

NSU @ Alliance

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Abstract

Northwestern State University of Louisiana and Alliance Compressors have developed innovative programs designed to meet the needs of both the local industry and the University's regularly enrolled students. This cooperative arrangement has become known as NSU @ Alliance. Alliance began production of scroll air conditioner compressors for Copeland Corporation, Lennox Industries, and Trane Company in 1998. Its state-of-the-art manufacturing facility is a key ingredient in the educational process of Alliance employees and full-time NSU students. NSU offers programs in four general areas: Technician Programs, Maintenance Programs, Team Leader Programs, and Engineering Technology Programs. The latter two can lead to a Bachelor of Science degree from NSU. For its part, Alliance offers a series of promotions and pay raises that are tied to the employee's completion of specific blocks of courses or programs. In this paper, we present the NSU @ Alliance programs, their benefits for the university and for industry, and the innovative design of the industry/university relationship. Included are discussions of the teamwork used to develop the program and a description of the cooperative work experiences, research opportunities, and special problem-solving situations available through NSU @ Alliance. We offer suggestions for other universities and industries that may wish to develop similar innovative industrial ties.

I. Introduction

Distance learning is the current buzzword in education. In higher education, distance education is thought to be tearing down the brick and mortar walls of traditional universities faster than a wrecking ball. You hear comments like, "Everyone's doing it, and if you're not on the bandwagon, you'll be left behind." In the business world, corporate universities are becoming equally popular. "By the early 1980s there were 400 corporate universities. But the real growth occurred in the 1990s, when that number increased sharply to 1,600, including 40 percent of Fortune 500 companies¹." No longer is the training section a small part of the human resources empire, struggling to maintain its existence. Extremely tight labor markets and ever-increasing requirements for high-tech employees have heightened the requirement for full-fledged corporate training programs. Gone are the days, in the world of high-tech business, of simple "on-the-job" training in lieu of formal training. Also gone are the days of rubber-stamped college graduates who could be easily retrained for many of the jobs in industry. "Learning has traditionally been

the job of our nation's more than 3,700 institutions of higher education. But those were the days when graduation signified the end of formal learning and work the beginning of the 'real world.' This paradigm is giving way to a new model of learning where working and learning are blending together into one seamless activity¹."

Big names in the business world—both in the manufacturing sector (Motorola and Harley Davidson, for example) and the service sector (such as Burger King and Home Depot)—are establishing corporate universities. Corporate universities offer both challenges and opportunities for universities and for continuing education programs^{2,3}. "Motorola University is the largest of the growing wave of 'corporate universities' which companies have set up in the US in an effort to co-ordinate [sic] training and to ensure that their employees gain skills which are relevant and up to date⁴." In this paper, we present one of the opportunities for Alliance and Northwestern and the industry-university partnership that was created as a result.

II. In the beginning

Alliance Compressors was born as an industrial partnership among Copeland Corporation, Trane Company, and Lennox Industries to manufacture scroll compressors to be used in air conditioners assembled by Trane and Lennox. While scroll technology has been around for years, mass production of usable units has been fraught with problems. The facility to produce scroll compressors would have to incorporate state-of-the-art manufacturing technology.

Alliance eventually chose Natchitoches, Louisiana, the home of Northwestern State University, as the site of their new manufacturing facility partly due to the availability of the university. Even before the site was chosen, Alliance planning teams met with university officials, and with the faculty in the Department of Industrial and Engineering Technology to discuss the electronics engineering technology and industrial technology curricula offered at the university. After choosing Natchitoches as the site for the plant, and while the facilities were under construction, the new plant manager and human resources director approached NSU with the possibility of developing a joint training program for the future employees in their high-tech operation. This forward thinking, and the willingness to work together, produced the opportunity that is benefiting both parties. This industry-university partnership has become known as NSU @ Alliance. While building its workforce during the first year of operation, Alliance has hired several recent Industrial Technology (IT) and Electronics Engineering Technology (EET) graduates.

III. Developing Industrial Ties Through Teamwork

To follow up on the initial contacts between Alliance planners and Northwestern State University educators, the Chair of the Industrial and Engineering Technology (IET) Department at NSU and the Director of Human Resources at Alliance began exploring alternative employee training solutions. IET faculty and some advanced students participated as instructors in a pre-hire training program.

After the initial investigation, the University's president appointed a committee to work with Alliance representatives on how NSU could best meet their education and training needs. This ad-hoc group strove to make NSU @ Alliance a seamless process for the Alliance students,

including the course offerings, financial assistance, registration, and textbook and supply purchases. The teamwork approach to project development led to several worthwhile programs between NSU and Alliance.

