

Recently, Cal Poly's Graphic Communication Department, under the mentorship of Dr. Penny Osmond, hosted a "scholar from China" to learn from us but to also to provide a perspective on the graphic communication industry and graphic communication education in China.

The article that follows is authored by Dr. Xiaohong Wang, a Chinese "graphic communication" scholar who spent nearly six months at Cal Poly studying the American printing industry and sharing views about the differences between education and industry in China and the United States. We believe that Dr. Wang's article will be of interest to the graphic communication industry in the United States and in other nations. Dr. Wang has provided permission to share it with the international press.

East Meets West

An Analysis of Printing Education and the Printing Industry in China and the United States

by Xiaohong Wang, Ph.D., Associate Professor of Digital Prepress and Printing Technology, University of Shanghai for Science and Technology

I was provided with the unique opportunity to travel abroad to advance my knowledge of printing technology and management with the goal of improving graphic arts education at my university and in China. This has become a significant facet of my professional development. Additionally, while abroad I had hoped to provide students and international colleagues with an understanding of the graphic communication industry in China and some of the challenges that it faces.

During my initial investigation of prospective universities to join, I found many very good graphic arts schools that may host me as a visiting scholar. There were fine schools in Europe, America and in several other industrialized countries that had reputable programs in the graphic arts. I ultimately chose the graphic arts program in the United States at the California Polytechnic State University (Cal Poly) in San Luis Obispo, California. I wanted to learn from the best teaching model in graphic communication, at the best school, that served the most highly developed printing industry in the world. All of the information that I was able to gather indicated that Cal Poly, indeed, had the best overall program in graphic communication. I wanted to learn from the best. I did not want to pass up this opportunity.

I was also especially attracted to the American culture, its friendly people, and its extraordinary and diverse geography. Among other places, I traveled to Orlando, Florida to attend the annual Flexographic Technical Association conference where I met many American industry professionals as well as students and professors from other universities. I also traveled to Rochester, New York to observe the printing program at the Rochester Institute of Technology and to speak with faculty members. I attended the Gutenberg Festival in Long Beach, California, and visited various companies.

I traveled and studied in America for a wonderful approximately six months. I received mentoring by the esteemed Cal Poly Associate Professor, Dr. Penny Osmond, who also generously permitted me to reside with her and her family during my stay. Choosing Cal Poly was certainly the correct decision. This extraordinary experience will have a profound influence on my life and career and will contribute greatly to my world perceptions and to my ability

as an educator and professional. This experience has also left me with great enthusiasm to share the things I have learned with my students and colleagues in the Chinese printing industry. I hope that I am able to contribute to the improvement in basic knowledge and to the development of advanced degree programs at my university, the University of Shanghai for Science and Technology, and throughout the industry in China.

At the same time, I sincerely hope that my participation at Cal Poly as a Research Professor will contribute to a mutual understanding, and continued cooperation, between universities in China and in the United States.

There are great differences between China and America in history, literature, economics, culture, family, and basic perceptions. These differences can also be seen in schools and, of course, university and training programs, and the industry as a whole. But as human beings, our final objectives are the same: that every citizen is given an opportunity for a decent life. Honorable goals of all nations are universal education, advances in science and technology that contribute to economic wellbeing, and the development of a just society that serves all of its citizens. It is the Chinese proverb that says, "Reach the same goal by different routes." While nations have different customs and processes, outcomes that benefit all societies and their people can be reached.

Some of my observations related to education and industry follow.

Differences in graphic arts education in China and the United States

First, I will explore some differences in graphic arts education for a Bachelor's degree in China and the United States.

- The name is different. In China, the program is called "Printing Engineering" or "Printing Technology," and in America, it is named "Graphic Communication" or "Print Media" or "Imaging Sciences." The name itself illustrates the difference in focus and belief in what we should teach the student.

- The Chinese program focuses more on theory and operation of equipment, but the programs in America emphasize more on management, marketing, client development and mastery of technology. In my opinion, the students that graduate from American schools have the comprehensive knowledge and ability that the industry expects.

- Enrollment is different. There are approximately 16,000 students now enrolled in regular printing technology education programs at universities in China. Along with the growing printing industry in China, we hope to see more enrollments and more training requirements by the Chinese industry in the future. By contrast, American universities now are struggling to find more students.

