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# TRAINING NEEDS ASSESSMENT OF ENGINEERING INSTRUCTORS IN A UNIVERSITY IN QUEZON CITY

Engr. Sharmaine M. Avila, Engr. Marry Sol Lare, Engr. Golbandrio Teo

### INTRODUCTION

Employees are the foundation of every organization, providing the framework for a long-lasting and profitable enterprise. Their abilities, skills, life experiences, and expertise are essential for a business to fulfill its objectives and stay competitive in the marketplace. Seek Capital's founder and CEO, Roy Ferman, stresses the value of investing in staff members equally to other parts of an organization. This investment greatly impacts a company's success by providing specialized training modules and developing a positive, employee-focused work environment with competitive pay and benefits. As observed by Tung-Chun (2001), a workforce with a strong educational and training foundation has a distinct competitive advantage over competitors.

According to Sharma (2018), training programs are crucial for improving the knowledge, skills, and capacities of employees, which in turn results in better performance. According to Armstrong (2006), training is a set of well-planned activities to promote learning. In addition to increasing a person's market value, earning potential, and job security, effective training strengthens organizational sub-departments. Adding value to the workforce is the main goal of training and development, which will ultimately give the business a competitive advantage (Michael, 2008). However, as noted by Bartram and Gibson (2000), for training to be truly effective, it needs to be in line with the demands of the company and its personnel, as it is both time-consuming and expensive.

Thus, this research will use the Training Needs Analysis to determine the training and support required for Engineering instructors at a university in Quezon City, which, for the sake of confidentiality, is referred to as University X.

### STATEMENT OF THE PROBLEM

This study aims to assess the training needs of the Engineering Instructor at University X. Specifically, it seeks to answer the following questions:

- 1. What is the demographic profile of the Engineering Instructor in relation to:
  - 1.1. Age
  - 1.2. Department
  - 1.3. Length of service at University X
  - 1.4. Educational attainment
- 2. What core subjects do the Engineering Instructor at University X currently teach?
- 3. What additional core subjects do the Engineering Instructor at University X wish to teach, aside from those taught in previous semesters?
- 4. What is the level of technical knowledge of the Engineering Instructor in the following core courses:
  - 4.1. Industrial Materials and Processes
  - 4.2. Industrial Organization and Management
  - 4.3. Statistical Analysis for Industrial Engineering
  - 4.4. Work Study and Measurement
  - 4.5. Operations Research
  - 4.6. Quality Management System

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- 4.7. Research (Feasibility & Capstone)
- 4.8. Ergonomics
- 4.9. Operations Management
- 4.10 Supply Chain Management
- 4.11 Information Systems
- 4.12. Systems Engineering
- 5. What is the level of interest of the Engineering Instructor in core courses and soft skills for their preferred training?
- 6. What are the preferences of the Engineering Instructor regarding the delivery of training:
  - 6.1. Delivery format
  - 6.2. Location preference
  - 6.3. Facilitator

#### **METHODOLOGY**

This study used a descriptive survey approach to evaluate the training needs of University X permanent engineering faculty members. A standardized questionnaire that includes demographics, core subjects' knowledge, technical expertise, and training preferences is used to collect data. Based on their university status, all permanent engineering instructors are surveyed. Descriptive statistics, such as frequency, weighted mean, and standard deviation, are used to analyze the data. By maintaining respondent anonymity, obtaining informed consent, and placing a strong emphasis on voluntary participation, the study assures ethical compliance.