IV. The NSU @ Alliance Programs

According to an article in the Financial Times, “Forty percent of corporate universities plan to grant degrees in partnership with accredited higher education institutions . . .³” NSU @ Alliance falls within that group. The Department of Industrial and Engineering Technology at NSU offers three degrees that, in various ways, meet the needs of Alliance for its employees. These degrees are:

1. An Associate of Science in Electronics (Engineering) Technology
2. A Bachelor of Science in Electronics Engineering Technology
3. A Bachelor of Science in Industrial Technology

For its part, Alliance wanted to establish training programs for several groups of employees. Each of these groups would require specialized training for its area of expertise. These groups are the following:

1. Technicians (in the following fields)
 - ◆ Production assembly
 - ◆ Production machining
 - ◆ Quality
 - ◆ Chemical
2. Maintenance personnel
 - ◆ Trainees
 - ◆ Technicians
3. Team leaders
4. Engineering personnel

As the planning for NSU @ Alliance progressed, the problem became one of matching NSU’s courses and curricula with the needs of Alliance. Despite the individualized programs for each technical area, a core of five courses emerged as important for every technical employee to be trained through NSU @ Alliance. As students advance beyond the core, each of the groups follows a different course progression. Further, the course progression for each group

culminates in a certificate or in one of the three degrees offered by NSU. The core courses, the course progression for each group, and diplomas awarded are shown in the Appendix.

V. Pedagogy

NSU @ Alliance courses are offered in a variety of locations and formats. Some are held during traditional times during the day and in the evening on the NSU campus. Others are given in the evening and on weekends at the Alliance facilities. Still others will be offered through the Northwestern State University videoteleconferencing system and via the Internet (and the World Wide Web). Other electronics and industrial technology courses are scheduled to be taught over the Internet in coming years.

The first NSU @ Alliance courses started during the Fall 1999 semester. The NSU faculty members are teaching many of the courses, but they are complemented by adjunct faculty, some of whom are Alliance engineers. Copeland Corporation, the majority owner of Alliance, has eight other manufacturing facilities in the United States and others overseas. Future plans call for including other Copeland plants in the partnership with Northwestern.

VI. Incentives and Benefits

Alliance Compressors strongly encourages its employees to take part in the NSU @ Alliance program. Incentives go far beyond the education they receive. Alliance will pay the tuition, fees, and cost of books for employees who are willing to take part in the program. In turn, the employee/student must earn a grade of "C" or better in the course.

However, the real incentives for the employees are promotions and pay hikes that are keyed to success in the various certificates and degree programs offered through NSU @ Alliance. This is one of the most innovative aspects of NSU @ Alliance. Alliance managers have agreed to establish promotions and pay raises that employees can earn by completing various phases of their education. Advancements are available from the lowest level technician programs, which result in certificates, to the highest level programs, which culminate in the awarding of a bachelor's degree from Northwestern.

As with every undertaking of this magnitude, there are some disadvantages, but the benefits to all far outweigh the increased workload. For its efforts, Alliance Compressors gets better-trained, high-tech employees. The price of the training and the time invested are well worth the increased productivity of trained employees. Alliance needs highly trained employees to remain competitive in the sophisticated scroll compressor manufacturing arena.

For its efforts, NSU would seem to benefit most from the increased student population derived from offering credit courses and degrees to Alliance employees. But the Department of Industrial and Engineering Technology stands to benefit in other ways. Alliance has agreed to contribute to the overall welfare of the department and the university in many ways.

1. Pre-training for the Faculty of the IET Department

In order to maintain leading-edge knowledge and competence in modern technology, faculty must continually strive to gain in-service training on a regular basis. Alliance

Compressors has agreed to provide training for the faculty in its modern state-of-the-art manufacturing plant. T.H.E. Journal reports that corporate sponsorships give educators “the opportunity to upgrade and update their skills and knowledge working with companies⁵.”

2. Cooperative (Field Experience) Opportunities for Students

Each semester, Alliance works with the IET Department to hire majors in co-op (field experience) jobs for that semester. Through this highly successful program, Alliance, NSU, and the students all win. The students earn good hourly wages, get invaluable experience, earn one or two academic credits, and get the opportunity for eventual full-time employment in the local area. Alliance gets trained recruits at a good price and the opportunity to scrutinize potential employees before they are offered full-time jobs. To date, the field experience has proved to be 100% successful. Every student in the program has become a full-time Alliance employee upon graduation. In addition to the enhanced industry/university relationship brought about through the co-op program, NSU gets students who bring their training and experiences back to the classroom to share with others.

