US-Korea Partners in Technology and Innovation Education Program (Part I): GNU-PSU Joint Korea Summer Program

Choong Lee[a,*], John L. Iley[b], Matthew Keller[b]

[a]*Department of Management & Marketing, Pittsburg State University, Pittsburg, KS 66762 USA*
[b]*Department of Technology Studies, Pittsburg State University, Pittsburg, KS 66762 USA*

Abstract

In Spring 2001, Pittsburg State University (PSU) and Gyeongsang National University (GNU) submitted the first "GNU-PSU Joint Korea Summer Program" to the Korean government through GNU. The PSU part of the proposal included a two-week plan for hosting and providing technology and business-related focus sessions, field trips, and entertainment activities for 40 Korean mechanical and transportation engineering students and two GNU faculty. The same program has been funded every year for the last four years since then.

Keywords: International Technology Education, Korea, International Partnership

1. Overall program description

The program provides for Korean participants to arrive at PSU late on a Sunday night (usually in the early hours of Monday morning) and begin activities early Monday. Monday morning begins with a formal welcoming reception and brief orientation; followed by a tour of the PSU Kansas Technology Center; and then lunch. After lunch, students receive a tour of the rest of the campus and a more detailed orientation. Typically, some rest and relaxation time is built into the day's schedule, because of their "jet lag".

The remaining nine days of their formal weekday schedule are primarily made-up of five and a half days of technology-related activities and three and a half days of business-related activities. Short general interest activities are sprinkled into some of these days. Some of these general sessions included English development, local cultural information, and presentations by Career Services.

The focus of this presentation is on the five and a half "technology days", including technical focus sessions, industrial tours and field trips, and also on closely related weekend activities. The activities are organized around a day with a theme (e.g., Technology Day 1- Automotive Day). For clarification, if certain activities are specific to only one year, that year is noted in parenthesis, (Year).

2. Technology-related presentations, industrial tours and experiences

The primary focus of Technology's five and a half weekdays is on transportation-related technology, since these Korean students are pursuing careers in aviation, transportation, and mechanical engineering. The topics and tours are organized with this goal in mind. Program organizers also believe that the Koreans should experience Technology Education, as it is taught in the United States, as well as learn more about problem solving and creative thinking.

Day 1 - Composites (morning, technology) and entrepreneurship (afternoon, business)

Lecture/Demos: Overview of Plastics and Plastics Applications in the Transportation Industry

Lab Activity Rotations

- Plastic processing labs (Group 1 – 15 students)
  - Injection molding
  - Transfer molding
  - Vacuum thermoforming
- Composite material processing (Group 2 of 15)

* *Corresponding author. Tel.: 620-235-4587, Email: lee@pittstate.edu*

Day 2 - Field trips: Boeing (Wichita) and Cosmosphere (Hutchinson, KS)

Tour: Boeing Aircraft Assembly Plant–Wichita
- Metal fabrication
- Heat treat and machining operations, including chemical milling
- Fuselage assembly operations
- Preparation of fuselage shipment to Washington

Tour: Cosmosphere
- Air and space museum
- Largest collection of Russian space equipment outside of Russia
- Examples of displays include: SR71 Blackbird, Apollo 13, X-15, Liberty 7 Mercury capsule

Day 3 - Automotive Technology

Lecture: Performance Testing
Demo: Drivability Dynamometer
Lecture: On-Board Diagnostics
Demo: Scan Tools
Lecture: SAE Mini-Baja
Demo: Engineering Design Competitions (video/live)
Lunch with video footage of SAE Mini-Baja competitions
Lab Activity Rotations (5) - 3.5 hours
- Dynamometer
- Scan tools
- Baja vehicles
- Pitt State Dragster/Toyota visual aids (demos/explanation)
- Transmission dynamometer

Special Demonstration: Pitt State Dragster "Burn-Out"

Day 4 - Diesel and heavy equipment, and farms Show

Presentations: Series of fluid power lecture - demonstrations
- Forklift hydraulic systems-
- Hydrostatic transmissions
- Pressure flow compensation and load sensing (advanced hydraulics)

Presentation: GPS Lecture/Demo - Speaker from Trimble
Lunch

Four State Farm Show
- Nearly 700 exhibit areas; 25,000 people attend per year. Exhibitors include: CAT, John Deere, Kubota, Case IH, and many more.

Diesel Lab Activities
- Forklift hydraulic systems labs
- Hydrostatic transmissions, pressure flow compensation and load sensing labs
- Miscellaneous heavy equipment and GPS-related activities

Day 5 - Kansas City trip and industrial tours

Tour: Harley-Davidson Motorcycle Plant Tour
- Frame manufacturing
- Metal stamping, tanks, and fenders
- Assembly of motorcycles
- Finishing and custom painting of "bikes"
- Final test and shipping

Tour: General Motors-Fairfax Assembly Plant Tour
- Assembly of uni-body car
- Build-up of powertrain on subframe
- Preparation for finish
- Paint (restricted, did not see)
- Mating of body and powertrain assemblies
- Soft trim line (installation of interior and glass)
- Pre-delivery testing on "dyno"
- Tour: A& E Machining
- Laser machining
- Stamping and related tool and die development
- High pressure abrasive water jet cutting
- Primarily subcontract jobs from automotive and aerospace

Isle of Capri Casino (Lunch)

Tour: Union Station
- Exhibits have included Titanic
- Restoration of major train station with historical displays

Tour: Hallmark
- Hallmark Exhibit Center – exhibit about their cards and entertainment projects
- Technology related exhibits include letterpress operation, product manufacturing, and simulation of complete printing and distribution system.

