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Enhanced On the Job Training Internship Program for Bachelor of Science in Electrical Engineering Students

*Aljon G. Martin**, *Deejay F. Magpayo*, *Jerald Jay Dela Pena*, *Rainer Charles M. Saddi*, *Alma L. Tanguangco*,
Rhoderick Favorito

Don Honorio Ventura State University, The Philippines

Correspondence: E-mail: 2018010381@dhvsu.edu.ph

ABSTRACTS

Following the University's mission of providing time and cost-effective training programs in different areas, On the Job Training (OJT) is an internship program undergone by qualified students as part of their requirements before graduating. This study aimed to identify the issues concerning OJT and provide recommendations to enhance the OJT Program. Bachelor of science in electrical engineering (BSEE) students, student internship program of the Philippines (SIPP) coordinators, and potential host training establishments (HTEs) were the selected respondents of this study since they were the ones involved in the phenomena, they were gathered through stratified random sampling here they are specifically identified from a population as strata. Preliminary findings indicated various guidelines and data, addressing the enhancement of OJT Programs in terms of rules and guidelines, Time, and Schedule, Potential HTEs, and SIPP relations. Further, this study would recommend how to enhance the OJT Program for BSEE students.

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1. INTRODUCTION

The OJT (OJT) is a method of teaching, coaching, and mentoring in an actual workplace using existing tools, equipment, and machinery distinct to Electrical Engineering, In Don Honorio Ventura State University, OJT became an annual practice for graduating students taken for them to experience an actual working environment and help them develop areas of knowledge that help them do work effectively in their chosen career. The university has facilitated its OJT Program for the bachelor of science in electrical engineering (BSEE) students on its curriculum in September 2021.

The internship program that the university facilitated was conducted through "Online Platform" particularly Google Classroom, Zoom, and Google Meet. It is because of the strike of the Global Pandemic named Covid- 19 and the Philippine Government ordered health restrictions and lockdowns resulting in education being continued flexibly through modules and the internet.

According to [Neo and Neo \(2009\)](#), the adjustments made to the educational system had created an influence on every area of a student learning environment both theoretical courses in the classroom and internship programs outside. Only 22% of college students took an internship, half were in-person positions, and quality indicators for online internships were low, according to a new study conducted by the Center for Research on College-Workforce Transitions (CCWT) at the University of Wisconsin-Madison (UW-Madison).

OJT provides much faster training through real learning experiences in the workplace. According to [Neo and Neo \(2009\)](#), it is common knowledge that traditional training is time-consuming, and learners may forget what they learn. This indicates that learners may need to be corrected or retrained in the future. Academic training must be reinforced, and learners may forget what they learn in OJT.

OJT can aid in speedier boarding and attaining a satisfactory level of performance. [Neo and Neo \(2009\)](#) also contend that OJT enables learners to understand processes in a business more quickly and efficiently. It is critical in industries with high turnover rates, such as retail, restaurant management, customer service, manufacturing, and so on.

Retention of good potential future employees is another significant benefit of OJT. OJT teaches learners exactly what responsibilities they are expected to do and how to perform them. As part of their training, learners perform each task that will be assigned to them and learn about the procedures involved in their employment. This reduces uncertainty and stress while allowing learners to do their jobs to the best of their ability. A worker is less successful if they are unclear about what their work entails. Lack of clarity can create a stressful workplace, resulting in high turnover rates.

[Neo and Neo \(2009\)](#) wrote that attracting deserving future employees from the roster of learners as part of a workforce is another benefit of OJT. OJT assists companies in finding the right workers for the job since they exhibit capability during the training process. Prospective employees from the learners doing OJT are aware that their time is being well spent, and companies may conduct skill assessments during training.

OJT is a hands-on way to gain new competencies and abilities for a job in a genuine, or nearly actual, working environment, which is also known in the pedagogical nomenclature as "experiential learning" ([Marras et al., 2021](#)). Rather than presenting staff seminars or handing out worksheets, they learn by doing. This training occurs in the workplace, under the supervision of a supervisor, manager, or another knowledgeable employee. Furthermore, OJT will require learners that undergo OJT to get a first-hand look at all the work procedures they can expect to encounter soon.

