Pragmatic Exchanges and Cooperation to Prepare Quality Engineers and Technologists

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Author Note

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Abstract

The mission of national colleges of technology (NCT's) in Japan and the universities of technology (UT's) in Taiwan is to pragmatically prepare quality engineers and technologists. In recent years, the partnership among NCT's and UT's is extended and expanded. This paper introduces the pragmatic and successful partnership between National United University (NUU), Miaoli, Taiwan and Kisarazu National College of Technology (KNCT), Chiba, Japan. The six key success factors are pointed out as follows: (1) Strong support from NUU's and KNCT's stakeholders, (2) Both NUU and KNCT focus on preparing quality engineers and technologists, (3) A shared focus is identified, (4) Good timing is selected for students' exchanges, (5) Multiple activities are arranged for students, and (6) Students are active partnership agents. Based on the past experiences, a checklist for pragmatic exchanges and cooperation to prepare quality engineers and technologists is suggested. It not only examines the current exchanges and cooperation but can also guide the future exchanges and cooperation.

Keywords: engineering and technology education, international exchanges and cooperation, Japan, Taiwan

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Introduction

When I visited Saitama University, located in the Tokyo metropolitan area, in the 1990's, a senior professor there presented me a copy of a journal including his article. The professor inscribed "一衣帶水 風月同天" on the journal. The eight characters of inscription is pronounced as "*yī dài shuǐ fēng yuè tóng tiān*" in mandarin Chinese, meaning that the sea between Japan and Taiwan is as narrow as a waist belt (see Figure 1) and both Japanese and Taiwanese concurrently share the same wind and moon.

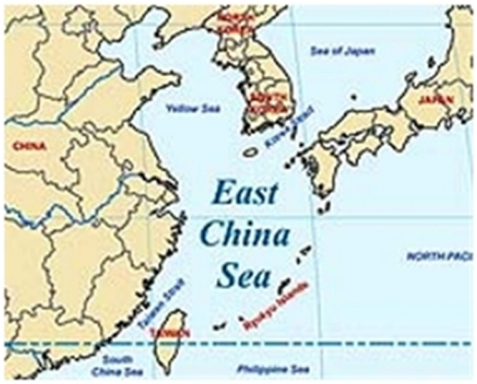

Figure 1. The sea between Taiwan and Japan is as narrow as a waist belt
(Photo source: http://www.energy-daily.com/reports/Tokyo_Manila_protest_Chinese_harassment_999.html)

Indeed, Japan and Taiwan are geographically close and have lasting friendship. The national colleges of technology in Japan (NCT's or *Kosen*) and the universities/universities of technology (U's/UT's) in Taiwan have become international partners for years. The partnership is anticipated to be "from strength to strength" or "to follow the past and herald the future" ("繼往

開來" in mandarin Chinese and pronounced as "*jì wǎng kāi lái*"). This paper aims to introduce what we have done in the past and propose what we can promote in the future.

What We Have Done in the Past—From Point to Line and Plane

The partnership among NCT's and U's/UT's began with several inter-institutional (or point-to-point) partnerships. Because of being the president of National United University (NUU), Taiwan in 2005-2012, I would like to take NUU for an example.

Granted by the National Science Council (NSC, now called Ministry of Science and Technology), Taiwan and the Interchange Association, Japan (IAJ), National United University (NUU), Miaoli, Taiwan and Kisarazu National College of Technology (KNCT), Chiba, Japan jointly organized a symposium on engineering and technology education, which focused on program accreditation and international exchanges, in Kisarazu City in December 2006. At the end of the symposium, NUU and KNCT signed an agreement of education and research exchange on December 13, 2006 (see Figures 2 and 3). Since that, there have been frequent exchanges and cooperation, such as organizing conferences, participating contests, and conducting faculty visits and student exchanges, between the two institutions. Some significant events are as follows:

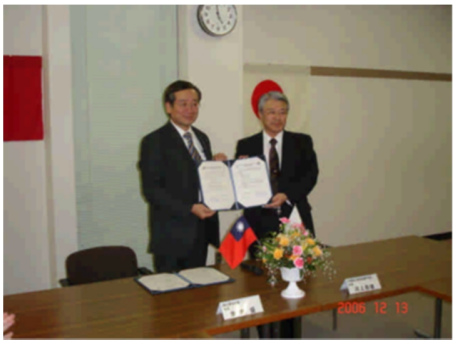

Figure 2. NUU and KNCT signed an exchange agreement on December 13, 2006
(Photo source: http://report.nat.gov.tw/ReportFront/report_detail.jspx?sysId=C09600281)

Figure 3. A group photo taken after NUU and KNCT signed an exchange agreement
Photo source: http://联大.tw/UIPWeb/wSite/ct?xItem=41382&ctNode=9180&mp=2

1. KNCT invited NUU's president and faculty delegates to visit KNCT and exchange research works regarding environment and welfare in December 2010
2. The Japan-Taiwan Youth Symposium on Environment Maintenance and Human Welfare 2011－We Are in Pursuit of Happiness via Auspicious Technologies－was held in Taipei, Taiwan, December 10–11, 2011
3. Witnessed by Dr. Yen-Yi Lee, Director-general of the Department of Technological and Vocational Education, Ministry of Education, Taiwan, NUU and three UT's signed the Agreement of Academic Exchange with the Institute of National College of Technology (INCT), Japan in Tokyo, April 25, 2012 (see Figures 4 and 5)
4. Led by Dr. Hidefumi Kobatake, President of INCT, the 25 delegates from 21 NCT's and INCT visited Taiwan (see Figures 6 and 7)
5. The 2012 Japan-Taiwan Symposium on intelligent Green and Orange (iGO) Technology －Memorial for the Comprehensive Agreement between Japan and Taiwan--was held in Miaoli, Taiwan, December 10-11, 2012

6. NUU's students were invited by KNCT to participate in in the NAPROCK International Programming Contest and the 22nd PROCON Programming Contest and received special awards

When INCT signed the Agreement of Academic Exchange with NUU and three UT's in 2012, the partnership was upgraded from point-to-point to point-to-line and even line-to-plan. At the moment, NUU and KNCT promised that they would serve as a service hub to promote the partnership among NCT's in Japan and U's/UT's in Taiwan, respectively. It is found that the partnership among NCT's in Japan and U's/UT's in Taiwan has been extended and expanded (see Figures 8 and 9).

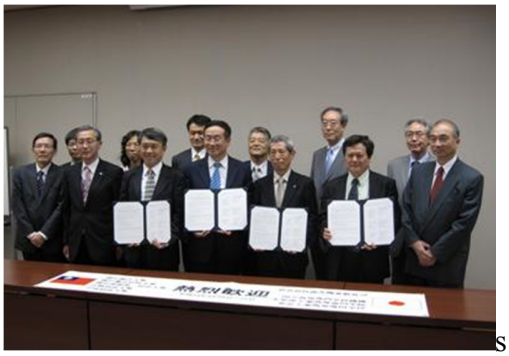

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Figure 4. NUU and other three UT's signed an academic exchange agreement with INCT on April 25, 2012
(Photo source: http://www.kosen-k.go.jp/news/news20120510.html)

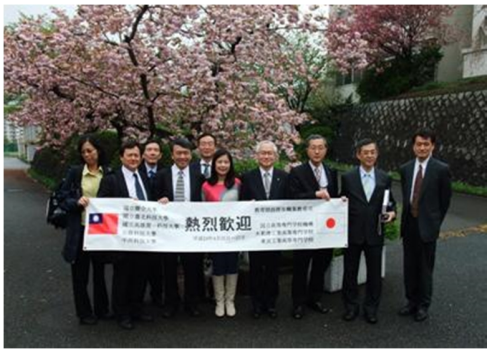

Figure 5. A group photo taken when the group from Taiwan visited Tokyo Kosen
(Photo source: http://www.kosen-k.go.jp/news/news20120510.html)