Day 6 - Technology education, creative thinking & problem solving

Presentation: Technology Education
- Technology Education in US
- Definition of Technology Education
- Description of K-12 Technology Education programs
- Technology for All American Project
- Preview of Today's Activities
- Tour: Depco, Inc.
- Product display - complete modular lab facilities
- Product development area
- Manufacturing facility

- Shipping and distribution center

Tour: Pitsco-Synergistic
- Complete modular labs
  - High school – "Pathways"
  - Middle school - "Explorations"
  - Elementary school - "Spectrum Systems"
- Research and development center
- "Dr. Zoon" appearance
- Multimedia production facility
- Shipping and distribution center

Presentation: Creativity and Problem Solving in Technology Education
- Introduction to problem solving
- Steps in problem solving process
- Introduction to creativity thinking
- Overcoming von Oech's "TEN Mental Locks" to creativity
- Creativity thinking exercises
- Other resources and approaches to creative thinking
- Introduction to the problem solving activity

TE Problem Solving Activity
- "Snuff the Candle" or the previous year's TECA Challenge
- Testing solutions and debriefing of activity

Other Technology Education Demonstrations (optional)
- CNC laser engraver and CNC sign maker,
- IDL Base Stations, and "Gorilla Ridge" competition
- "Conkle's Mechanical Function Display"

3. Weekend: Other technology-related activities

3.1 Winston solar race

The high school solar car competition used PSU facilities as an evening rest stop and the Korean students were given opportunity to visit with the racers and look at the cars.

3.2 MOKAN drag racing

The Korean participants are given VIP treatment as they watched the races, interviewed drivers in the pit areas, and toured the control tower. They are taken in small groups to the control tower so they could observe the races and the systems used to gather data from racing performances.

3.3 Silver Dollar City

A visit to Silver Dollar City provides opportunity to see technologies that were prevalent during the latter half of the 19th Century, including stamping mills, saw mill operations, glass blowing, forging and metal casting process, furniture building, gunsmithing, silversmithing, and many other crafts. Additionally, there is a wide variety of entertainment, including plays about the Civil War, various types of music, comedy skits, and characters in authentic dress throughout the theme park. These activities along with several theme-based amusement park rides provides students with a rich cultural experience.

4. Business-related, English development and career skills presentations

For the remaining three and a half weekdays, the Korean participants attend special classes in business (with business tours), intensive English and career development. Business-related topics include: entrepreneurship, international business, and business leadership. The students also visit local businesses and hear from the entrepreneurial founders of these businesses. The career development sessions include instruction on interviewing, dressing for success, resume development, web resources and resumes, and recommended protocols. Intensive English activities include assistance with spoken language and daily journals in English.

5. Findings and recommendations

The first year of the GNU-PSU Korea Summer Program was a major success, and resulted in subsequent funding and program refinement. Several ideas were developed for future programs (e.g., the GNU-PSU Joint SAE Mini-Baja Project), as well as "Summer Program" recommendations. Feedback from all participants, both PSU and GNU, resulted in the following recommendations and/or improvements:

- **Reduce student numbers.** Reduce the number of participating students from 40 to 30. This makes the overall program much more economical and manageable, logistically. In comparing 2001 (40) to 2002 (30), it was much easier and less expensive organizing transportation, setting up industrial tours, providing entertainment, and getting to know the students.

- **Industrial tours.** The industrial tours were the highlight for most students. Planners made sure to include an equal or greater number of tours in the future.

- **Hands-on activities.** The number of "hands-on" experiences in plastics, automotive, and Technology

education were well received and asked to be continued in subsequent programs. Many of the Koreans had learned theory, but not "experienced" these technology activities. PSU faculty found out they should not presume too much in terms of Koreans' previous experiences, including whether they had driven a car (For example, "dynamometer testing a vehicle" and "driving the Mini-Baja vehicle" required more instructional time than originally planned. This was because several students, though upperclassmen in college, did not have a driver's license and had never previously driven a car.)

- **PowerPoint slide handouts.** For the most part, student participants could read English very well, but had difficulty understanding spoken English. Presentations using handouts, that had slides with simplified notes to the side, were very beneficial. Technology prepared, in advance, notebooks with all the handouts and a table of contents. This proved helpful to the students, so they could concentrate on the visual aids and demos during the presentation. Faculty also learned it was best to speak slowly and enunciate precisely. This resulted in less need for the translator.
- **Pick dates carefully to maximize experience.** The dates of the summer program have a major impact on the types of activities and experiences that may be available, as well as costs. For example, the 2001 program was in the last two weeks of July and provided opportunities to tour Harley-Davidson and General Motors, as well as attend the Four State Farm Show and see Winston Solar Race Vehicles. In 2002, the Koreans found they could save several thousand dollars if their flight originated prior to July 1. Unfortunately, GM goes through plant changeover for new models and does not offer tours. Harley-Davidson does not offer tours during this period because they are introducing their new models to their sales people. And finally, the Farm Show is always held during the third week in July.