- The motivation driving the education system in China is different than that of the United States. The prosperity and decline of graphic communication education in America is directly related to the fate of the entire printing industry. So the aim of the education system is to provide the industry with an excellent graduate with talent and ability. I believe that the "planned economy" still influences China's

education system. As a result, our education has fallen behind the market economy. Often we cannot provide students with state-of-the-art technology, and the information that we sometimes give to our students does not meet the needs of our printing industry.

- There are different instruction and teaching methods in China and the United States. Many of the universities in America have very complete, modern, state-of-the-art instruments and equipment that is donated by the industry. By learning how to operate this equipment, the students more fully understand the technology, can improve their practical analysis and problem-solving ability, and gain a more complete understanding of the industry. And at the same time, they become more familiar with industry trends and future developments. But in China, most schools lack the equipment to provide good laboratory facilities, so students only learn the theory taught to them during lecture classes and what they can read in books. Schools do not get the financial support from government or industry to provide first-rate technical laboratories.

- Students lack “hands-on” experience in China. They do not have the opportunity to work with the equipment that they will see in industry when they graduate. There is also a huge gap between the knowledge and skills learned in school and the requirements of industry. Students must often be retrained to make up for the deficiency in their learning experience at school. This deficiency hurts many students when they look for a good job.

- The educational system in America focuses a lot on helping students to learn study skills that help them learn on their own. This ability to study and learn independently, develops life-long habits of self-improvement and achievement; a skill that continues to serve them throughout life, long after they have graduated from school. By contrast, Chinese students rely heavily on their teachers to provide all the information that they will need and lack the initiative or skills to study and learn independently. This leads to a lack of overall creativity and initiative in Chinese students.

- There are different philosophies about education in China and the United States. The educational philosophy at Cal Poly, for example, “Learn by doing,” appears to be very effective. The focus at universities in China’s is more on teaching theory and neglects teaching the implementation of technology. I believe that the primary reason for this is that in China there are fewer instruments and less equipment to work with. In fact, if the theories learned in the classroom cannot be tested by the students in a practical way, it becomes very difficult to really understand the theory and use the resulting technology to solve practical problems.

- There are simply different systems of education in China and the United States. In China, the students are under more pressure to find a good job. But, because we do not have an effective job or career placement service that help to match student skills to job requirements, students often have less choice in combining their personal interests and strengths with their career. This tends to limit the creativity, enthusiasm, and effort that they bring to their career. By contrast, the students in America have more choices and more opportunity to follow their personal interest and

strengths in selecting their major and career. Students in the United States also have support from their universities in finding jobs in which the students are likely to be successful.

Additionally, in China, the Printing Technology major has a narrow definition; the students will focus on pre-press, printing mechanical or electronic publishing from the second academic year. I believe that the limitation of this system is that students do not get a broad picture of the printing industry and have less flexibility in meeting the rapid changes that are taking place. What I learned in America is that the students have more choice in what they want to learn, which career they want to pursue, and what they want to be. They can respond to the rapid developments in the industry more quickly and smoothly. This type of “general education” can help students to get a more complete picture of the graphic communication education program offerings and the scope and breadth of the printing industry. In America, students have the ability to solve practical problems from a comprehensive understanding of management issues and technology. The industry then helps them with additional experience to become an expert in their field after they graduate.

- The resources that help in the education process are different. In America, a university can find financial support from government, industry, various graphic arts organizations, and individuals. This means that the whole society is helping universities to operate and improve. The universities in China are isolated because the entire Chinese society and economic system are both still developing. Hopefully, we can do better in the future.

Improving the graphic arts education process in China

My main objective in coming to Cal Poly was to study its graphic communication education program and, hopefully, learn some techniques and ideas to improve the printing program at the University of Shanghai for Science and Technology. During my nearly six months experience in America, I believe that I have learned many things that will help to improve graphic arts education in China. From what I have studied and observed, I believe that our printing education program has many problems that should be urgently addressed. Only after great effort could our system of education meet the requirement of providing excellent human resources to the Chinese printing industry. Some ideas follow.

- Broaden the material and scope of knowledge and technology; focus more on practice and hands-on experience.

- As part of the teaching and learning process, students in China should have more opportunities to work on projects. This will help them to define the problem, analyze and solve it. This technique will greatly contribute to training students to solve problems on their own, and will improve their analytical and practical skills. At the same time, they will learn how to communicate more effectively and create a consensus within a group. I had the opportunity to see a group of students make a presentation in one of their classes at Cal Poly. I was impressed by the content of material they presented, the close cooperation within the group, and excellent presentation skills that the students developed.

