

What Happens to Industrial Technology Alumni? A Comparative Look at Two Universities' Graduates

William Brauer

My association with two industrial technology programs at two very different universities sparked my curiosity about their similarities and differences. This prompted a follow-up investigation to gather preliminary data about the graduates of programs that appeared to be similar at two institutions. The information gathered, along with my observations about both educational programs, permit me to briefly describe the similarities and differences of the curriculum at both institutions and their programs, as well as present job titles of their graduates and to offer suggestions about possible additional research and implications for the profession.

Nationally, the number of bachelor graduates in technology has increased in the past decade. This increase is reflected in the growth of the School of Technology at Purdue University. Since its beginning in 1964, the School of Technology has graduated over 18,000 students and has grown into a school composed of eight departments representing many different technologies (Lawshe, McNelly, and Gentry, 1990; Hubele, 1994). Industrial Technology is one of these departments.

Geographically Purdue University is located in north central Indiana in the city of West Lafayette. There are over 40,000 students on the West Lafayette main campus. The University is classified as a Research I University (Res I). It has many undergraduate and graduate degree programs. The population of the greater Lafayette area is over 100,000 and encompasses an area with a strong industrial base. The Industrial Technology Department offers a Bachelor of Science degree and a Master of Science in Industrial Technology degree.

This description contrasts with Bemidji State University. Located about 100 miles south of the Canadian border in northern Minnesota, Bemidji

State University is a former teachers' college. The University is classified as a Master's University (MA I). The University is located in Bemidji, Minnesota and is part of the Minnesota State College and University system. The population of Bemidji is around 11,000. The University's enrollment is approximately 4,300 and over 25,000 students have graduated from the institution (Hauser, 1998). The regional population is rural, and while there is some industry, it is very limited, scattered across northern Minnesota, and usually small compared to the more industrialized Midwest near Purdue University. Many of the students are first generation university students.

Until 1998, Bemidji State University students were not required to take math unless it was required as part of their major. The Industrial Technology Department did not and does not require math as part of the department requirements. All students were required to take one academic year of science. Students could take biology, physics, chemistry, geology, or physical science for non-science majors. The Industrial Technology Department did not require a specific science sequence but physics and chemistry were recommended. Also, computer science was not and is still not required.

Bemidji State University has graduated over 2000 students from the Industrial Technology Department since its beginning as an Industrial Arts program. The graduates come from a department that is one of the largest on the Bemidji State University campus with approximately 250 majors. In the Industrial Technology Department, there are four programs. They are Design Technology program, Industrial Technology Teacher Education program, Vocational Education program, and Industrial Technology program. Within the Industrial

Technology program, there are six emphasis areas. These emphasis areas are Industrial Design Management, Model Making, Graphic Design Management, Construction Management, Manufacturing Management, and Manufacturing Technology. The only graduate program is in Industrial Technology Teacher Education.

The data used in this article focuses on the Manufacturing Management and Manufacturing Technology emphasis area graduates because these two emphases most parallel the offerings at Purdue University.

Bemidji State University and Purdue University differ in Carnegie Classification (carnegiefoundation), size, regional location, industrial base, and

Table 1. Comparison by Area of Instruction, 1999 Catalogues.

Areas of instruction	Bemidji State University Semester Credits		Purdue University Semester Credits	
	English	8	6.3%	6*
Math	3	2.3%	5**	4.2%
Science	7	5.5%	10**	8.3%
Computer Science	0	0%	6**	5.0%
Free Electives	42	32.8%	15	12.5%
Required in Major	68	53.1%	63***	52.5%
Technical Electives	0	0%	15	12.5%
Total	128	100%	120	100%

*Option to take 3 Cr Business Writing or Speech Communications

** Option to take a 3 CR Math, Science, or Computer Science

*** Includes the 3 CR from the ** option to take a 3 CR Math, Science, or Computer Science

background of students. Table 1 compares their curricula. The control of the course of study by the student is more structured at Purdue University (<http://www.purdue.edu/>). Bemidji State University students are reasonably free to select 32.8% of the total credits (Hauser, 1998). Of the 32.8%, 16.4% must be selected from the liberal education requirements (over 170 courses). This 32.8% compares to only 12.5% Free Electives in the Industrial Technology program at Purdue University. The other 16.4% of the 32.8% can be almost any offered class. Computer Science courses are not required in the Industrial Technology program at Bemidji State University. In general, the Industrial Technology pro-

gram at Purdue University requires more credits in math and science than Bemidji State University. It is the purpose of this study to identify the job titles of the graduates and compare the job titles of graduates at these two different universities.

