

## IMPACT OF PROGRAM LEARNING OBJECTIVES (PEO) OF DIPLOMA IN INFORMATION TECHNOLOGY (DIGITAL TECHNOLOGY) ON ALUMNI PROFESSIONAL SKILLS

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### ABSTRACT

**Objective:** This study focuses on assessing the achievement of Programme Educational Objectives (PEO) among Politeknik METrO Kuala Lumpur (PMKL) alumni four to five years post-graduation, fulfilling the requirement of Outcome-Based Education (OBE) and stakeholder involvement to meet industry needs.

**Research Method:** This quantitative method employed a survey design using a structured questionnaire based on five established PEOs. The study involved 87 alumni from five intakes spanning December 2016 through December 2018.

**Findings:** The research discusses the achievement of PEO 1, PEO 2, PEO 3, PEO 4, and PEO 5. The highest mean score from alumni feedback was PEO 4, at 4.59, while the highest mean score from employer feedback was PEO 1, at 4.73. The findings provide valuable insights into the continuous quality improvement of academic programs, ensuring their relevance to global employment demands and emerging technologies.

**Originality:** This study is significant as it represents a pilot study for PMKL in evaluating alumni success within a defined post-graduation timeframe, utilizing alumni feedback to enhance program quality.

**Keywords:** Program Educational Objectives (PEO), Industry, Program Quality, Alumni Outcome, PEO Achievement, Outcome-Based Education (OBE).

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### 1. INTRODUCTION

Politeknik METrO Kuala Lumpur (PMKL), which is the 28th polytechnic institution established under the Department of Polytechnic and Community College Education (JPPKK) of the Ministry of Higher Education (KPT), was founded to meet the needs of the service sector. PMKL offers three main programs: the Diploma in Retail Management (DRM), the Diploma in Hotel Management (DHM), and the Diploma in Information Technology (Digital Technology – Game Track) (DDT).

Every study program offered is required to obtain accreditation from professional bodies such as the Malaysian Qualifications Agency (MQA) and the Malaysian Board of Technologists (MBOT) to ensure program quality. This quality assurance is carried out through the Outcome-Based Education (OBE) framework.

One essential element within OBE that must be measured is the Programme Educational Objectives (PEO). PEO generally assesses the success of alumni within 3 to 5 years after graduation and evaluates the effectiveness of the study programs offered based on alumni achievement.

Specifically for the DDT program, five (5) PEOs have been drafted. These PEOs describe the expected characteristics of alumni within 3 to 5 years after graduation, encompassing aspects such as knowledge, technical skills, communication, teamwork, and lifelong learning, as detailed in Table 1.

**Table 1:** List of PEOs for the DDT program

PEO	Description
PEO 1	Have relevant knowledge, skills and abilities to meet job specifications, organizational and system requirements.
PEO 2	Can use current computing tools and techniques by applying knowledge and interpreting information to solve problems, can perform and be responsible for routine tasks.
PEO 3	Have effective communication skills to communicate information, problems and solutions.
PEO 4	Have teamwork and interpersonal skills, entrepreneurial awareness and are aware of their social and ethical responsibilities.
PEO 5	Have skills for lifelong learning and career development.

This study represents the first pilot study conducted internally on the alumni of the DDT program at PMKL. The purpose is to evaluate the achievement of the PEOs in producing a knowledgeable and skilled workforce among polytechnic alumni.

## 2. LITERATURE REVIEW

### 2.1 DEFINITION AND ROLE OF PEO IN HIGHER EDUCATION

Programme Educational Objectives (PEO) is a long-term goal statement that summarizes alumni achievements several years after graduation (Rahman et al., 2016). PEO functions as a critical evaluation tool ensuring the study program remains aligned with the vision and mission of the higher education institution (Ab-Rahman et al., 2022), besides describing alumni success in career and professional achievement contexts, ensuring they are equipped with technical competencies and modern industry skills (Abbadeni et al., 2013). Furthermore, PEO provides a basis for institutions to evaluate students' long-term performance based on learning outcomes, simultaneously aligning the curriculum with the constantly changing job market requirements (Pramono et al., 2020).