- Provide more time and opportunity for students to develop their own strengths and areas of interest. At Cal Poly, there is University Graphic Systems (UGS) a student managed and run printing and publishing company. This is a real company but also an experiential endeavor in which students can apply for different positions within the company in keeping with their interest and ability. I am profoundly impressed with the learning opportunities that are possible within such an organization. I hope that in the future our campus practice center would play a more important role in helping students get more practical managerial and operational experience by using the “student company” concept as a teaching and learning tool.

- With the help of faculty or instructors from industry, a selfmanaged and run student company would provide more opportunities for the students to gain practical experience.

- Establish a good relationship with the printing industry in China. In the near term, we cannot hope to get the kind of support from the printing industry that we need because a great many of the companies are still struggling financially themselves. However, we should have patience, and persist in our efforts to maintain and improve our existing relationships and reach out to create new friends and new industry support.

- Support from industry does not always have to be in the form of money or donations of equipment. Perhaps it is possible that printing companies would allow students to use their equipment in an off-campus program to get real-world experience.

- The Chinese printing industry must cooperate more with our education programs by giving students meaningful jobs in management, quality, or production that relates to what they studied at the university. The companies would probably benefit from the education the student has, but must pay them decently for their work. One program that could be effective is creating a schedule where students rotate in and out of companies. The plan would be to ensure that a company always has at least one student in an internship type of capacity. Someone at the university would have to be qualified to supervise the student interns and also work closely with the employers.

- Invite more experts in the printing industry to participate on our educational consulting board to help us further improve our education programs. Such individuals could be a valuable and priceless source of intelligence. Frequent contacts with these experts will encourage them to learn more about our university, our programs, and our students. This too would help us build our reputation as one of the best educational programs focusing on printing in China.

- Strive to develop more resources such as scholarships and jobs for students, and professional development opportunities in the industry for faculty.

- Improve the knowledge structure of the faculty; provide more chances for them to “refresh” themselves by working with the industry and to learn new technology. The professors could be hired by industry during the summer holiday, or during a semester sabbatical, to solve some specific short-term problem and to, perhaps, train workers.

This would provide the professors some extra income and real-life experience.

- Hire more industry experts as part-time lecturers or instructors because they can bring the newest technology and the fresh ideas into the classroom.

- Strengthen international communication, including sending more people to attend international academic conferences and become members of several of the most well-known industry organizations. Invite eminent professors to give lectures to the faculty and students. Establish international cooperative education programs between universities.

- Establish a research center with the cooperation of the printing industry so that faculty and graduate students could work to solve the practical problems brought to them by the industry. And at the same time, marketing and sales research should also be encouraged. By providing such a research platform for the faculty and the students, they will have the opportunity to participate in research projects and establish a strong reputation within the Chinese printing industry.

Differences between the printing industry in China and the United States

The following shares some of my impressions of the differences between what I know about the printing industry in China and what I learned in the United States.

Many international printers, press manufactures, and consumer packaging companies started businesses in China. I believe the primary reason is that we have the lowest cost of labor and the largest consumer market in the world. Many printing related companies, such as Heidelberg, Agfa, R.R. Donnelley, and Goss, to name only a few, have established factories or branch offices in China, and have done very well. Though China is determined to have the largest printing industry within the next ten years, the present difference, or the gap between the printing industries in China and America, is great. Here are several impressions.

- The output of the printing industry in China is just a small percentage of the output of the printing industry in America.

- The printing and products produced in China usually involve middle or low end types work. But there are also some excellent printed products produced in China for export that can compete with printing in Italy, the United States, Spain, Germany, or England.

- The printing industry in China is still a labor-intensive industry; usually companies will hire more employees instead of investing into the high technology equipment to improve productivity with fewer employees. This policy hinders the creativity of the industry.

- The size of the companies in the printing industry varies in China. Some have the most modern equipment, some are companies that operate in villages and towns, and only have the most basic equipment. The top companies do not have the absolute dominance in market share. That means that the productivity of the entire printing industry is low and there is much waste of materials, labor, and equipment. I visited some companies in the United States; they always have the most modern equipment and fewer employees than would be the case in China.

- The companies in the printing industry in China do not have much incentive to be innovative. That is why there are not many original, high technology products that are produced in China. But in America, there appears to be creativity everywhere.

- I believe that the professional organizations and associations in America play a key role in education and industry development. They support the education system and they support industry. Companies within the same industry work together, contributing their resources to move the industry forward. The industry institutions in China should improve their efforts to organize.