Methodology

Population

The population for this study included bachelor degree recipients from the Industrial Technology Program in the Industrial Technology Department with Manufacturing Management and Manufacturing Technology emphasis areas at Bemidji State University and the Industrial Technology Department in the School of Technology at Purdue University. The graduates from the Industrial Technology Program in the Industrial Technology Department at Bemidji State University were selected from the Industrial Technology Program in the period from 1989–fall quarter of 1994. From this sample of 230 graduates, 30 respondents were identified from manufacturing. The bachelor graduates from the Industrial Technology Department at Purdue University were selected from those who had graduated between the period of 1988 – 1992 (Brauer, 1993). Since the program at Purdue University does not have emphasis areas, it was not necessary to identify emphasis areas. Therefore, a random selection was made from these graduates to form a sample of 100 individuals.

Research Design

In the Bemidji State University study, an instrument was developed as part of an alumni survey for the University's Industrial Technology Program. This questionnaire was reviewed, edited, and approved by three department faculty. The questionnaire at Purdue University was developed to investigate a master's program while the questionnaire at Bemidji State University was developed to gather data as part of an alumni review for program analysis. While there were differences between the two questionnaires regarding the researcher's particular goals, both questionnaires surveyed alumni and included a question asking for the respondent's job title.

Data Collection

At Purdue University, alumni questionnaires were mailed to a random sample from the Alumni Association mailing list representing the Industrial Technology Department. Included with the questionnaire was a personalized cover letter explaining the purpose of the survey and why it was important for the reader to fill in and return the questionnaire in a timely fashion (Brauer, 1993). A second mailing was conducted after 14 days. This mailing was conducted in the same manner as the first mailing.

The Bemidji State University alumni questionnaires were mailed to graduates from the Industrial Technology Program. These alumni were from all the emphasis areas. Graduates with Manufacturing Management and Manufacturing Technology emphasis areas were identified from the responses to the survey. Included with the questionnaire was a personalized cover letter explaining the purpose of the survey, and why it was important for the reader to fill in and return the questionnaire in a timely fashion. A second mailing was not performed.

Results and Analysis

The responses consisted of self-report responses. The data recorded were the job titles of the respondents. Percentages were used to describe the size of the groups.

An overall response rate from the Purdue alumni was 45 percent. The response rate from Bemidji State University Industrial Technology Program alumni was 40 percent.

The self-reported job titles were divided into similar groups. These title groups were engineer, manager/supervisor, sales, professional, and miscellaneous. Job titles were placed into groups based on common keywords. Titles with the singular term engineer in the title or the first of two terms were placed into the engineer group. Titles placed into the manager/supervisor group were placed in the group if the job title's first or second term was manager or supervisor, but engineer was not present, in the title. In addition, titles with the term coordinator were placed in the manager/supervisor group. Titles placed in the professional group were titles typical of specific career positions. The miscellaneous group contained titles that did not readily fit into one of the groups.

Percentages were calculated to determine the percent of titles in each group (Table 2). The percentages in each grouping comparing Purdue graduates and Bemidji State graduates were similar. Approximately

71% and 76% respectively, of the graduates were in the engineer and manager/supervisor groups.

Implications

The purposes of this article were to present the job titles of Industrial Technology graduates and compare the job titles of graduates from a Bemidji State University with the job titles of graduates from Purdue University. It should be noted that descriptions of job tasks would be more genuine than job titles but job tasks were not available. The differences in curriculum, as well as their many other differences such as Carnegie Classification, size, and location might lead one to suspect that the graduates would have different job titles.

Based on an examination of the data, the following conclusions were derived. There were similarities in the job titles of the graduates. From the data, 33% of the Industrial Technology bachelor degree recipients from Purdue University and Bemidji State University had engineering titled positions; 38% and 43% respectively had manager/supervisor positions; 14% and 13% had professional positions; and 14% and 10% were in the miscellaneous group. Furthermore, it is apparent that Industrial Technology bachelor degree recipients secure the largest percentage of positions in the engineering and manager/supervisor job title categories.

Since Industrial Technologist is not a common job title, the actual bachelor degree obtained by the individual is obscured by the job title. Typical job titles include industrial engineer, production supervisor, manufacturing engineer, and variations of these titles (Table 2).

The data suggests that a more structured Industrial Technology degree program with more credits directly related to Industrial Technology (much like Purdue University with its 12.5% free electives) and an Industrial Technology degree program with a more open degree program with a larger liberal education requirement (32.8%) were both effective in securing the same or similarly titled jobs. In addition, the job title similarities may indicate that school size, regional locations, industrial base, and student background do not affect job titles of Industrial Technology bachelor degree recipients.

In addition, differences in the curricula are in the areas of math and computer science. During the period in which these graduates were surveyed, the Industrial Technology program graduates at Bemidji

Table 2. Job Titles Compared for IT Graduates.