### 2.2 IMPLEMENTATION OF PEO IN MALAYSIA AND INTERNATIONALLY

The implementation of PEO is adopted across various higher education institutions in Malaysia, including Politeknik and Community Colleges. PEO implementation helps enhance the quality of study programs and ensures alumni possess skills and knowledge relevant to meet industry demands, involving continuous evaluation of job criteria (Zaira et al., 2016). Internationally, the practice of PEO is widespread; institutions such as Massachusetts Institute of Technology (MIT) in the United States utilize PEO to ensure the relevance of academic programs to the latest industry developments (Abbadeni et al., 2013). PEO is also applied in countries like India (Jayaprakash, 2020) and the Philippines (German et al., 2021) aiming to equip alumni with global competencies and standards.

### 2.3 RESEARCH MOTIVATION AGAINST PEO

The evaluation of PEO is essential to ensure alumni are equipped with industry-relevant skills and knowledge, thereby enhancing educational quality and adaptability in the competitive job market. PEO acts as a benchmark for alumni success in meeting employer and market needs (Rahman et al., 2016). Crucially, feedback from alumni and stakeholders is vital for improving academic programs. (Zaira et al. 2016) emphasize that alumni input is critical for assessing PEO effectiveness, offering valuable insights into how well programs meet actual workplace needs.

### 2.4 PROGRAMME EDUCATIONAL OBJECTIVES AND ITS MEASUREMENT

PEO are dimensional metrics used to assess alumni capabilities in various aspects of their professional careers. This study specifically measures alumni

achievement based on five core objectives. These objectives encompass professional knowledge (PEO 1), technical competence (PEO 2), communication skills (PEO 3), teamwork and social responsibility (PEO 4), and lifelong learning/career development (PEO 5). Each PEO is subsequently evaluated through specific measurement items designed to quantify the extent of alumni success against these established objectives.

#### 2.4.1 PROGRAMME EDUCATIONAL OBJECTIVES (PEO 1)

PEO 1 measures alumni knowledge and skills related to job requirements and entrepreneurial tendencies. Research by (Zaira et al., 2016) indicates that alumni achieving PEO 1 demonstrate superior ability in applying acquired knowledge to daily tasks, enhancing their employability. The specific measurements tested are presented in Table 2.

**Table 2:** Measurement Items for PEO 1

PEO Code	Measurement Item
PEO 1.1	To assess the extent of the alumni's knowledge in Information and Communication Technology when performing related tasks.
PEO 1.2	To evaluate the extent of the alumni's competence in the fundamental principles of computing knowledge.
PEO 1.3	To assess the extent to which the alumni can apply existing technical skills relevant to their job requirements.

#### 2.4.2 PROGRAMME EDUCATIONAL OBJECTIVES (PEO 2)

PEO 2 focuses on alumni technical skills in problem-solving and utilizing current technology (Abbadeni et al., 2013). Measurements tested are presented in Table 3.

**Table 3:** Measurement Items for PEO 2

PEO Code	Measurement Item
PEO 2.1	To assess the alumni's ability to use current computing tools and techniques in their daily tasks.
PEO 2.2	To evaluate the alumni's ability to solve problems based on the knowledge gained during their studies.
PEO 2.3	To examine the alumni's ability to solve problems innovatively, creatively, and ethically.
PEO 2.4	To assess the alumni's ability to interpret information to complete tasks within their work context.

#### 2.4.3 PROGRAMME EDUCATIONAL OBJECTIVES (PEO 3)

In the context of communication skills, PEO 3 assesses the extent to which alumni effectively convey information and work in teams (Pramono et al., 2020). Measurements tested are presented in Table 4.

**Table 4:** Measurement Items for PEO 3

PEO Code	Measurement Item
PEO 3.1	To assess alumni's teamwork communication skills.
PEO 3.2	To evaluate active listening and constructive feedback abilities.
PEO 3.3	To assess presentation confidence and clarity.
PEO 3.4	To evaluate improvement in information management skills.