Training can take anywhere from days to weeks or longer, depending on the school's required number of hours for its OJT program, and what they are expected to be hired for in the future.

Because graduates of higher education institutions have failed to satisfy current labor market standards in recent years, their employability has been a big concern (Andrews & Higson, 2008; Chetty, 2012; Kalufya & Mwakajinga, 2016). Higher education institutions have been criticized for creating graduates that are unsuited for employment (Alpert *et al.*, 2009). As a result, it is critical that higher education institutions, particularly in developing countries such as the Philippines, offer programs that will enable students to get the essential knowledge and practical abilities in their subjects so that they can provide dependable and high-quality services. Google Classroom, Zoom, and Google Meet were used at DHVSU's internship program.

The global pandemic of CoViD-19, as well as health restrictions and lockdowns imposed by the Philippine government, led to flexible schooling based on modules and the internet. Changes in the educational system, according to Neo & Neo (2009), had an impact on both classroom theory and internships. The first OJT program for Electrical Engineering students at DHVSU was conducted online using Zoom, Google Meet, and Google Classroom. This provides an idea for a future OJT internship program for academics.

The main objective of the study is generally to enhance the students' internship program by proposing course activities provided with sub-topics and schedules. Additionally, training, coaching, and mentoring would become an expected and well-utilized aspect of the work environment.

To evaluate the assessment of students, student internship program (SIP) of the Philippines (SIPP) Coordinators, and potential Host Training Establishment (HTE). To recommend guidelines and recommendations to enhance the OJT internship Program for BSEE students based on the results of the study.

This study would be beneficial for the students because it contains policies and guidelines that would help them in participating in the OJT internship program effectively regarding Higher Educational Institutions (HEI) and HTE. It would also benefit the university as it addresses the issues experienced by trainees and SIPP coordinators within past OJT practices. More so, different companies within the area would gain benefits as they would be proposed to several potential talents from the university.

2. METHODS

2.1. Research Design

This employed a descriptive design of research since its implied observation and investigation of such variables. The study narrates the supposedly OJT Enhancement Recommendations for DHVSU. This study used both quantitative and qualitative research approaches, a methodology for conducting research that involves collecting, analyzing, and integrating quantitative and qualitative research.

2.2 Respondents of the Study

The study was anchored to the method of stratified random sampling, as we captured key populations to help provide data that address specific research studies involving OJT Internship Program. This sampling method enabled us that study OJT enhancement a lesser error in estimation and greater precision. Stratified Random Sampling involves dividing the entire population into homogeneous groups called strata (singular is stratum). A random

sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form a random sample. Simple random sample advantages include Stratification gives a smaller error in estimation and greater precision than the simple random sampling method. **Table 1** shows the Distribution of respondents per category. In this study, fifty (50) students from the electrical engineering department of DHVSU, five SIP coordinators, and notable HTEs were classified as the respondents. To fulfill the objectives of this study, we consider the new entrants of potential HTEs within the area of Pampanga.

Table 1. Distribution of respondents per category.

Category	Population
Student	5
	0
SIIP coordinators	5
Host training establishments	3
Total	58

2.3. Instrument

We used structured interview survey questionnaires as a research instrument in conducting this study. They used qualitative and quantitative survey questionnaires that aimed to reveal real-time opinions, experiences, narratives, and accounts through a structured conversation. There will be three (3) sets of questionnaires that will be separately given to the potential HTE, students, and SIP coordinator. For the students, the questions will be based on what they would expect in an OJT program including the schedule, course subjects, and mode of implementation.

For the potential HTEs, the survey questionnaire is about the concerns they recognized in the practice of the OJT internship program. They are also asked about what they will expect from an enhanced OJT program. For SIP coordinators, the survey questionnaire is about the past issues that they encounter since they are the ones handling the OJT program at the university.