#### **RESULTS AND DISCUSSION**

#### 1. Profile of respondents

1.1 AGE TABLE 1

Distribution of Engineering Instructor in terms of Age

AGE	FREQUENCY	PERCENTAGE
25 - 35 years old	2	16.67 %
36 - 45 years old	4	33.33 %
46 - 55 years old	1	8.33 %
56 - 65 years old	5	41.67 %
TOTAL	12	100 %

Table 1 shows the age distribution of the 12 respondents, with the majority (41.67%) aged 56 to 65. The next age group is 36 to 45 (33.33%), followed by 25 to 35 (16.67%), and the smallest group is 46 to 55 (8.33%). Salthouse (2010) observes that cognitive decline with age is frequent, while Young (2020) emphasizes the importance of cumulative experience. Guskey (2002) emphasizes the importance of continuous professional growth in maintaining good performance across all age groups.

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### 1.2 LENGTH OF SERVICE

### **TABLE 2**

Distribution of Engineering Instructor in terms of Length of Service

LENGTH OF SERVICE	FREQUENCY	PERCENTAGE
1 - 5 years	0	0.00 %
6 - 10 years	5	41.67 %
11 - 15 years	6	50.00 %
16 - 20 years	0	0.00 %
21 - Above years	1	8.33 %
TOTAL	12	100 %

Table 2 reveals that 50% of respondents have served 11 to 15 years, 41.67% have served 6 to 10 years, and 8.33% have served for more than 21 years. According to research, extended service improves teaching efficiency, but it can also lead to fatigue and resistance to new methods. Continuous, targeted professional growth is essential for sustaining outstanding performance and adapting to new instructional methodologies.

### 1.3 EDUCATIONAL ATTAINMENT

### **TABLE 3**

Distribution of Engineering Instructors in terms of Educational Attainment

EDUCATIONAL ATTAINMENT	FREQUENCY	PERCENTAGE
Bachelor's Degree	1	8.33 %
Master's Degree	8	66.67 %
Doctorate Degree	3	25.00 %
TOTAL	12	100 %

Table 3 shows that 66.67% of respondents have a master's degree, 25% have a doctorate, and 8.33% have a bachelor's degree. Research shows that while bachelor's degree holders are effective in fundamental teaching, master's and doctoral degree holders demonstrate greater knowledge and effectiveness. However, a strong emphasis on research can have an impact on teaching quality, emphasizing the importance of ongoing professional development at all levels of education.

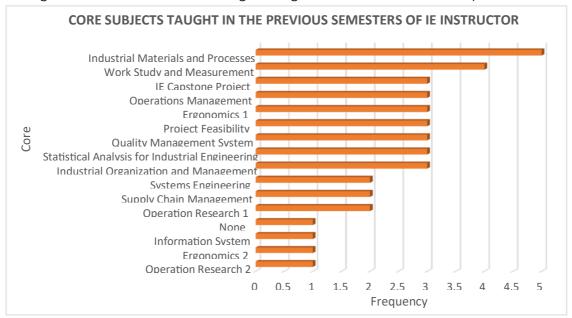


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### 2. Core Subjects taught in previous semesters FIGURE 1

Figure 1 shows that Industrial Engineering Instructors most commonly teach Industrial



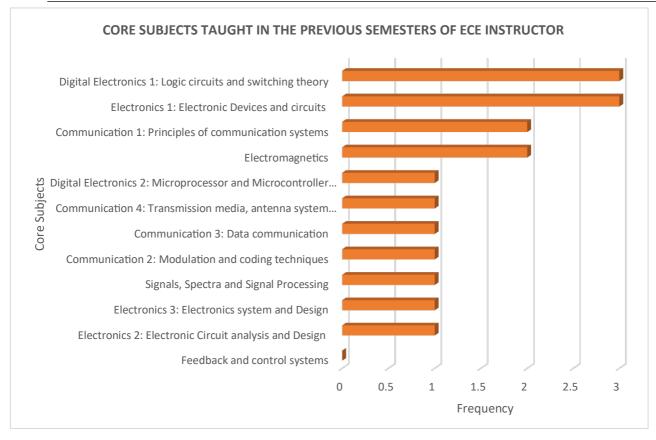
Materials and Processes, Work Study and Measurement, and Operations Research 2, with Information Systems, Ergonomics 2, and Statistics being less popular. Subject-specific training and continued professional development are essential for effective teaching and remaining current in the field (Ball et al., 2008; Desimone, 2009; McLaughlin & Talbert, 2006).