3. Research and Special Problems for Students

Some students are already involved at Alliance with special problems and research. Alliance assigns a supervisor to monitor the students and provide guidance for selected students who are enrolled in the department’s “Special Problems” course. Currently, one student is assisting the safety and health manager at Alliance in improving the occupational safety and health program for the plant while another student is helping develop procedural policies for the tool and die section.

4. Technical Consultation and Troubleshooting

Alliance Compressors has agreed to provide to Northwestern’s faculty any technical consultation and troubleshooting needed to maintain operational efficiency of complex laboratory equipment such as computerized numerical control (CNC) mills and lathes. This will assure that the equipment will continue to provide educational service to the university and its students.

5. A Field Resource Location

Alliance Compressors has agreed to keep its “doors open” to the faculty and students of the Department by serving as a field resource location. As needed, faculty will schedule observation and study sessions at the Alliance plant to watch the production of products in the real-plant setting. In effect, Alliance serves as a multi-million dollar operational laboratory for NSU’s students.

6. Guest Lecturers and Technicians

Alliance has agreed to provide release time for selected engineers and technicians that will allow these employees to serve as guest lecturers or technicians in classes offered on

the Northwestern State University campus. This will greatly enrich the education and training of the students enrolled in technical courses.

VII. Suggestions for Developing Industrial Ties

NSU was fortunate to have Alliance Compressors locate its high-tech facilities close to the university. Alliance's forward-thinking management and its immediate need for personnel trained in the same skills that NSU offers in its electronics engineering and industrial technology degrees made for a natural association of the two entities. Other universities or industries may not be as fortunate. The first step toward developing industrial ties is to associate with an industry whose needs match the capabilities of the university. In some cases, this may require extra effort and compromises that neither of the partners had not previously been forced to make.

The development of NSU @ Alliance started as a marketing challenge. The ad-hoc committee of university and Alliance representatives had to convince the industrial partners of the benefits of the program. Modern managers understand the need for employee training. In the case of industry/university ties, management needed to be convinced of the appropriateness of the education and training that NSU could offer. Further, they needed to be convinced that it made economic sense for them to outsource this training to NSU. While Alliance could hire trainers for an in-house program, NSU offers credit courses, degrees, and highly skilled faculty—all at a distance of about two miles from the plant. Others working on industry/university partnerships should start by convincing the potential industrial partner of the benefits of a relationship with the university.

The second marketing challenge for the NSU @ Alliance committee was convincing the university's administration that the industrial partnership would supply an invaluable dimension to the university and several of its programs. In the case of NSU @ Alliance, the industrial partner offers a state-of-the-art manufacturing facility that is a real world "laboratory" for the subjects taught in NSU classrooms and labs. The students study computer numeric control (CNC) mills and programmable logic controllers (PLC) in their lectures and university labs. A short field trip to Alliance lets them see the same equipment in full operation on the plant floor. As further reinforcement, NSU graduates—the recent Alliance hires—have been completely involved in the installation, operation, and maintenance of Alliance's manufacturing facilities. While the industrial partners are being convinced of the benefits of the partnership, the university administration should also be shown the advantages.

Once the industry and university leaders are persuaded, representatives of each entity should begin meeting to develop the plan. This effort should comprise several key personnel. At minimum, the human resources manager, the training manager, and engineering managers from industry should be included. The university should involve the engineering or technology department head and dean, the registrar, the admissions officer, the comptroller, the financial aid officer, and the bookstore manager. This group should be charged with the task to fully develop the programs for the partnership and present the programs to the industry management and the university administration.

The last task is to implement the program. This step seems simple, but too frequently it becomes the burial ground for even the best-planned programs. Getting the program off the ground

requires tremendous effort from all involved. Inherent in program implementation is assessment and improvement. The NSU @ Alliance partnership is off and running—with the first classes having started in the fall of 1999. We still have the job of assessing the program and making further changes based on the results of the assessment. For example, we have already discovered that we must assess the students' math skills before they begin the NSU @ Alliance program. Some students need math remediation before they can be successful. We anticipate continuing our assessment of the program and continually improving it as we progress. There will be several years of growth and continued development of NSU @ Alliance before the first bachelor's degree is awarded.

VIII. Summary

We have described a special partnership between Northwestern State University of Louisiana and Alliance Compressors. We also have discussed the many benefits of the partnership, and we have offered some suggestions to others wishing to develop similar programs. Already, many other university/industry partnerships exist, and more will be developed over the coming years. A survey by Corporate University Xchange found that 62 percent of corporate universities are currently partnered with universities, and that percentage is expected to rise to 85 by the year 2003¹. In fact, NSU has cooperative arrangements with other regional companies. But, NSU @ Alliance is unique due to the close ties between academic advancement and job advancement.