%	Purdue University	%	Bemidji State University
33	Engineer 1. Clinical Engineer 2. Control Engineer - Staff Associate 3. Design and Fabrication Engineer 4. Detail/Design Engineer 5. Facilities Engineer 6. Field Engineer 7. Industrial Engineer 8. Industrial Engineer 9. Manufacturing Engineer 10. Manufacturing Engineer 11. Process Engineer 12. Production Engineer 13. Quality Engineer 14. Safety Engineer	33	Engineer 1. Current Product Engineer 2. Manufacturing Engineer 3. Project Engineer – QA 4. Project Engineer 5. Manufacturing Engineer 6. Staff Mining Engineer 7. Process Engineer 8. Manufacturing Engineer 9. Materials Engineer 10. Site Safety Engineer
38	Manager / Supervisor 1. Manufacturing and Engineering Manager 2. Quality Assurance Manager 3. Quality Control Manager 4. Shift Manager – Assistant Coordinator 5. Assembly Foreman 6. Fabrication Supervisor 7. Foreman (First-line Manager) 8. Maintenance Supervisor 9. Operations Supervisor 10. Production Supervisor 11. Production Supervisor 12. Quality Assurance Supervisor 13. Site Supervisor 14. Sales Coordinator 15. Production Team Leader 16. Manager	43	Manager / Supervisor 1. Plant Manager 2. General Manager/Manufacturing Engineer 3. Plant Manager/Engineer 4. QC & Production Manager 5. Senior Project Coordinator 6. Predictive/Preventative Maintenance Coordinator 7. Project Coordinator 8. Manufacturing Engineering Director 9. Plant Supervisor 10. Electrical Supervisor 11. Roughmill Supervisor 12. QC Supervisor/Engineer 13. Instrumentation Supervisor
14	Professions 1. Drafting Technician 2. Fire-fighter/EMT 3. Illustrator 4. Naval Flight Officer 5. Quality Control Technician 6. Scientist	13	Professions 1. Mold Maker/ R&D 2. Pipe Fitter 3. Production Technician 4. Safety Coordinator – Plant Millwright
14	Miscellaneous 1. Administrative Assistant 2. Graduate Research Assistant 3. In-Plant Technician Trainee 4. Logistic Analyst 5. Production Scheduling 6. Sales Representative	10	Miscellaneous 1. Planner 2. Operator 3. Maintenance Planner

State University may not have had any math. Data are not readily available to indicate how many and which students from the survey did not complete a math course as part of their University experience. In the area of computer science, Industrial Technology program graduates at Bemidji State University are not required to take any computer science classes, while those at Purdue University take at least 6 credits. Curricula during this period have changed some-

what over time; however, the overall structure of the degree programs has not changed substantially. Research comparing the job titles of graduates from current catalogues might be useful in identifying the impacts of these differences in math and computer science.

Job titles do not describe the job that is performed, pay, or other parameters of particular positions. They are at best a rough indicator of responsi-

bilities and duties. A study of specific job tasks is an area for further study. Furthermore, a follow-up investigation into the exact backgrounds of the students may be useful.

This article does provide a glimpse of bachelor graduates from two different Industrial Technology programs. Both Industrial Technology programs have graduates at about the same amount in similarly titled jobs. Assuming that most graduates obtain jobs in their region, one could speculate that the recommended National Association of Industrial Technology (NAIT) curriculum should continue to provide flexibility for each institution to fulfill that particular institution's regional needs. In addition, the NAIT accreditation standards should continue to

provide opportunity for dissimilar institutions to be eligible for accreditation.

The job titles reported from these graduates also signal this: Industrial Technology program graduates obtain a majority of positions which are engineering and manager oriented. Based on the number of graduates from the many Industrial Technology Programs throughout the nation, the next time you meet a manager or engineer you may well be talking to an Industrial Technologist.

William M. Brauer is a professor at the Department of Industrial Technology at Bemidji University in Bemidji, Minnesota. He is a member of Alpha Gamma Chapter of Epsilon Pi Tau.

References

- Brauer, W. M. (1993). *A needs assessment for a Master of Science Degree in Technology at Purdue University*. Unpublished doctoral dissertation, Purdue University.
- carnegiefoundation available at <http://www.carnegiefoundation.org/OurWork/Classification/CIHE94/PartIIfiles/PartIIclassIndex.htm>.
- Hauser, S. (Ed.). (1998). *Bemidji State University undergraduate catalog*. (Available from [Admissions Office, Bemidji State University, Bemidji, MN 56601]).
- Hubele, R. C. (1994). *Purdue University School of Technology employment picture - 1994*. (Available from [Hubele R. C., Assistant Dean, Office of Manpower Studies, Knoy Hall of Technology, Purdue University, W. Lafayette, IN. 47907]).
- Lawshe, C. H., McNelly, G. W., & Gentry, D. K. (1990). *The first 25 years of the School of Technology*. West Lafayette, IN: School of Technology, Knoy Hall, Purdue University.
- Purdue University catalog available at <http://www.purdue.edu/>.