this paper it became readily apparent that there were a number of issues that peripherally relate to this paper that require further research. These topics could indeed be researched and written as separate and distinct papers:

1) The means and measurement of attained educational objectives for the various programs included herein

2) A further refinement of the Human Economic Theory relative to literacy with the possibility of establishing statistical correlations between literacy, economic growth, and opportunity

3) A program to further stimulate the interest of, and to change attitudes to bring forth the improvements necessary in the educational system of China

4) Additional exploration, identification, and reporting on successful educational programs in both China as well as other country's

5) A statistical study and analysis to determine of a statistical correlation exists between literacy and the investment in personal use technology

6) The development of a language for educators so as to fully understand critical reflection learning

7) A better understanding of the visceral and cognitive critical reflection process

8) A better understanding of contextual factors surrounding decision making when utilizing the critical reflection process

9) The extent to which critical reflection theory is influenced by personality

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