Cultural differences

China has a long history, and its culture has influenced many of its neighbors. America also has a unique cultural that impressed me deeply. I believe that this culture has, and will, influence my thinking about issues of life related to learning, education, commerce, and living. I believe that the following expressions that are frequently used by Americans are the soul of American cultural.

- “It’s Okay.” I believe that the core of American culture is a great deal of tolerance in making a mistake. There is the realization that nobody is a saint, and nobody is perfect. Only through learning from mistakes can we improve ourselves. It is often said that we learn more from our mistakes than we do from success on the first try. Thomas Edison, the great American inventor, was asked, after years of trying to find the correct material for the filament in his light bulb, “Aren’t you discouraged?” He said, “No, I now know 10,000 things that do not work to make a light bulb.”

- “You can do it.” Encouragement is so important. It can inspire the individual or group to accomplish heights of success they would never achieve if subjected to frequent criticism. Encouragement and support helps people to try, explore, discover, and fulfill their ideals and goals.

- “You are the best.” Chinese culture seems more reluctant to offer praise. After being in America for almost six months, I realized that we should not be hesitant to offer our praise of worthy accomplishments or efforts. Praise can change a people, an industry, and a nation.

- “I will try my best.” Only when you try your best, can you know what you can do. Americans do what they promise. Everybody tries to do their best; the country would not be the best, otherwise.

- “Have fun.” Maybe Buddhism’s life philosophy that “life is bitter” has more influence on the Chinese than on others. Our culture has less fun. Sometimes the job, or life, seems a burden. At first I was surprised by Americans’ attitude toward their job, but finally I understood that only when you find fun from your job and life can you enjoy it and can you do the most to fulfill your potential.

- “Who said that?” Learn to be brave and challenge anything that you are suspicious of. Learn to analyze things from every point of view. Challenge the “conventional wisdom.” The truth is discovered by skepticism, curiosity, and investigation, it is not just total acceptance of all the things you are taught.

- “Let’s talk about it.” Good and effective communication can help to solve problems and conflict. In education, life,

and commerce, we need open and honest two-way communication to keep things going smoothly and productively.

- “Trust me, because I said it.” Respect and trust is the foundation of a healthy society.

Education and training growth in China

Primary and secondary education, continuing higher education, and career training in graphic communication, is now seeing unprecedented growth in China. China has the largest population in the world and the need for more education is rapidly increasing along with the growth of the printing industry. But the training system, training material, trainers and training facilities, and equipment, especially for the career training, are all in only their basic stages. In America, there are the excellent educational resources, including renowned universities, excellent professors, plentiful instruments and equipment, and a fully developed printing industry. So according to the theory of supply and demand, I believe that in the future, we should develop a good relationship between educational institutions in China and United States by continuing cooperative programs in the following ways.

- Invite professors and experts to periodically lecture in our schools. This outreach could promote the understanding of each other’s educational programs and industry.

- Establish student exchange programs with universities around the world, so the most talented students could learn in different universities during different periods. This will also help the universities in America get the best international students.

- Establish continuing education and training centers with the cooperation of industry and the universities in China working together. Actually, as more American companies and other international companies begin to do business in China, they hope to find trained experts in China as they do in their own countries. By establishing training centers, we could provide these companies with the best managers, marketing and salespersons, and operators. This will help the international companies run their businesses more profitably in China. At the same time, by earning money from training programs conducted in China, the universities in America could invest more in their traditional education programs.

- Establish a research center with world-class companies and the universities in China. A research center is a good way to improve the universities’ reputation throughout the printing industry, and is also the best way to incubate the best researchers for the entire industry and drive its future development. Only when more students find influential positions within the industry, can our education system have a better chance to develop.

International cooperation in commerce between China and the United States

With the rapid development of convenient communication systems, and fast and reliable, transportation, different countries in the world seem geographically or physically closer. I believe that the future potential of interdependent and co-competitive relationships in commerce between Chinese companies and those in the United States involved in the graphic communication industry could act as dif-

ferent departments in a large company or different positions in the same department.

For example, in long run printing, such as consumer package printing, China may take some business from American. However, along with the fast growth of digital printing, on-demand printing, and individualization printing, the American printing industry should recover their production in a short time. This business will account for most of the jobs that will be created for America by the new technology. We could also find truth in the reality that the American companies still hold almost the entirety of high-end, high technology intensive and high creativity businesses and jobs. The products made in China helps the American people live a better life. At the same time, more output from China provides more jobs to Chinese workers and it stimulates economic consumption, development, and productivity. The Chinese people will then need more products that are made in America. In a word, cooperation in commerce between China and America would make the lives of the people in both countries better.

