

AN ASSESSMENT OF THE PERFORMANCE OF ENGINEERING TECHNOLOGY GRADUATES

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ABSTRACT

Graduates of Engineering Technology Programs continue to perform at high levels of employer satisfaction in very diverse positions. This paper describes a study performed by The University of Dayton Engineering Technology Department of graduates between the years of 1992 - 1996. This study addresses salary levels, satisfaction of graduates with the Engineering Technology Program, academic preparation, and career mobility opportunities. The study includes feedback from the employers of the graduates relative to their satisfaction with academic preparation and performance of the graduates. A comparison is made of this information with similar work done in 1991 that covered a twenty-five year period of bachelor degree graduates.¹ This paper also provides the procedures and approaches used in completing this assessment, and other instruments that are used for similar purposes.

INTRODUCTION AND BACKGROUND

The University of Dayton offers four programs in Engineering Technology, all of which are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.² In preparation for a Fall 1997 visit, the Department of Engineering Technology conducted a survey instrument to meet the requirements for re-accreditation. The survey was sent to all graduates since the 1991 accreditation visit and to their employers. The rate of returns was more than adequate enough to provide clear information on the performance of our graduates, their satisfaction levels, and the views of their employers. The information is also consistent with the other vehicles used in our total plan for assessment. The other instruments used in the assessment plan include a "Cap and Gown" survey, named because it is a very brief questionnaire administered to students that are literally lined up for the graduation ceremony, and longer term alumni surveys that reach further back for data from graduates.

While each of the survey instruments has a different focus and goals, the general picture that is generated from the surveys allows us to assess the job placement, earnings capability, and career mobility of the graduates. They also allow us to determine the graduates' satisfaction with the program, their academic preparation, and their thoughts on curriculum development. The surveys completed by the employers of our graduates allow us to measure their views on the program at the university and the type of graduates that we produce.

RELATED STUDIES

A number of recent studies indicate that University of Dayton Engineering Technology graduates are faring well. Robert L. Mott performed a study of Engineering Technology graduates at the University of Dayton between 1966 and December 1991.¹ Mott concluded that graduates are

performing at a very high level in terms of position, responsibility, and salary. He concluded that over 98% of graduates were working in technical positions pertinent to their fields, 35.6% of the positions also involved management, and that Engineering Technology graduates compared favorably with engineers of all disciplines according to the Engineering Manpower Commission data.

The Engineering Technology Department regularly conducts a survey of graduates just prior to commencement exercises.³ Information about the level of job search activities conducted, pending job offers, starting salaries, etc., are gathered. The latest survey indicated that 75% of graduates either had job offers or offers pending at the time of graduation. Starting salaries ranged from \$30,000 to \$46,000.

A survey by Robert L. Wolff identified career potential of University of Dayton Engineering Technology graduates.⁴ The Wolff study identified 27 “Corporate High Flyers”, i.e., Chairman, President, CEO, General Manager, etc., and an additional 21 entrepreneurs. The study further identified that one Engineering Technology graduate was serving on the University Board of Trustees and another is currently Chair of the School of Engineering Advisory Council.

A study by David Myszka explored demand for University of Dayton Engineering Technology graduates.⁵ The Myszka study indicated that the average starting salary of 1996 Engineering Technology graduates and salaries for 1996 Engineering Technology Cooperative Education students were among the highest in the University.

METHODOLOGY FOR THE STUDY

Recent college graduates are a very mobile group of people who are difficult to reach with mailings. Since the survey targeted graduates over the last five years, we knew that many of these individuals have moved at least once. Still, we used a mailing list provided to us by the Alumni Relations office at the university. The mailing included a letter from the Chair of the Department of Engineering Technology and a one-page survey to be filled out by the graduate. Also included was a one page letter and survey to be forwarded by the graduate to his or her employer. Self-addressed, stamped envelopes were included for each survey. The letters and the survey forms are included at the end of this paper. Graduates were instructed to fill out the graduate survey and return it, and forward the employer survey and its return envelope to their supervisor at work.