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### FIGURE 2

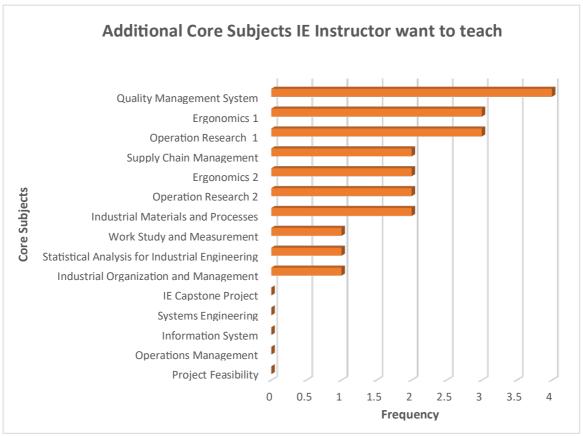
According to Figure 2, ECE instructors most frequently teach Electronics 1: Electronic Devices and Circuits and Digital Electronics 1: Logic Circuits and Switching Theory, whereas Feedback and Control Systems is the least taught. Darling-Hammond et al. (2009) found that instructors with significant subject matter expertise generate more interesting and challenging learning environments, resulting in higher student accomplishment and deeper understanding.



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3. Additional core subjects do the Engineering Instructor wish to teach, aside from those taught in previous semesters



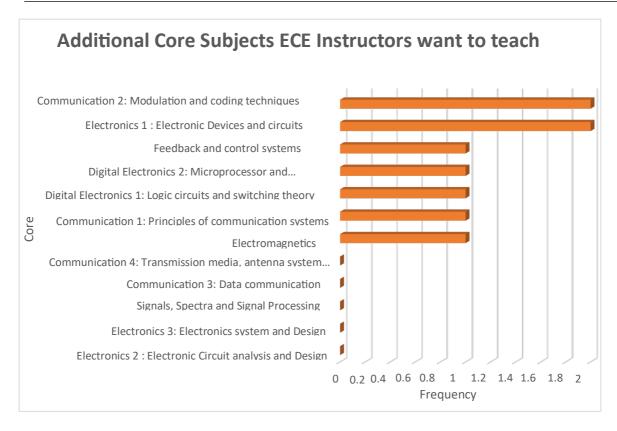
### FIGURE 3

Figure 3 illustrates that Industrial Engineering instructors prefer to teach Quality Management in the future, while IE Capstone, Systems Engineering, Information Systems, Operations Management, and Project Feasibility are less popular. According to Day and Gu (2009), instructors who are excited to teach new subjects bring excitement and commitment to the classroom, resulting in more dynamic and effective instruction.



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### FIGURE 4

Figure 4 depicts how ECE instructors choose to teach Electronics 1: Electronic Devices and Circuits and Communication 2: Modulation and Coding Techniques in the following semesters. Teaching new courses increases professional growth by encouraging reflective practice and ongoing learning, which improves teachers' long-term career development and adaptability (Knight, Tait, and Yorke, 2006).



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## 4. Level of the technical knowledge of Engineering Instructors in the core subjects. Table 4

Summary of the technical knowledge levels of Industrial Engineering Instructors across core subjects