China's role in the world's economy

There has been concern by some American graphic arts companies that doing business in China may lead to a deterioration of American companies; that doing business abroad can lead to the loss of business and jobs in the United States. In fact, I can provide several examples to diminish this concern. I am certain that the whole of economics, worldwide, will benefit from doing business in China.

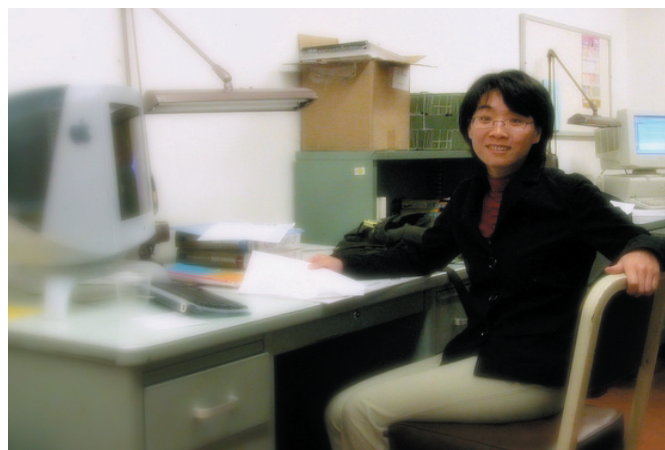
I am very concerned about how the world thinks about China and its growing economic strength. So when I came to the United States, I read some books and articles that covered the concern over the Chinese economic development. I believe that the most powerful proof that concern is not warranted is in the statistics; numbers provide answers. Did the GDP of America decrease as a result of economic growth in China? Did the lives of the American people deteriorate when China began growing as an economic power? I believe that many people held the same concern when Japan began to grow in the 1960s. However, what happened? The reality is that in nearly 50 years, the economics of America and the life of the typical America had become better. Therefore, I believe that the reason that America became so strong is because the overall growth of economic strength in companies around the world. My point is that historically, growing economies worldwide has led to benefits and economic growth in the United States.

One of my American friends who recently retired told me that he wanted to begin his own business in China, because one of his clients, a publisher, saved \$1 million (U.S.) in one month when his books were printed in China. He said, "It's amazing! I want to dig for more gold in doing business in China." Another example is that the value of 800 million shirts that are made in China is equal to the value of one airplane made in America. I believe that the American people have the ability and wisdom to create new technology and new jobs to replace what might be lost to China. So please do not consider the loss of some low-end jobs as being significant. You have more jobs in the high-value industries in America to more than replace the loss of low-end jobs.

Summary

In summary, education is the key to continued economic success in China and the United States. And the main job of Bachelor's degree programs is to teach students how to learn, and to provide them with an understanding of the industry they have chosen for their career. Technology changes quickly and we could not possibly teach the students everything. However, when they have the ability to learn, they will know how to remain current in their field.

As a member of the graphic communication profession, I believe that the future of our industry, worldwide, depends on cooperation and a sharing of knowledge among the world's universities that teach and do research in graphic communication. The world will become a better place through cooperative international efforts in preparing the future scientists, engineers, technologists, as well as managers, sales and marketing professionals, operators, and other innovators who will lead and advance the graphic communication industry in the years ahead.



About the author

Dr. Xiaohong Wang is an Associate Professor of Digital Press and Printing Technology at the University of Shanghai for Science and Technology. Dr. Wang received her Ph. D. in Image Processing and Pattern Identification from Donghua University. She received a Master's degree in Printing Signal and Information Processing from Xi'an University of Science and Technology, and a Bachelor's degree in Printing Technology and Machinery from Shanxi Institute.

Dr. Wang's Ph.D. work focused on printing and packaging technology. She is presently the Director of the Science Research Department, Shanghai Publishing and Printing College at the university. Her responsibilities include management of the science research department, drawing up the science research strategy development plans for the college, enacting files and disciplines that relate to scientific research activity. In this capacity, Dr. Wang is responsible for contact with the government departments, printing and packaging industry companies, universities and enterprises to setup stable and long-term cooperation. Additionally, Dr. Wang founded the science research management system and assessment system for the college, setup a science research work group, and developed the long-term strategy development plan for scientific research. She assisted the founding of five printing enterprise research institutions involved in digital workflow, computer control of printing press, and color research.