The total number of mailings for our 1991 – 1996 graduates was 546. We used one technique to increase the rate of return on the surveys. Each faculty member went through the mailings before they were sealed. Each pulled out mailings to graduates that they knew well, had advised, or had worked with in extracurricular activities. The faculty members then took the time to write a very short note to the graduate. Every mailing that went out had a hand written “post-it” note on the front page. If the parents received the mailing, we presume that they were more likely to forward it to a son or daughter if it was a note from a former professor, rather than “just another survey”. Also, the graduates saw the importance of filling out the instrument, as a favor to that professor if nothing else.

The surveys were very short and focused on the needs of assessment for the purpose of accreditation. This information is, however, the key information for the institution, and could be obtained with a short instrument that was not very cumbersome or intimidating. When we found ourselves lobbying for additional questions, we tried to stay focused on the need for a solid percentage of returns and reminded ourselves of the natural trade-off between the two.

The graduate and employer survey for the 1997 Fall visit addressed the following areas:

Graduates:

- Work on advanced degrees
- Present Employment Position, Year started, Job title, Annual Salary
- First Position after graduation, Year started, Job title, Annual salary
- Job classification

A rating of:

- Satisfaction with the program
- Academic preparation
- Career mobility opportunities
- Satisfaction with starting salary
- Satisfaction with initial job assignment and title

Employers:

- Degree of satisfaction with academic preparation
- Degree of satisfaction with performance
- Degree of satisfaction to begin work with minimal training
- Comments

RESULTS OF THE STUDY

The survey received an overall return rate of 44% from graduates. The employer responses could only be obtained through graduates that passed them along to employers. Since access to employers was one level removed, that expected return would be less than that of graduates. We received employer forms for 30% of our graduates, which represented 69% of the graduates that returned surveys and personally forwarded surveys to the employers. The breakdown of returns is shown in Table 1.

TABLE 1. Summary Of Survey Counts - Engineering Technology Graduates

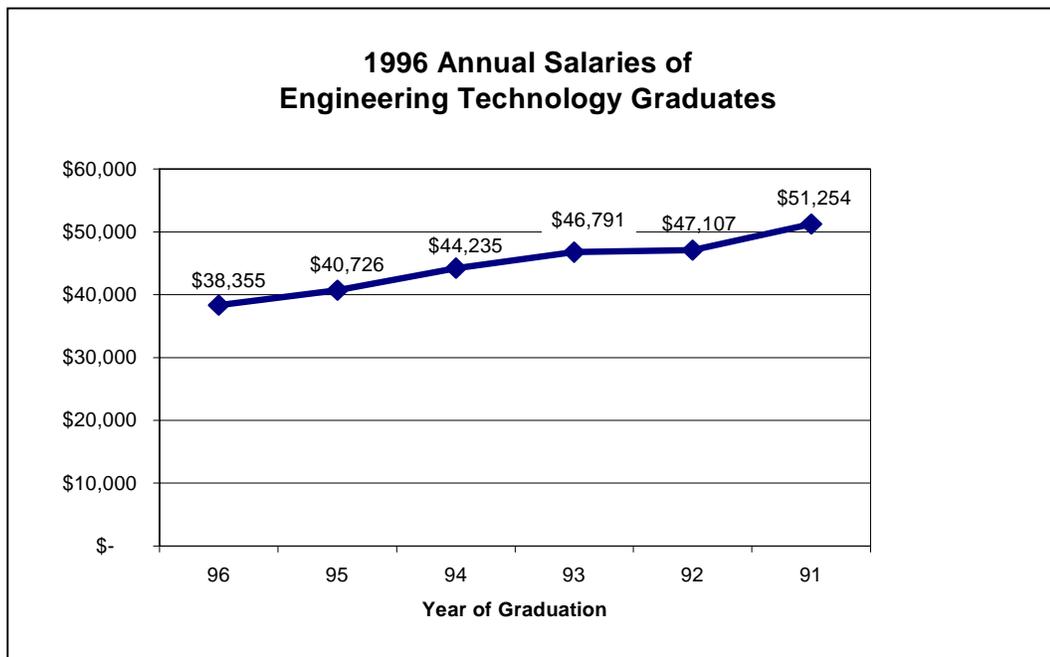
Major	Graduate Survey Results			Employer Survey Results		
	Number Sent Out	Number Returned	Percent Returned	Number Returned	Percent of total returned	% of Graduate Returns
EET	132	50	38%	32	24%	64%
IET	140	52	37%	35	25%	67%
MCT	242	121	50%	84	35%	69%
MFG	32	18	56%	15	47%	83%
Total	546	241	44%	166	30%	69%