#### 2.4.4 PROGRAMME EDUCATIONAL OBJECTIVES (PEO 4)

PEO 4 emphasizes the importance of teamwork, interpersonal skills, and awareness of ethical/social responsibilities in their careers. Measurements tested are presented in Table 5.

**Table 5:** Measurement Items for PEO 4

PEO Code	Measurement Item
PEO 4.1	To assess the alumni's ability to work effectively in a team.
PEO 4.2	To measure the alumni's potential and entrepreneurial skills that contribute to the development of the ICT industry.
PEO 4.3	To evaluate the alumni's ethical values toward the local community.
PEO 4.4	To assess the level of social responsibility and leadership demonstrated by alumni in performing tasks and making decisions.

#### 2.4.5 PROGRAMME EDUCATIONAL OBJECTIVES (PEO 5)

PEO 5 measures alumni capacity for continuous learning and skill development throughout their careers (Ab-Rahman et al., 2022). This objective supports the premise that lifelong learning is critical for ensuring alumni remain relevant in the constantly evolving job market. Measurements tested are presented in Table 6.

**Table 6:** Measurement Items for PEO 5

PEO Code	Measurement Item
PEO 5.1	To assess the alumni's ability to continue learning and develop their skills throughout their careers.
PEO 5.2	To evaluate the improvement of alumni's skills in learning new things.

### 3. METHODOLOGY

This study employed a quantitative approach using numerical data to objectively measure and analyze the phenomenon under investigation. The cross-sectional survey design was adopted to collect data at a single point in time, allowing the description of characteristics and relationships among study variables efficiently and within a limited timeframe. The study population comprised alumni from the Diploma in Digital Technology (DDT) program who graduated in December 2016, June 2017, December 2017, June 2018, and December 2018. Sampling was conducted using the Majid Konting method.

Data was gathered using a structured questionnaire consisting of three sections: demographic information (18 items), alumni perceptions of PEO importance (5 Likert-scale items), and PEO achievement (17 items) based on the five established objectives. The questionnaire was distributed online via Google Form through academic advisors, offering ease of access, cost efficiency, and faster data collection. The survey was conducted over two months (March–April 2024). Collected data were analyzed using SPSS Version 26, employing descriptive statistics such as mean, frequency, and percentage, as well as Spearman correlation to identify relationships between variables (Pallant, 2020).

## 4. RESULTS AND DISCUSSIONS

### 4.1 ALUMNI DEMOGRAPHIC DISTRIBUTION

The findings of the alumni demographic distribution who responded to the survey are summarized as in Table 7 below.

**Table 7:** Alumni Demographic Distribution

Item	Quantity	Percent
<b>Gender</b>		
Male	37	61%
Female	24	39%
Total	61	100%
<b>Age</b>		
20 – 24	19	31%
25 – 29	40	66%
30 – 34	2	3%
Total	61	100%
<b>Race</b>		
Melayu	51	83%
India	8	13%
Cina	1	2%
Others	1	2%
Total	61	100%
<b>Year End</b>		
2019	21	34%
2020	22	36%
2021	18	30%
Total	61	100%
<b>Employment Status</b>		
Employed	32	52%
Self-Employed	7	12%
Pursuing Further Studies	20	33%
Unemployed	2	3%
Total	61	100%
<b>Further Studies</b>		
Diploma	30	49%
Bachelor's Degree	31	51%
Master's Degree	0	0
PhD	0	0
Total	61	100%
<b>Employed in Related Field</b>		
Yes	25	41%
No	36	59%
Total	61	100%
<b>Current Employment Sector</b>		
Government	7	12%
Private	32	52%
Statutory Body	5	8%
Self-Employed	17	28%
Total	61	100%
<b>Salary</b>		
Below RM1000	15	25%
RM1001 – RM2000	17	28%

RM2001 – RM3000	17	28%
RM3001 – RM4000	6	10%
RM4001 – RM5000	2	3%
RM5001 and more	4	6%
Total	61	100%

A total of 87 alumni from the Diploma in Information Technology (Digital Technology) program graduated in the December 2020 session, with 61 responding to the questionnaire. However, among these 61 respondents, only 39 (64%) were employed. Out of the 39 employed alumni, only 33 employers participated in the survey. The demographic distribution of the employers who responded is summarized in Table 8 below.