Figure 6. President Hidefumi Kobatake and other delegates visited NUU on June 12, 2012
(Photo source:
http://120.105.144.202/UIPWeb/wSite/ct?xItem=87691&ctNode=9180&mp=2)

Figure 7. Vice President Wu Den-yih, ROC (left) met President Hidefumi Kobatake (right), INCT and other delegates on June 12, 2012
(Photo source:
http://www.president.gov.tw/Default.aspx?tabid=131&itemid=27472)

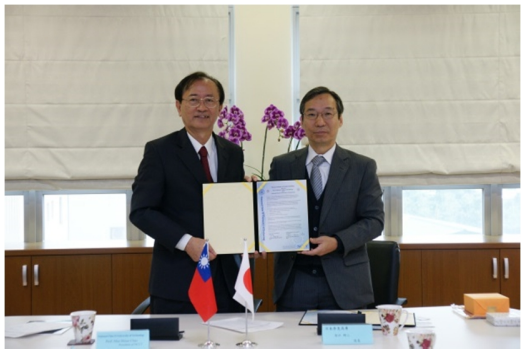

Figure 8. Nara Kosen signed a memorandum of understanding (MOU) with National Chin-Yi University of Technology (NCUT) on November 28, 2013
(Photo source:
http://www.ncut.edu.tw/oia/new2/news_info.php?sn=50)

Figure 9. President Ming-Hsi Hsu and his colleagues of NUU visited KNCT on August 4-5, 2014
(Photo source:
http://www.kisarazu.ac.jp/news/2014/0806.html)

To effectively help our students' learning and development is the ultimate goal of the exchanges and cooperation. Thus, NUU's and KNCT's students have frequent academic exchange activities and have built a growing friendship in recent years (see Figures 10 and 11).

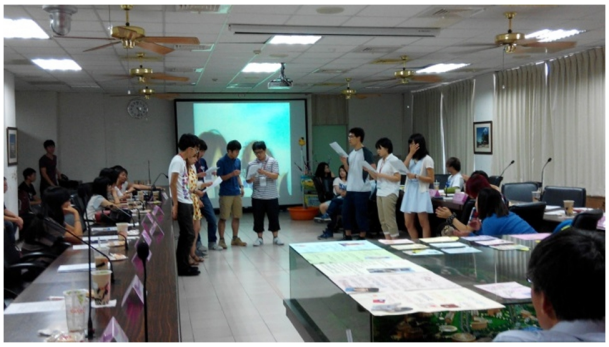

Figure 10. KNCT students' two-week practicum at NUU in August 2014
(Photo source: http://www.nuu.edu.tw/UIPWeb/wSite/ct?xItem=110116&ctNode=9180&mp=7)

Figure 11. Anna Kosen and Nagano Kosen students' practicum at NUU in August-September 2014
(Photo source: http://www.nuu.edu.tw/UIPWeb/wSite/ct?xItem=110913&ctNode=9180&mp=7)

To my knowledge, the partnership between NUU and KNCT is pragmatic as well as successful and can serve as a reference for other NCT's in Japan and U's/UT's in Taiwan to enhance their partnership. It seems to me that the key success factors are as follows:

1. Strong support from NUU's and KNCT's stakeholders

   Without strong supports from NUU's and KNCT' stakeholders, the partnership would not work. In addition, I would like to mention that Dr. Ginsuke Kono, who is a professor at KNCT and an alumnus of NUU, has always done his best to promote the partnership.

2. Both NUU and KNCT focus on preparing quality engineers and technologists

   Although being a comprehensive university and not an UT, NUU's number of faculty and students in the field of engineering and technology is about 70%. Both NUU and KNCT focus on preparing quality engineers and technologists.

3. A shared focus is identified

In coincidence, both NUU and KNCT have a common interest or shared focus, “environment and welfare” or “Green and Orange Technologies (GO Tech)”, as the feature of their education and research.

4. Good timing is selected for students’ exchanges

   KNCT’s and other NCT’s students visit NUU in either March or August-September (see Figure 9) while NUU’s students visit KNCT in July-August.