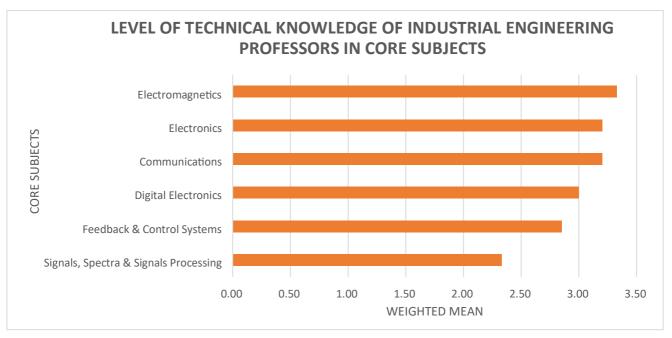
CORE SUBJECTS	WM	SD	VERBAL INTERPRETATION	RANK
INDUSTRIAL ORGANIZATION AND MANAGEMENT		1.35	I have a working knowledge	1
INDUSTRIAL MATERIALS AND PROCESSES	3.19	1.54	I have a working knowledge	2
WORK STUDY AND MEASUREMENT	3.10	1.2	I have a working knowledge	3
RESEARCH (FEASIBILITY & CAPSTONE)	3.10	1.29	I have a working knowledge	3
QUALITY MANAGEMENT SYSTEM	3.05	1	I have a working knowledge	5
STATISTICAL ANALYSIS FOR INDUSTRIAL ENGINEERING	2.96	1.42	I have a working knowledge	6
ERGONOMICS	2.95	1	I have a working knowledge	7
OPERATIONS MANAGEMENT	2.95	1.14	I have a working knowledge	7
SUPPLY CHAIN MANAGEMENT	2.86	0.83	I have a working knowledge	9
OPERATIONS RESEARCH	2.43	1.01	I know something about it	10
SYSTEMS ENGINEERING	2.43	0.63	I know something about it	10
INFORMATION SYSTEM	2.33	1.05	I know something about it	12

Table 4 demonstrates that Industrial Engineering Instructors perform well in Industrial Organization and Management (3.24), Industrial Materials and Processes (3.19), and Work Study, Measurement, and Research (3.10). However, their skill in information systems is lower (2.33), indicating a preference for traditional domains over multidisciplinary topics such as systems engineering (Cassell, 2008; Dhillon, 2013).



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### FIGURE 5

Figure 5 ranks disciplines according to ECE instructors' technical expertise, with electromagnetics at the top, indicating extensive knowledge in this foundational field critical for telecommunications, radar, and wireless systems. In contrast, signals, spectra, and signal processing are ranked last, showing a lack of skill. This distribution is frequently consistent with instructors' academic backgrounds and research interests, as many may have focused on electromagnetics during their graduate studies and research (Balmain, 2015).

## 5. Level of interest of Engineering Instructors in terms of core courses and soft skills on their preferred training or Seminars.

TABLE 5

Summary of Preferred Trainings or Seminars of Industrial Engineering Instructors in core subjects

CORE SUBJECTS	WM	SD	VERBAL INTERPRETATION	RANK
INDUSTRIAL MATERIALS AND PROCESSES	3.57	1.92	Very Interested	1
INDUSTRIAL ORGANIZATION AND MANAGEMENT	3.52	1.96	Very Interested	2
QUALITY MANAGEMENT SYSTEM	3.52	1.79	Very Interested	2
WORK STUDY AND MEASUREMENT	3.50	1.63	Very Interested	4
ERGONOMICS	3.48	1.68	Very Interested	5

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STATISTICAL ANALYSIS FOR INDUSTRIAL ENGINEERING	3.43	1.79	Very Interested	6
OPERATIONS RESEARCH		1.62	Very Interested	7
INFORMATION SYSTEM	3.29	1.84	Very Interested	8
SUPPLY CHAIN MANAGEMENT	3.29	1.3	Very Interested	8
SYSTEMS ENGINEERING	3.29	1.7	Very Interested	10
OPERATIONS MANAGEMENT	3.24	1.36	Interested	11
RESEARCH (FEASIBILITY & CAPSTONE)	3.14	1.48	Interested	12

Table 5 summarizes the chosen training options among industrial engineering instructors, demonstrating a considerable preference for seminars on industrial materials and processes, with the highest average rating of 3.57. This is closely followed by training in industrial organization and management and quality management systems, both with an average rating of 3.52. In contrast, research training (feasibility and capstone) receives the lowest average.

rating of 3.14.