The data gathering procedure started with the identification of the respondents and selecting the respondents that were given a chance to answer the questions given to us. A standardized procedure was strictly followed for each respondent to ensure the credibility of the answers. During the distribution of the survey questionnaire, we provided guidelines on how to answer the following questions and statements. They also informed them that all the responses would be treated with the utmost confidentiality.

2.4. Data Analysis

Percentage and Weighted Mean were used to analyze quantitative data of this study. A given Likert scale was used to interpret the quantitative results of this study: 2.40- 3.00- Satisfied; 1.80- 2.40- Neutral; 1.00- 1.80- Unsatisfied. Narrative analysis with an Inductive Approach is used to analyze qualitative data.

The results were identified through coding and processed by interpreting significant statements into contexts. The respondents used codes to identify their response, big letter "C" will be used as the code of potential HTEs followed by their assigned number e.g., "1". For the SIP coordinators, they will be treated as the "SI" as their code followed by their numerical identification e.g., "1".

3. RESULTS AND DISCUSSION

BSEE Students' Assessment of the OJT Program of DHVSU, the students were evaluated by us on their assessment of the OJT internship program through their rate of satisfaction. They were told to pick their personal choice regarding the implementation of OJT.

Table 2 illustrates the satisfactory assessment of the Electrical Engineering department of DHVSU regarding the OJT internship program. The overall assessment revealed that the BSEE students are "Neutral" accounting for a weighted mean of 2.23. Among the indicators presented, the data gathered reveal that indicators "OJT and supervision in collaboration with the company", "DHVSU and the HTEs forging a Memorandum of Agreement (MOA)", and "the SIPP Coordinator takes account of the school/development Departments in the HTEs regularly" scores unsatisfactory for the students accounting 1.68, 1.44, and 1.50 respectively.

SIP supervisors' frequent and constructive feedback to OJT students is critical to the success of the program and the development of a strong link between the OJT student and the company (Coco, 2000; Maertz *et al.*, 2014; Parker *et al.*, 2007). Working with supervisors makes it much easier for OJT students to acclimate to the demands and requirements of the industry.

Table 2. BSEE students' assessment of the OJT program of DHVSU.

Indicators	Satisfied (3)	Neutral (2)	Unsatisfied (1)	Weighted mean	Verbal interpretation
1. Conducting an OJT program evaluation once students have completed their OJT	38 (76%)	10 (20%)	2 (4%)	2.68	Satisfied
2. Giving timely feedback to OJT students	19 (38%)	20 (40%)	11 (22%)	2.16	Neutral
3. The SIPP Coordinator takes account of the school/development Departments in the HTEs regularly	5 (10%)	15 (30%)	30 (60%)	1.50	Unsatisfied
4. Students' academic preparation for company duties and their challenges	29 (58%)	16 (32%)	5 (10%)	2.48	Satisfied
5. DHVSU and the company/agency create a memorandum of Agreement (MOA)	5 (10%)	12 (24%)	33 (66%)	1.44	Unsatisfied
6. OJT design and supervision in collaboration with the company	7 (14 %)	20 (40%)	23 (46%)	1.68	Unsatisfied
7. Conducting an orientation regarding the OJT program, including the perquisites, preparation, and expectations	46 (92%)	4 (8%)	0	2.92	Satisfied
Overall Average				2.23	Neutral

BSEE Students’ Expected Subject Courses, the students were given a survey that assessed what course subjects were most applicable to take on an internship program that could enhance their technical and cognitive skills. They were instructed to choose five (5) subjects. The course subjects that the students are most likely to expect to take in their Internship Program are Watt-Hour-Meter Reading with twenty- nine (29) score, Critical Path Method with a score of thirty- two (32), Electrical Installation Maintenance with thirty- (31), Earn Value Analysis with thirty- one, and Data Acquisition with twenty (20). This combination of subjects was then presented to potential HTEs and provided their approval regarding the course activities. Electrical engineering majors commonly must have an aptitude for the following electrical engineer qualities, which they attempt to improve in an internship program critical thinking, technological expertise, active education, personality traits, organizational skills, and so forth according to [Parker et al., \(2007\)](#).