SALARIES REPORTED BY GRADUATES

The surveys requested salary data, and indicated that the individuals and salaries, along with other feedback would be kept confidential and would only be presented when the pool was large enough to provide confidentiality. Each of the four programs presented returns for individual majors, but there was not a significant variance. Results presented in this paper are for the combined engineering technology graduates.

The mean salary information for Engineering Technology overall is presented in figure 1 below. The results indicate the starting salary values for 1996, as well as an indication of the salary increases for the graduates of up to five years prior.

Figure 1. Salaries Reported by University of Dayton BSET Graduates



WHERE GRADUATES ARE EMPLOYED

This survey also identified the employers and the types of positions held that resulted in the salaries shown in the figure above. A listing representing some of the employers is shown below in Table 2. Engineering Technology graduates are employed at a wide variety of large and small firms. The list includes many of the most respected companies in American Industry such as Andersen Consulting, Boeing Commercial Airplane, Ford Motor Company, General Motors, Hewlett-Packard, Honda, Lockheed Martin Corp., and Proctor & Gamble.

Table 2. Employers of Surveyed Graduates

A. O. Smith APC Plymouth	Harletron Inc.	Omega International
Alcatel Telecommunications	HBD Industries	O'Neal Steel Inc.
Alcoa Building Products	Heapy Engineering	Owens – Corning
Andersen Consulting	Heidelberg Finishing Systems	Packaging Res., Inc.
Applied Mechanical Systems	Hendrickson Trailer Susp Sys	Pahnke Engrng Co.
Arbor Industries Inc.	Hewlett – Packard	PAKO Inc.
Arvin Industries, Inc.	Hill-Rom Inc.	Parker Hannifin
Atlantic Tool & Die Co.	HOK/K Industrial Inc.	PCC Airfoils
AWP Industries	Honda of America	Pentagon Engrg Corp.
Bank One	Horiba Instruments	Perceptron Inc.
Boeing Commercial Airplane	Hydromat Inc.	Perforating Company
C. L. Douchette Inc.	Integrated Process Systems	Phoenix Pkging Corp.
Cadillac Gage Textron	Intool, Inc.	PMI Food Eqp. Group
Chemineer Inc.	Invotec Engineering, Inc.	Prestolite Power Corp.
Cincinnati Bell Telephone	ITT Automotive	Process Eqp. Co.
Computer Aided Systems, Inc.	Jamestown Precision Tooling	Procter & Gamble
Computer Sciences Corp.	JAYCOR	Production Cntrl. Units
Continental Hose	Lakeland College	Rich's/Laz./Goldsmiths
Copeland Corporation	Lear Corporation ISG	Rotex Inc.
Copperweld Corporation	Liebert Corporation	Sachs – Auto / Mktg
CPI Corp.	Lincoln Electric	Savage Industries
Cummins Engine Company	Lockheed Martin Corp.	Scott Industrial Sys.
Cutco Cutlery Corporation	Mansfield Typewriter Co.	Select Tool & Die Corp.
Dayton Power and Light Co.	Marathon Oil Co.	Senco Products
Dayton Thermal Prod Chrysler	McDonnell-Douglas Aerospace	Sorbothane Inc.
Delphi -GM Corp.	Metz Jade Associates, Inc.	Stanley Electric
DSCC-VOC	MFG / Search Inc.	Sunoco Products
Duriron	Middletown Police Dept.	Techman Sales Inc.
Electronic Data Systems	Ministry of Comm. - Kuwait	The Lincoln Electric .
Fanuc Robotics NA Inc.	Minster Machine Company	Timken Company
Ford Motor Company	Motoman Inc.	Toner Company
General Motors Truck Group	MTC	Tox Pressotchnik
Glacier Daido America	Nacom	Trane Company
Globe Products Inc.	Navistar International	University of Dayton
Gorbel, Inc.	Norcold	Voith Sulzer Paper Tech
Green Tokai Co. LTD	NUPRO Company	Whirlpool Corp.
Grob Systems Inc.	Nutro Machinery Corporation	Winco Industries Inc.