**Table 8:** Employer Demographic Distribution

Item	Quantity	Percent
Gender		
Male	20	61%
Female	13	39%
Total	33	100%
Current Employment Sector		
Government	3	10%
Private	26	78%
Statutory Body	1	3%
Self-Employed	3	9%
Total	33	100%

## 4.2 QUANTITATIVE ANALYSIS FINDINGS AND DISCUSSION

### 4.2.1 DESCRIPTIVE ANALYSIS FINDINGS

The data obtained from the survey were analyzed and interpreted using Table 9, which outlines overall data patterns based on items developed for the five (5) Program Educational Objectives (PEO).

**Table 9:** Interpretation of Mean Score

Mean Range	Interpretation of Mean Score
1.00 – 1.89	Very Low
1.90 – 2.69	Low
2.70 – 3.49	Moderate
3.50 – 4.29	High
4.30 – 5.00	Very High

## 4.3 ANALYSIS OF PEO IMPORTANCE BY ALUMNI AND EMPLOYERS

Part 2 of the distributed questionnaire measures the importance of the PEO statements according to alumni. There are five (5) questions in this section, and the analysis for each question is as shown in Table 10.

**Table 10:** Analysis of PEO Importance by Alumni and Employers

PEO	Min	
	Alumni	Employer
PEO 1: Have relevant knowledge, skills and abilities to meet job specifications, organizational and system requirements.	4.46	4.73
PEO 2: Can use current computing tools and techniques by applying knowledge and interpreting information to solve problems, can perform and be responsible for routine tasks.	4.51	4.61
PEO 3: Have effective communication skills to communicate information, problems and solutions.	4.56	4.61
PEO 4: Have teamwork and interpersonal skills, entrepreneurial awareness and are aware of their social and ethical responsibilities.	4.59	4.58
PEO 5: Have skills for lifelong learning and career development.	4.54	4.67

Table 10 shows the mean PEO scores from alumni and employers. Alumni rated PEO 4 highest (mean = 4.59) and PEO 1 lowest (mean = 4.46), while employers rated PEO 1 highest (mean = 4.73) and PEO 4 lowest (mean = 4.58).

#### 4.4 ANALYSIS OF ALUMNI AND ALUMNI EMPLOYER PERCEPTION TOWARDS PROGRAMME EDUCATIONAL OBJECTIVES (PEO) ACHIEVEMENT

Part 3 of the questionnaire measures the perception of alumni and alumni employers regarding PEO achievement

**Table 11:** Mean Score of PEO 1

No.	PEO	Mean	
		Alumni	Employer
1	Graduates can apply Information and Communication Technology knowledge in performing tasks.	4.56	4.55
2	Graduates possess competency in the basic principles of computing knowledge.	4.62	4.64
3	Graduates can apply existing technical skills appropriate to job requirements.	4.51	4.42
Average Mean		4.56	4.54

Table 11 shows the mean scores for PEO 1, with averages of 4.56 (alumni) and 4.54 (employers). Item 2 recorded the highest score for both groups, indicating strong competency in basic computing principles. PEO 1 achievement was 91.2% for alumni and 90.8% for employers.