### Table 6

Ranking of subjects based on their level of interest in training and seminars

Table 6 rates disciplines based on instructors' interest in training and seminars, with Feedback and Control Systems having the highest average grade of 3.60, indicating a significant enthusiasm among Electronics Engineering instructors. This is followed by other electronic-related trainings, which have an average rating of 3.53. In contrast, Electromagnetics has the lowest average rating of 3.36, indicating a lack of interest in this area for training and seminars.

### 6. Preference of the Engineering Instructors with regards to the delivery of training

TRAININGS	WEIGHTED MEAN	RANK
Feedback & Control Systems	3.60	1
Electronics	3.53	2
Communications	3.50	3
Soft Skills	3.45	4
Signals, Spectra & Signals Processing	3.40	5
Digital Electronics	3.40	5
Electromagnetics	3.36	7

FIGURE 6

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Figure 6 shows that active learning formats including study groups (3.42), hands-on activities (3.50), and instructor-led sessions (3.33) are preferred by engineering instructors. These are preferred over independent research (2.92), interactive online learning (2.83), and video-based education (2.92). According to research, active approaches increase retention and engagement while passive formats could provide less depth (Prince, 2004; Mayer, 2002).



### FIGURE 7

Engineering instructors prefer to attend training at University X, giving it an average grade of 3.42. They also prefer sessions held abroad (3.00), in the Philippines (2.92), and online (2.75). Comfortable locations are chosen, while overseas training provides global experiences. Domestic and internet solutions are considered less reputable. TABLE 7

Preferred Facilitator for the Trainings or Seminars

FACILITATOR	WM	SD	VERBAL INTERPRETATION
(a) Colleagues	2.75	1.87	Preferred
(b) University Top Management (e.g. President, Deans, etc.)	3.00	1.73	Preferred
(c) Training Specialists	3.58	3.08	Strongly Preferred
(d) Outside Consultants	3.58	3.08	Strongly Preferred

Engineering instructors appreciate trainings led by outside consultants and training specialists, giving them an average grade of 3.58 for their knowledge and objectivity. Sessions featuring university top management and colleagues are also popular, with average ratings of 3.00 and 2.75. External facilitators are seen as more credible and relevant.

### **SUMMARY OF FINDINGS & CONCLUSION**

The study examined 12 engineering instructors aged 25 to 65, the majority of whom had more than 11 years of experience and held master's degrees. Work study, industrial materials, and electronics are the most commonly taught disciplines, while information

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systems, feedback, and control systems are among the least taught. Industrial engineering instructors are particularly interested in teaching quality management, but less so in areas such as project feasibility and systems engineering.

Instructors are particularly educated in work study, industrial materials, and electromagnetics, with less knowledge of information systems and signal processing. They prefer hands-on, in-person learning and training at University X, but they are also open to online and overseas opportunities. Outside consultants and training specialists are their favorite facilitators, although they also value sessions delivered by university top management and staff.

### **RECOMMENDATION**

The study recommends that the University tailor professional development programs to the different demands of its engineering personnel, taking into account their age, career stage, and technological skills. These programs should contain both advanced and basic courses, mentorship opportunities in which veteran instructors guide junior colleagues, and specialist training to fill gaps in less-taught disciplines. To ensure accessibility and engagement, training information should be tailored to the instructor's interests and available in a variety of formats, including in-person, online, and peer learning.

The University should conduct training sessions in convenient settings, such as on campus, with the option for remote participation. Collaboration with international universities could lead to great cross-cultural learning opportunities. To improve training quality, other experts should be asked to lead sessions. The report also recommends creating a dedicated fund for instructor development, assuring equal access for all, and performing long-term studies to determine the impact of these programs on instructor satisfaction and performance.

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