For those, either in academe or in industry, seeking to establish partnerships like NSU @ Alliance, the following process steps will serve as an initial guide:

- ◆ Find the right industrial or educational partner by matching required skills and degree programs. Fine-tune the degree programs as necessary.
- ◆ Convince the industrial partner's top management of the benefits of the partnership.
- ◆ Convince the university's administration on the benefits of the partnership.
- ◆ Develop the plan. Initially, involve key leaders from both industry and the university to ensure that they agree to a set of mutual goals. Ad hoc groups and key staff members may work out the details of the plan.
 - Resolve issues with application, registration, matriculation, financial aid, books, classrooms, professors, and others.
 - Relate the students' progress in education to progress on the job.
 - Offer both educational and work-related incentives to the students.
- ◆ Implement the plan.
- ◆ Assess the implementation.
- ◆ Make continual improvements.

As of fall 1999, NSU @ Alliance began its first semester. Its benefits are already apparent. Alliance employees are starting to reap the benefits of both a college education and training in technology programs. Alliance is just beginning to receive advanced training for its workforce. In addition, the Department of Industrial and Engineering Technology at NSU has seen a significant increase in its enrollment. But most importantly, the potential future benefits to Alliance and its sister plants, to NSU, and to the economy of the local area seem boundless.

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Appendix

Table 1. Courses and Diplomas for Technicians and Maintenance Personnel

<u>Training Group</u>	<u>Courses</u>	<u>Diploma</u>
Core courses (all groups)	Technical Mathematics DC Circuits and Laboratory Blueprint Reading Metals Technology	None
Technicians:		
◆ Production Assembly	General Welding Materials and Processes of Industry Manufacturing Processes	Certificate
◆ Production Machining	Metals Machining Advanced Metals Machining Manufacturing Processes	Certificate
◆ Quality	Metals Machining Quality Control Materials and Processes of Industry	Certificate
◆ Chemical	General Chemistry I General Chemistry II General Chemistry Laboratory	Certificate
Maintenance:		
◆ Trainee	AC Circuits and Laboratory Basic Electronics and Laboratory Digital Electronics I and Laboratory Instruments and Controls and Laboratory	Certificate
◆ Technician	General Chemistry Electrical Fabrication Laboratory Digital Electronics II and Laboratory Advanced Electronics and Laboratory Composition and Rhetoric I and II Introduction to Industrial Technology Orientation	AS, Electronics (Engineering) Technology

Table 2. Courses and Diplomas for Team Leader Development

<u>Training Group</u>	<u>Courses</u>	<u>Diploma</u>
Team Leader:		
◆ Certificate Program	Production Organization and Management Elements of Occupational Supervision Manufacturing Processes	Certificate
◆ BS, Industrial Technology	Orientation Intro to Industrial Technology Technical Drafting Computer Aided Drafting and Design Metals Machining Quality Control Production and Inventory Control Motion and Time Study AC Circuits and Laboratory Materials and Processes of Industry Adv. Safety Engineering and Management Basic Electronics and Laboratory Instrumentation and Controls and Laboratory Elective Survey of Calculus Mathematics of Statistics Intro to Computer Application Introduction to Programming Tools General Physics and Laboratory General Chemistry Economics Exploring the Arts Composition and Rhetoric I and II Technical Writing Literature Fundamentals of Speech History and Social Science Health and Personal Fitness	BS, Industrial Technology

Table 3. Courses and Diplomas for Alliance Engineering Personnel

<u>Training Group</u>	<u>Courses</u>	<u>Diploma</u>
Engineer		
◆ BS, Electronic Engineering Technology	Orientation Intro to Industrial Technology AC Circuits and Laboratory Basic and Advanced Electronics and Laboratories Digital Electronics I and II and Laboratories Microprocessor Fundamentals and Laboratories Instrumentation and Controls and Laboratory Automation and Control and Laboratory Communications Electronics and Laboratory Digital Communications Project Design I and II Statics and Strength of Materials Program Design I (C++) Technical Drafting Elements of Occupational Supervision Electives Calculus General Physics I and II and Laboratories General Chemistry Biological Science Exploring the Arts Composition and Rhetoric I and II Technical Writing Literature History and Social Science Fundamentals of Speech Health and Personal Fitness	BS, Electronics Engineering Technology