5. Multiple activities are arranged for students

   Students like to experience multiple activities when they are at the host institution. For example, NUU arranges ecological education, Chinese characters learning, Chinese and Taiwanese culture, calligraphy, opera, and tea culture for KNCT’s students to learn.

6. Students are active partnership agents

   Faculty and staff are responsible facilitators, but students are always active partnership agents. Students’ positive interactions quickly overcome language barriers.

At the end of March 2011, after a severe earthquake occurred in Japan, an adjunct instructor of NUU, who hoped that the earthquake hazard areas in Japan recover quickly, wrote the calligraphy ”往事如昨” (pronounced as “wǎng shì rú zuó” in mandarin Chinese; which means “those old memories are still fresh”) as shown in Figure 12. The past experiences I described above are still fresh.

Figure 12. In March 2011, KNCT's students at NUU with the calligraphy "往事如昨"
(Photo source:
http://mag.udn.com/mag/edu/storypage.jsp?f_MAIN_ID=87&f_SUB_ID=327&f_ART_ID=309799)

What We Can Promote in the Future—From Plane to Body

In terms of future efforts, the pragmatic exchanges and cooperation among NCT's in Japan and U's/UT's in Taiwan should be upgraded from plane to body. Borrowing some ideas recommended in "Revised Recommendation concerning Technical and Vocational Education" (UNESCO, 2001), I drafted a checklist for pragmatic exchanges and cooperation to prepare quality engineers and technologists as shown in Table 1. It is suggested that the checklist is used (or modified then used) to not only examine the current exchanges and cooperation but also guide the future exchanges and cooperation.

Table 1.

A checklist for Pragmatic Exchanges and Cooperation to Prepare Quality Engineers and Technologists

	Possible Exchanges and Cooperation Provisions or Measures	Frequency				
		1	2	3	4	5
1.	Regular exchange, making use of contemporary information and communication technologies (ICT's), of information, documentation, and materials obtained from research and development					
1.1	Publications concerning comparative education, psychological and pedagogical problems affecting general and technical and vocational education, and current trends					
1.2	Information and documentation concerning curriculum development, methods and materials, study opportunities abroad, and employment opportunities, including human resource requirements, working conditions and social benefits					
1.3	Ideas, innovations and new teaching/learning/training materials					
2.	Cooperation to face common problems in the development or extension of engineering and technology education					
2.1	Periodic meetings and the establishment of a mechanism to review policies formulated and actions taken					
2.2	The creation of joint facilities or platforms for higher level research, the development of prototype materials and equipment, and the professional development of faculty					
3.	The development of teaching and learning materials or channels which use the information and communication technologies (ICT's) and are suitable for international use					
3.1	The progressive establishment and recognition of common standards for professional competencies/qualifications acquired through engineering and technology education					
3.2	The development of international collaborative teaching and learning materials for the above needs					
4.	The creation of a climate favorable to international cooperation with a view to capacity-building of students, especially in the areas of acquisition, adaptation and application of engineering and technology					
4.1	Fellowship and exchange programs for faculties, students and administrators					
4.2	Establishing sustained cooperation between similar institutions					
4.3	Provision of work/internship experience abroad, particularly when opportunities at home are limited;					
4.4	Presenting and making known their educational programs outside their national boundaries					
5.	Through the exchange of good practices and methods, aiming to apply relevant and appropriate internationally recommended standards and norms					
5.1	Systems of assessment/evaluation/accreditation					

5.2	Professional/Occupational qualifications and certification					
5.3	Equipment and technical standards					
5.4	Information processing					
5.5	Equivalencies of qualifications implying standardization of curricula and testing, including aptitude tests					
5.6	Occupational safety and security through testing of materials, products and processes					
5.7	Environmental protection and conservation					

Frequency scale: 1-Never, 2-Rarely, 3-Sometimes, 4-Often, 5-Very Often
Source: UNESCO, 2001.

Reference

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2001, November 2). ***Revised Recommendation concerning Technical and Vocational Education*.** Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=13145&URL_DO=DO_PRINTPAGE&URL_SECTION=201.html