Due to the existing threat of the COVID- 19 pandemic, there would also be a chance for IATF to raise Alert Level Signals that will directly affect the mode of an education platform. **Table 3** illustrates that majority of the respondents agreed to participate in the virtual OJT program accounting for 41 respondents who agreed. This indicates that the students are expecting changes in the mode of education delivery at any moment depending on the Virus strike. **Table 4** shows the participation of DHVSU students in the online OJT *IF* alert level 3 protocol was implemented.

Table 3. Frequency distribution of students assessed coursed subjects.

Course subject selected	Frequency
SCADA	26
Work from home operational management	21
Occupational health and safety procedures	24
Data acquisition, archiving, and retrieving	20
Critical path method	32
Earn value analysis	31
Watt-hour meter reading	29
Electrical equipment installation and maintenance	31
Bidding procedures and practices	22

Table 4. Participation of DHVSU Students on online OJT to IATF alert level 3 protocol.

Agree	Neutral	Disagree	Weighted mean	Verbal interpretation
41 (82%)	4 (8%)	5 (10 %)	2.72	Agree

Due to the existing threat of the COVID-19 pandemic, there would also be a chance for IATF, **Table 5** represents the distribution of potential HTEs responses that address their desired assessment of OJT practice. All the company respondents have handled OJT in their previous years and are willing to cater to OJT interns from DHVSU. They have also evaluated the proposed course subjects from the assessment of the students and agreed to the following course subjects and recommend nothing more. They would also like to practice their potential OJT program for DHVSU students on the premises of their company for workplace awareness. OJT program provides OJT students with realistic workplace scenarios that clarify work expectations and maximize the fit between what the OJT student wants and what the company provides ([Hurst and Good, 2010](#)).

Table 5. Response of potential HTEs.

Questions asked	THE's response using inductive approach analysis
Have you already catered for the OJT training program in your company? Where would you like the students to practice their OJT program?	The potential HTEs that responded are all catered to OJT programs in previous years According to the responses of the potential HTEs, they would like to cater to OJT interns on their company premises and appoint them to technical support offices of the company
Would you accept OJT interns from DHVSU?	Two of the potential HTEs that responded are willing to cater to OJT interns from the Don Honorio Ventura State University and the other one is willing to accept OJT as per the guidelines provided by the IATF
From the subject courses that have been responded to by the students, what are the course subjects you wanted to remove and recommend?	The subject that has been evaluated by the students are approved by potential HTEs and they have no recommendations

The respondents from the population from accredited SIP Coordinators show that they have handled OJT Internship programs and they both did it virtually and face to face. The SIP coordinators have all agreed to 3-5 days a week for the schedule of the internship program. According to the SIP Coordinators, some of the major issues concerning OJT internship programs are the completion of the scheduled number of hours in the internship program, tardiness, speakers, location, and expertise (Anjum, 2020). According to some SIP personnel, the coordinator should not be changed every semester for job familiarisation and to avoid challenges between awareness of research (See Tables 6, 7, 8).

Table 6. SIPP coordinators' qualitative response.

Questions asked	Response
Do these SIP coordinators have handled the OJT internship program?	Yes
Do SIPP coordinators let the students choose where HTEs they would like to perform OJT?	Yes
Letting the students be the ones to pick which they want to practice their OJT?	Yes

Distribution of Respondents' Response as per Theme. Theme 1 is the schedule, the HTEs, and SIPP coordinators conclude their assessment regarding the schedule of an effective OJT training program. The respondents agreed to conduct an OJT Program during the dry season. Considering a calm dry climate in an internship program will assure the prevention of cancellation of meetings and activities on the field. They also emphasize that if the requirements needed by the HEIs and HTEs are finalized, the OJT program will start. It is also revealed from the data gathered that the student is expected to attend the class two to three times a week. Several comments are:

- (i) " Our Company accepts interns at any date of the year. For convenience, the dry season is much preferable." -H1.
- (ii) "Any date will be okay as long as document requirements needed by the company are submitted before the OJT" -H3.

Table 7. Proposed course subjects.