**Table 12:** Spearman Correlation Results for PEO 1

Item	Details
Analysis Method	Spearman Correlation ( $r_s$ )
Number of Items (N)	3
Value of $r_s$	+1.00
Level of Relationship	Perfect Positive
Alumni Mean Score Average	4.56
Employer Mean Score Average	4.54
Alumni Standard Deviation	$\pm 0.045$

Employer Standard Deviation	±0.09
Difference in Average Mean (Alumni – Employer)	+0.02

The Spearman correlation ( $r_s = +1.00$ ) shows perfect alignment between alumni and employer evaluations, with minimal score difference (4.56 vs. 4.54), reflecting shared views on graduate skills matching industry needs.

**Table 13:** Mean Score for PEO 2

No.	PEO	Mean	
		Alumni	Employer
1	Graduates are competent in using computing tools and techniques to complete routine tasks.	4.54	4.48
2	Graduates can apply knowledge to solve problems in the organization.	4.62	4.18
3	Graduates solve problems creatively, innovatively, and ethically.	4.59	4.27
4	Graduates show responsibility in completing assigned tasks.	4.62	4.45
Average Mean		4.59	4.34

Table 13 shows the mean scores for PEO 2, with averages of 4.59 (alumni) and 4.34 (employers). Alumni rated Items 2 and 4 highest (4.62), while employers rated Item 1 highest (4.48). The results indicate strong technical competence and responsibility among alumni, with achievement levels of 91.8% (alumni) and 86.8% (employers).

**Table 14:** Spearman Correlation Results for PEO 2

Item	Details
Analysis Method	Spearman Correlation ( $r_s$ )
Number of Items (N)	4
Value of $r_s$	-0.55
Level of Relationship	Moderate negative
Alumni Mean Score Average	4.59
Employer Mean Score Average	4.34
Alumni Standard Deviation	±0.04
Employer Standard Deviation	±0.12
Difference in Average Mean (Alumni – Employer)	+0.25

Based on the correlation results table, the Spearman correlation ( $r_s = -0.55$ ) indicates a moderate negative relationship between alumni and employer evaluations. Alumni scored higher (4.59 vs. 4.34) with a +0.25 gap, showing that alumni graduate achievement was higher than employers, reflecting some misalignment in perceptions of graduate strengths.

**Table 15:** Mean Score for PEO 3

No.	PEO	Mean	
		Alumni	Employer
1	Graduates demonstrate effective communication skills.	4.64	4.40
2	Graduates possess active listening skills and provide constructive feedback.	4.64	4.42
3	Graduates deliver presentations confidently with appropriate content.	4.54	4.40

4	Graduates show the ability to improve information management skills.	4.74	4.42
Average Mean		4.64	4.41

Table 15 shows the mean scores for PEO 3, with averages of 4.64 (alumni) and 4.41 (employers). Alumni rated Item 4 highest (4.74), while employers rated Items 2 and 4 highest (4.42). These results indicate strong active listening, constructive feedback, and information management skills, with achievement levels of 92.8% (alumni) and 88.2% (employers).

**Table 16:** Spearman Correlation Results for PEO 3

Item	Details
Analysis Method	Spearman Correlation ( $r_s$ )
Number of Items (N)	4
Value of $r_s$	+0.75
Level of Relationship	Strong Positive
Alumni Mean Score Average	4.64
Employer Mean Score Average	4.41
Alumni Standard Deviation	$\pm 0.07$
Employer Standard Deviation	$\pm 0.01$
Difference in Average Mean (Alumni - Employer)	+0.23

Based on the correlation results table, the Spearman correlation ( $r_s = +0.75$ ) shows a strong positive relationship between alumni and employer evaluations. Despite minor score differences, both parties show aligned assessments. Alumni rated slightly higher (4.64 vs. 4.41) with a +0.23 gap, indicating consistent positive views of graduate achievement, though alumni rated themselves marginally higher.