FUNCTIONS PERFORMED BY GRADUATES

The job classifications indicated by our graduates' show that a majority of them are employed in responsible positions related to the application of engineering principles. Table 3 summarizes the functions performed by graduates.

Table 3. Functions Performed by Engineering Technology Graduates

Item	Function	Number	Percent
1	General Management	48	19.90%
2	Design Engineer	20	8.30%
3	Product Planning and Design	14	5.80%
4	Product Evaluation and Testing	5	2.10%
5	Controls Engineer	4	1.70%
6	Research and Development	7	2.90%
7	Manufacturing Engineering/Management	48	19.90%
8	Process Design	12	5.00%
9	Quality Assurance	12	5.00%
10	Sales/Marketing	12	5.00%
11	Service Industries	17	7.10%
12	Field/Applications Engineering	7	2.90%
13	Hardware/software Engineering	9	3.70%
14	Other Technical Areas	26	10.70%
Total		241	100%

In order to compare the data collected in this study to the data collected by Mott¹, the data in Table 3 was combined into categories that are similar to those in the Mott study. Items 2-6 of Table 3 are combined to form the design-related functions; 7-9 are the manufacturing-related functions; 10-12 are the sales/service-related functions; and 13-14 are the "other technical functions." A significant increase is seen in the percent of Engineering Technology graduates going into general management functions within five years of graduation. This comparison is presented in Table 4 below.

Table 4. Comparison of Function Data with Mott Study

	1991	1997
General Management	6%	20%
Design-related Functions	31%	24%
Manufacturing-related Functions	28%	30%
Sales/Service-related Functions	25%	15%
Other Technical Functions	8%	11%

GRADUATE SATISFACTION

The level of satisfaction of the graduates with the program at UD and their careers is indicated in Tables 5-7 below. A comparison with the Mott¹ results from 1991 is provided. The results from this study compare favorably with the 1991 results. The graduates expressed satisfaction with the Engineering Technology Program, their academic preparation, and their career mobility potential.

Table 5. Overall Satisfaction with the Engineering Technology Program

	1991	1997
Excellent or Above Average	82%	87%
Average	16%	13%
Below Average	2%	< 1%

Table 6. Satisfaction with Academic Preparation

	1991	1997
Excellent or Above Average	74%	85%
Average	23%	14%
Below Average	3%	< 1%

Table 7. Career Mobility Opportunities

	1991	1997
Excellent or Above Average	60%	80%
Average	32%	19%
Below Average	8%	< 2%

Graduates were asked to rate two additional items that were not assessed in the Mott study. These two items, satisfaction with their initial starting salary and initial job assignment and title are given in Tables 8 and 9 below.

Table 8. Satisfaction with Initial Starting Salary

Excellent or Above Average	54%
Average	34%
Below Average	12%

Table 9. Satisfaction with Initial Job Assignment and Title

Excellent or Above Average	69%
Average	24%
Below Average	7%

EMPLOYER SATISFACTION WITH GRADUATES

One key element in this type of an assessment is from the perspective of the employers. Many times academicians get into debates over who are our customers. Some argue that it is the student while others say that it is the employers. It is clear to the authors that the right answer is “at least both of those.” Jay H. Zirbel⁶ identified entry-level tasks that employers expected their employees to be able to perform in the year 2000. To see how well we are doing in providing the needed skills expected by employers of our graduates, we asked the employers to assess the performance of the graduates. Tables 10 and 11 provide the overall satisfaction of employers with academic preparation and performance of graduates along with the 1991 Mott results. Table 12 provides the results of an item not assessed by Mott, employer satisfaction with the ability of graduates to begin work with a minimum of training.