- **It's a two-way street.** The Koreans are here not only to learn about technology and business, but to also learn about America. US faculty, students and others, took the opportunity to learn about Korea and its culture (and even some Korean language) through regular personal interaction with the Korean participants. The whole "Korea Summer Program" was mutually beneficial.

- **"GNU-PSU Joint SAE Mini-Baja Project."** As a direct result of the students learning about the SAE Mini-Baja and experiencing it, the idea for the project was initiated, and subsequently developed and implemented.

6. Opportunities for PSU students in Korea

Each May, Dr. Choong coordinates PSU Study Abroad Program–Korea. This trip, which is scheduled for May every year, is open to PSU students and faculty. Priority is given to students and faculty that participate with the Korean students either in the *Korea Summer Program* or the *Joint SAE Mini-Baja Program.*

It is suggested that individuals planning to participate in the study abroad program enroll in special courses the semester before the trip. Suggested (but not required) courses include:

- Beginning Conversational Korean
- Introduction to International Business
- Korea in the Global Business Environment

During the two-week trip to Korea, several activities are planned. These include: tours and educational opportunities, cultural events, sightseeing with visits to Kyungju and Chinju. Chinju is the home of PSU's sister university, Gyeongsang National University. Participants also have the option to enroll in a post-trip course for up to three credit hours.

7. PSU and GNU student and/or faculty exchange program

Pittsburg State University and Gyeongsang National University have a formal agreement that provides for tuition waivers for individuals from these universities that want to participate in the student exchange program. Typically participants are doing this for one semester.

8. Replicating these PSU-GNU partnership programs on other campuses

Many universities have similar exchange programs in place. The key is to have someone on the home campus to serve as a "champion" for this type of program along with the Director of International Studies. PSU has faculty members from several different countries that serve in this capacity. In the case of Korea, Dr. Choong Lee was born and raised in South Korea, where he attended Seoul National University. After coming to PSU, he established himself as a liaison between PSU and universities in Korea and the Korean government. As a result of his efforts, relationships were established between PSU and the Korean universities. Currently, the strongest relationship is with Gyeongsang National University. For these programs to be replicated at other universities, the universities need to establish similar liaisons and relationships. Also, please note that the individual

responsible for International Programs and Services is a key figure in the success of these programs and an excellent source of international grant opportunities.

A major consideration in developing program like this is the level of "spoken" English ability demonstrated by potential participants. Knowing the participants' English skills is critical in developing instructional presentations and making tour arrangements. For high profile industrial tours (e.g., Boeing), the University had to provide names, ages, and visa information prior to receiving approval to bring the group.

A key recommendation is "not to assume too much", as was previously noted (e.g., Do not assume that all 20 year olds are licensed to drive.). Similar advice is true regarding safety in laboratory activities and on industrial tours. Do not assume that everyone is aware of common dangers. A brief orientation about safety and acceptable practices preceded each trip and laboratory activity. An interpreter was used on these occasions to assure understanding. Students were required to indicate verbally or with a show of hands their understanding. Students were randomly selected and asked a question, in follow-up to the safety orientation presentation, before continuing with the tour or activity.

9. Summary

In this series, *Part I. GNU-PSU Joint Korea Summer Program* has examined the development and implementation of a two-week, technology and business-related program, designed to accommodate over 30 Korean engineering students. Technical presentations, industrial tours, business guest speakers, and many opportunities to experience American culture were all a part of this program. The program has been very successful with continuous improvement made each year. A direct result of the *GNU-PSU Korea Summer Program* was the *GNU-PSU Joint Mini-Baja Project.* This project will be discussed in depth in Part II of this "US-Korea Partners in Technology and Innovation Activities" series.

Biography information

CHOONG Y. LEE is a Professor of Management at Pittsburg State University, Pittsburg, KS, U.S.A. His areas of research include operations strategy, quality management, technology management, and international business. Dr. Lee has more than fifty peer-reviewed articles published in major journals, in addition to more than a hundred refereed proceedings articles, and had numerous workshops, seminars and speeches in many conferences and meetings internationally.

JOHN ILEY is a University Professor/Chairman of Technology Studies at Pittsburg State University, Pittsburg, KS, U.S.A. Dr. Iley has lots of experience in international programs and projects with publications and presentations for the last 20 years. The experience includes teaching, program administration, curriculum writing, exchange program development, and international student training. In addition, he has a long list of publications, workshops, and presentations not only domestically, but also internationally.

MATTHEW KELLER graduated from Pittsburg State University with a B.S. and a Master's degree in Automotive Technology. He has extensive experience in international technology education and training program as a program coordinator as well as an instructor.