Course/Subject	Competencies	Knowledge	Skills	Attitudes
Occupational health and safety	Ability to perform the duties of an electrical professional with the consideration of health and safety	Characterize and utilize health and safety equipment within the workplace	Proper application of safety procedures, gears, and equipment	Awareness of the trainees to put safety first for every activity that has been done within the workplace
Watt-hour meter reading	The ability of the trainees to read watt-hour meter (electricity meter) and interpret data and results including (electricity billing machine)	Characteristics and uses of a watt-hour-meter and other basic equipment in the electrical field	Accurate reading and gathering information from an electrical device with credible understanding and skills.	Awareness of the trainee to develop a good work ethic toward duty
Work from home operation management	The ability of the trainees to manage the office effective to the organizations of operations and workloads	Understand the trainees' purpose and importance to the organizational management of a company	Satisfactory level of productivity inside or outside the employers' premises	Awareness of oneself of self-management and self-organization
Critical path method (CPA)	The ability of the trainees to identify all possible paths through diagrams, and tasks' duration to calculate the time to complete each path	Characteristics and uses of resource utilization, an algorithm for scheduling a set of project activities	Proper organization of available resources and time management	Awareness of the trainee to be organized in workload management
Earn value analysis (EVA)	The ability of the trainee to predict the total cost of a project at completion. And monitors the progress of a project.	Use a standard method of measuring a project's plan and adjust the budget accordingly	Develop a standard project costing, planning, and utilizing resources	Awareness of the trainee to be accountable for any profit loss on budget management
Data acquisition, logging, archiving and retrieving	Ability to measure or control the physical characteristics of something in the real world	Characterization of the process of digesting data from the world around us so it can be displayed, analyzed, and stored in a computer	Proper and systematic data research, interpretation, and data storage	Awareness of the trainee to gather, interpret and provide credible information

Table 7 (Continue). Proposed course subjects.

Course/Subject	Competencies	Knowledge	Skills	Attitudes
Supervisory control and data Acquisition (SCADA)	The ability of the trainee to collect, analyze, and visualize data from industrial equipment	Operators can view critical measurements like temperature, vibration, power usage, and levels of industrial machine	Proper acquisition of data and credible calculation for a much more accurate application of actual practice	Awareness of the difference between factual-information and non-credible sources.
Electrical apparatus and devices	Ability to conduct experiments involving power transformers, AC, machines, data/results	Characteristics and uses of power transformers, electrical apparatus, and device	Proper installation, operation, and maintenance of power transformers and other electrical apparatus	Awareness of proper and appropriate use of devices and responsible maintenance application

Table 8. Program schedule.

Week	Activity	Administrator	Topic	Equivalent hours
1	Introduction Internship Program	OJT coordinator REEs/ CEA Dean THE coordinator	OJT orientation occupational health and safety	18
2	Lecture (Virtual group)	OJT coordinator REE coordinator REE coordinator	Historical logging/ data acquisition, archiving, and retrieving	24
3	Webinar, lecture-discussion (Virtual group)	OJT coordinator/ REEs/ guest speakers	OJT accomplishment reports/data retrieving/ sales management	40
4	Lecture discussion Theoretical short examination (virtual group)	OJT coordinator/REEs	OJT summary of modules	24
4	Actual activity Actual examination	OJT coordinator	OJT summary of modules	16
5	Lecture discussion Webinar Lecture discussion	OJT coordinator, REEs	Electrical installation and maintenance	40
6	Lecture discussion Seminar/webinar activities OJT evaluation	OJT coordinator, REEs, electrical inspector	Watt-hour meter reading	40
7		OJT coordinator, REEs electrical inspector	Electrical installation and maintenance (EIM), watt- hour meter reading	18
8	Lecture discussion	OJT coordinator	Bidding procedure and practices	14
9		OJT coordinator, REEs, CEA dean, school admins		6
Total hours				240

Theme 2 is the issues Concerning to OJT Program, the qualitative data that have been gathered from the respondents of this study reveals the issues faced by the participants of the OJT Program. One of the most common issues is the lack of linkages between the HEIs and HTEs. This linkage involves the forging of a memorandum of agreement that solidifies the relationship between the potential HTE and HEI. Another issue regarding OJT is the invitation of speakers with expertise and students' limited participation.