Table 10. Employer Satisfaction with Academic Preparation of Graduates

	1991	1997
Excellent or Above Average	87%	87%
Average	12%	13%
Below Average	1%	< 1%

Table 11. Employer Satisfaction with Performance of Graduates

	1991	1997
Excellent or Above Average	93%	92%
Average	7%	8%
Below Average	0%	0%

Table 12. Employer Satisfaction with Graduates Capability to Begin Work with a Minimum of Training

Excellent or Above Average	88%
Average	10%
Below Average	2%

PURSUIT OF ADVANCED DEGREES

In his anniversary comments, Lawrence J. Wolf⁷ asks the question: “Can Engineering Technology graduates go on to graduate school?” He concludes that the answer is yes. Good grades are required of any student for admission to a graduate school of quality. This survey indicates that about one third of our graduates during the past five years have gone on to work on a Master’s degree, most commonly a Masters in Business Administration, Management Science, Industrial Management, or similar degree. This compares favorably with the Mott 25 year study that indicated 34% of graduates had pursued graduate degrees.

CONCLUSIONS

This report describes the study of 1991 - 1996 graduates from the Engineering Technology Department of the University of Dayton. The conclusions that can be made from this study are similar to those of the Mott¹ study.

1. Graduates continue to exhibit excellent success in terms of position, salary, and promotion potential.
2. Graduates hold professional career positions in the applications area of the spectrum of engineering-related functions appropriate to the goals of engineering technology education.
3. About a third of the respondents are pursuing a graduate degree or have completed a Master’s degree, most commonly a Masters of Business Administration, Management Science, Industrial Management, or similar degree.
4. Both graduates and their employers continue to express a high level of satisfaction with their academic preparation and job performance.
5. Graduates continue to enjoy a good rate of advancement in position and responsibility. A larger percentage of graduates are moving into management positions within five years of graduation.
6. Over 99% of graduates are working in technical positions pertinent to their fields. Less than 1% reported that they were working in a non-technical field.

REFERENCES

1. Mott, Robert L., "Twenty-five Years of Success with the Baccalaureate Degree in Engineering Technology", Journal of Engineering Technology, Fall 1992, The American Society of Engineering Education
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4. Wolff, Robert L., "Career Potential of Graduates of UD Engineering Technology Programs," Nov 1997
5. Myszka, David, "Demand for Engineering Technology Graduates," Oct 1997
6. Zirbel, Jay H., "Manufacturing Engineering Technology: What Employers Want", Journal of Engineering Technology, Spring 1992
7. Wolf, Lawrence J., "Anniversary Comments", Journal of Engineering Technology, Spring 1994

BIOGRAPHICAL INFORMATION

Charlie P. Edmonson

Charlie P. Edmonson is an Associate Professor and Program Coordinator of Industrial Engineering Technology at the University of Dayton. Prior to joining the faculty at UD, he retired from the U.S. Air Force civil service after 30 years engineering and management experience.

Joseph A. Untener

Joseph A. Untener is a Professor and Chair of the Department of Engineering Technology at the University of Dayton. Prior to joining the faculty at UD eleven years ago, he worked in manufacturing for General Motors Corporation.

APPENDIX A

March, 1997

Dear ,

I hope that all is going well since you graduated. It is always great to hear from our graduates, and I am pleased when I bump into an alum someplace, or someone stops by or Emails me a personal update. Right now, I am writing to each graduate from the past six years to get more structured feedback.

It is time once again for the Engineering Technology programs at the University of Dayton to be reviewed by our accreditation organization. As you know, all of our graduates benefit from the prestigious standing of our programs within the Accreditation Board for Engineering and Technology. It is important we work hard to document the fact that we meet the standards of this organization. We received full accreditation last time with the maximum period allowed before the next review.

A very important part of the re-accreditation process is to survey graduates from the programs to determine their level of satisfaction with their experience at UD and their subsequent careers. It is also important that we receive feedback from the employers of our graduates.

To obtain this feedback, there are two surveys enclosed. Each of them is a simple one-page form that can be completed very quickly. Please fill out the graduate survey, and return it in the envelope provided. Please give the "Employer Survey" to an appropriate supervisor and ask them to fill it out and return it to us in the envelope provided.