**Table 17:** Mean Score for PEO 4

No.	PEO	Mean	
		Alumni	Employer
1	Graduates can work effectively in teams.	4.72	4.55
2	Graduates demonstrate entrepreneurial potential and skills that contribute to ICT industry development.	4.51	4.15
3	Graduates serve as role models in the community and uphold ethical values.	4.62	4.36
4	Graduates demonstrate strong leadership in managing assigned tasks.	4.64	4.36
Average Mean		4.62	4.36

Table 17 shows the mean scores for PEO 4, with averages of 4.62 (alumni) and 4.36 (employers). Item 1 recorded the highest score for both groups (4.72 and 4.55). The results indicate that alumni work effectively in teams and demonstrate strong leadership skills, with achievement levels of 92.4% (alumni) and 87.2% (employers).

**Table 18:** Spearman Correlation Results for PEO 4

Item	Details
Analysis Method	Spearman Correlation ( $r_s$ )
Number of Items (N)	4
Value of $r_s$	+0.95
Level of Relationship	Strong Positive
Alumni Mean Score Average	4.62

Employer Mean Score Average	4.36
Alumni Standard Deviation	±0.08
Employer Standard Deviation	±0.15
Difference in Average Mean (Alumni - Employer)	+0.26

Based on the correlation results table, the Spearman correlation ( $r_s = +0.95$ ) shows a strong positive relationship between alumni and employer evaluations. Both share similar PEO priorities, though alumni rated higher (4.62 vs. 4.36) with a +0.26 gap, indicating generally consistent views, with alumni assessing achievements slightly higher.

**Table 19:** Mean Score for PEO 5

No.	PEO	Mean	
		Alumni	Employer
1	Graduates engage in lifelong learning to enable career advancement.	4.70	4.09
2	Graduates consistently enhance their skills and are ready to learn new things.	4.62	4.33
Average Mean		4.62	4.66

Table 19 shows the mean score values for PEO 5. The average mean for alumni and employers is 4.66 and 4.21, respectively. Item 1 shows the highest mean score for alumni (4.70), and Item 2 shows the highest mean score for employers (4.33). These findings indicate that alumni consistently enhance their skills and are ready to learn new things. The mean achievement for PEO 5 is 93.2% for alumni and 84.2% for employers.

**Table 20:** Spearman Correlation Results for PEO 5

Item	Details
Analysis Method	Spearman Correlation ( $r_s$ )
Number of Items (N)	2
Value of $r_s$	-1.00
Level of Relationship	Perfect negative
Alumni Mean Score Average	4.66
Employer Mean Score Average	4.21
Alumni Standard Deviation	±0.04
Employer Standard Deviation	±0.17
Difference in Average Mean (Alumni - Employer)	+0.45

Based on the correlation results table, the Spearman correlation ( $r_s = -1.00$ ) shows a perfect negative relationship between alumni and employer rankings, indicating reversed PEO priorities. Alumni scored higher (4.66) than employers (4.21), with a +0.45 difference, suggesting differing views on lifelong learning and skill development.

## 5. RECOMMENDATIONS

Future curriculum development should prioritize the enhancement of mechanisms that enable students to verifiably demonstrate, and employers to objectively recognize lifelong learning competencies (PEO 5). Notably, alumni assigned the highest rating to lifelong learning and career development (mean = 4.66), whereas employers provided the lowest rating for this outcome (mean = 4.21). This marked disparity resulted in a perfect negative correlation ( $r_s = -1.00$ ) between stakeholder rankings. To bridge this perceptual gap, curricular revisions and assessment strategies

should focus on facilitating evidence-based demonstrations of graduates' continuous skill acquisition and adaptability to emerging technologies, thereby aligning employer perceptions with actual graduate achievements in this critical domain.

## 6. CONCLUSIONS

The evaluation of the DDT (Diploma in Information Technology) program at Politeknik METrO Kuala Lumpur found that all Programme Educational Objectives (PEOs) were achieved at a very high level by the 2021 alumni. Spearman correlation analysis of alumni and employer feedback showed that all five PEOs were met, with PEO 1 showing a perfect positive correlation ( $r_s = +1.00$ ). The study also highlights that Politeknik METrO Kuala Lumpur and JPPKK prioritize both skills and curriculum in the DDT program. This is crucial, as alumni gain knowledge, technical skills, and valuable soft skills during their studies.

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