“Applying to companies that would cater OJT programs, If webinars for online OJT, inviting outside speakers with expertise and students’ limited participation. If on- site location where they will be deployed. (Issues)”

SI3, theme 3 is the guideline recommendations, the data that have been gathered by the HTEs and SIPP coordinators emphasize their suggestions on the guidelines for the enhancement of the OJT in DHVSU. It includes the forging of clear guidelines from the higher education institution for the convenience of the HTEs and interns. The respondents also recommend the entrant of more related HTEs to accommodate a larger scale of interns from the institution. They also recommend the guidance and regular monitoring of SIPP coordinators for a positive evaluation and accessibility of interns to information. For the credibility of the SIPP coordinators on their job, the respondents recommend the retention of SIPP coordinators for the instance of familiarisation with the job description.

“The SIPP coordinators should not be changed every semester for job familiarisation, next, the SIPP coordinator should guide student interns in choosing their HTE.”

The SIPP coordinators of the Electrical Engineering Department should double their effort in looking for possible linkages from the industry so that they may be able to provide the student's list of companies where they can take their OJT.

The curriculum of the different programs of the Electrical Engineering Department should be revisited regularly to align the courses that are offered before the OJT of the students. The courses that are deemed necessary by the previous OJT students should be offered before the OJT program.

The OJT program of the different departments should be handled by an OJT coordinator who has industry experience so that the OJT coordinator can share and transfer to the students the actual knowledge and skills from the industry. Also, the OJT coordinator should maximize the use of technology in monitoring the students such as creating social media groups where the OJT can post their learning in their work.

The Electrical Engineering Department may consider the development of an OJT Manual which will have the roles and responsibilities of all the academic stakeholders.

4. CONCLUSION

This study, “Enhance OJT Program for BSEE Students of DHVSU” aimed to identify the issues concerning the OJT program, to provide solutions to the issues. The objectives of this study were to evaluate the assessment of students, SIP Coordinators, and potential HTE and to recommend guidelines and recommendations to enhance the OJT internship Program for BSEE students based on the results of the study. Through the data gathered, we conclude the following:

- (i) The majority of the respondents from students to HTEs expect an OJT internship program to be practiced on a traditional basis. Due to the pandemic, we suggest course programs that could be taken on both on-campus and online set- up.
- (ii) The students, SIP coordinator, and HTEs agreed on the schedule of practicing the OJT internship course, the proposed date - between the second semester of the third year of the bachelor’s degree and the first semester of the fourth year. According to the

potential HTEs, any time of the year but at least during the dry season is the best time for practicing the OJT internship course.

- (iii) Based on the gathered data, the course subjects that would be offered in taking enhanced OJT internship program include Watt- Hour- Metre Reading, Critical Path Method, Earn Value Analysis, Data Acquisition, Logging, Archiving, and Retrieving, Renewable Energy, and SCADA.
- (iv) Work from Home Operational Management, the job description that the potential HTEs would like to cater to involves Technical Service Department and Area Offices.
- (v) The most common issue within the HTEs concern according to the data gathered was the presence of SIP personnel in the actual workplace within HTEs premises.
- (vi) The policies and recommendations were inclined with the DOH IATF Protocols, CHED memorandums, and the data gathered in this study.

Based on the data that have been gathered, we recommend the sustainability of the OJT program for BSEE Students. We recommend a new set of guidelines based on the data that's been gathered. We also suggest course subjects that will improve the skills set of the trainees, to further enhance the OJT program, we suggest a linkage between HEI and potential HTEs to meet the upright needs of the trainees, and we suggest that the SIP coordinators must monitor their trainees and be physically present on the ground of OJT proper. The data that has been gathered suggests that potential HTEs must have an agreement that explains the guidelines and policies of both with HEIs.

Course Subjects, this proposed program is flexible in all modes of education, it is evaluated by the potential Host Training Establishment. These subject courses are also verified by their characteristics corresponding to Specific measurable attainable realistic time-bound (SMART) recommendations.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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