It is really important that we get both surveys back as soon as possible. If we get a prompt response from you, it will save the time and expense of follow up mailings and calls.

If you get a chance, include a personal note about yourself along with a business card so that we can stay in touch. Thank you for your time.

Sincerely,

Joe Untener
Chair

1997 SURVEY OF GRADUATES
UNIVERSITY OF DAYTON - DEPARTMENT OF ENGINEERING TECHNOLOGY

Name _____ Phone (_____) _____

Address _____
Street City State Zip

Major _____ Graduation Year Bachelor's Degree _____ Did you continue your formal education? Yes _____ No _____

If Yes, where? _____ Additional Degree(s)/Year(s) _____/_____, _____/_____

PRESENT POSITION

Employer _____ Year Started _____

Address _____
Street City State Zip

Job Title _____ Annual Salary (Confidential) _____

Description of Duties _____

FIRST POSITION AFTER GRADUATION

Employer _____ Year Started _____

Job Title _____ Annual Salary (Confidential) _____

Description of Duties _____

CHECK THE ONE ITEM THAT IS CLOSEST TO WHAT YOU DO:

- | | |
|--|---|
| _____ 1. General Management | _____ 16. Systems Design |
| _____ 2. Engineering Management | _____ 17. Product Evaluation or Testing |
| _____ 3. Sales and Marketing Management | _____ 18. Hardware/Software Development |
| _____ 4. Health Care Management | _____ 19. Controls Engineering |
| _____ 5. Service Industries Management | _____ 20. Manufacturing Engineering |
| _____ 6. Manufacturing/Operations Management | _____ 21. Process Design |
| _____ 7. Plant Engineering Management | _____ 22. Plant Engineering |
| _____ 8. Maintenance Management | _____ 23. Methods/Standards Engineering |
| _____ 9. Management of Other Functions | _____ 24. Quality Assurance |
| _____ 10. Sales and Marketing | _____ 25. Production Planning and Control |
| _____ 11. Purchasing | _____ 26. Plant Layout |
| _____ 12. Technical Services | _____ 27. Research & Development |
| _____ 13. Field/Applications Engineering | _____ 28. Education |
| _____ 14. Product Planning | _____ 29. Other--Technical _____ |
| _____ 15. Product Design | _____ 30. Other--Non-Technical _____ |

USING THE SCALE NUMBERS BELOW, RATE THE FOLLOWING:

- 1) Excellent 2) Above Average 3) Average 4) Below Average 5) Poor

- _____ a) Your satisfaction with your Engineering Technology Program at U.D.
 _____ b) Your academic preparation at U.D. for your professional career.
 _____ c) Your career mobility opportunities within your career field.
 _____ d) Your satisfaction with your starting salary.
 _____ e) Your satisfaction with your initial job assignment and title.

➤ **PLEASE USE REVERSE SIDE FOR ANY ADDITIONAL COMMENTS** ◀

Dear Employer of University of Dayton Engineering Technology Graduate,

The Department of Engineering Technology is accredited by the Accreditation Board of Engineering and Technology. Part of the requirement for continued accreditation is that we periodically survey the employers of our graduates to measure their level of satisfaction with the preparation and performance of our graduates. If you would take a minute of your time to answer the questions in this survey it will help us to continue our accreditation. The results of the survey will be compiled in a tabular format to protect the confidentiality of individual responses. If you have any questions, please call me at (937) 229-4216.

Joseph A. Untener, Chair

1. Please rate your degree of satisfaction with the academic preparation of University of Dayton Engineering Technology graduates.

Highly Satisfied

Not Satisfied

5 4 3 2 1

2. Please rate your degree of satisfaction with the performance of University of Dayton Engineering Technology graduates.

Highly Satisfied

Not Satisfied

5 4 3 2 1

3. Please indicate your degree of satisfaction with University of Dayton Engineering Technology graduate's capability to begin work with a minimum of training.

Highly Satisfied

Not Satisfied

5 4 3 2 1

4. Please provide any additional comments about our Engineering Technology programs to help in our continuous improvement efforts.

COMPANY NAME: _____

YOUR NAME: _____ TITLE: _____

SIGNATURE: _____ DATE: _____

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