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Attainment of The Program's Educational Objectives (PEO) among Community College Students in The Field of Civil Engineering & Built Environment as Semi-Skilled Workers

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Abstract

Program Educational Objectives (PEO) are required for every academic program to describe and represent the program's objectives. Outcome-based education (OBE) requires that PEOs be enhanced in an integrated manner with the involvement of stakeholders to address the demands and requirements of the programme in response to current obstacles and challenges. Furthermore, required is a link between the updated PEOs and the objectives of the Jabatan Pendidikan Politeknik & Kolej Komuniti (JPPKK). Each redesigned program must create several PEOs statements that refer to the five clusters of Malaysian Qualification Framework 2.0 (MQF 2.0) learning outcomes and an MQF 2.0 level descriptor. Analyzing PEOs accomplishments to determine whether they were met or not depends on the department's Key Performance Indicator (KPI). To evaluate community college graduates' contributions to society and industry within four to five years of graduation, this study measures PEO's achievement of community college graduates in the field of construction. In this study, questionnaires are used in a survey design using a quantitative approach. A simple random sample method was used to choose 356 graduates from three civil engineering & built environment study programs that were available in Kolej Komuniti, Malaysia. The three PEOs that have been established are mentioned in the questionnaire item. The findings for PEO1, PEO2, and PEO3's successes in producing knowledgeable, skilled workers and entrepreneurs in the construction industry are discussed in this research article. The study's data findings demonstrate that all of its objectives were met, with a mean score above the KPI target of 3.80 and a high degree of program objective attainment measurement. The results of this study have implications for improving the quality of study programs available to fulfill the needs of the global labour market and cutting-edge technology, according to respondents who submit comments. This paper deserves consideration because it is a pilot research project for community colleges looking at graduate achievement within the specified time frame. Additional research can be conducted using the educational goals of other programmes to observe graduates holistically in accordance with their vision and mission, particularly those of Kolej Komuniti, Malaysia.

Keywords: - Program Educational Objectives, community college, Civil Engineering & Built Environment

1. Introduction

As the primary criterion for evaluating programs created for certification under Levels 3–6, MQA has modified outcome-based education. The five learning outcome clusters listed in the Malaysian Qualification Framework 2.0 are referenced in the PEO statement (MQF 2.0). The PEOs stated expectations for graduates' performance three to five years following graduation.

PEO emphasizes the expectations of students and their capacity to comprehend what must be done when they graduate from the program. PEOs assessed as a percentage of predicted success. PEO will be evaluated 3 to 5 years after graduates have finished their education.

After graduating from the program, PEOs are evaluated based on their present employment, graduate vertical advancement in the industry, and research done with higher education in Malaysia or overseas (Zainal, 2009).

The main goal of core domain courses should be to prepare students with a thorough understanding of fundamental concepts in the domain as well as modern skills needed by industry, with plenty of opportunities for students to work hands-on and complete design projects.

1.1 Background of The Research

The purpose of this study was to assess the success of a certificate programme in civil engineering field offered by a community college. Others than that, the goal of this study is to evaluate the PEO program's performance in producing graduates who meet both national and industry needs. In addition, as a result of the study's findings and reporting, a continuous quality improvement (CQI) effort and monitoring are being carried out to improve the program's implementation.

The Curriculum Division, *Jabatan Pendidikan Politeknik and Kolej Komuniti* (JPPKK) has also established a performance-based improvement plan linked to the goal and suitability of the strategic plan and/or improvement plan in raising the standard of higher education. The following are the objectives of this study on PEO achievement measurement:

i. Identifying the level of programme goal achievement (PEO 1) of graduates of the community college certificate programme in civil engineering and built environment;
ii. Identifying the level of programme goal achievement (PEO 2) of graduates of the community college certificate programme in civil engineering and built environment;
iii. Identifying the level of programme goal achievement (PEO 3) of graduates of the community college certificate programme in civil engineering and built environment; and
iv. Evaluating the overall level of programme objective attainment (PEO) for community college students who have completed the certificate programme in civil engineering and built environment.

2. Literature Review

The objectives and outcomes of the recommended education handbook are typically used to evaluate the accreditation of a program that is being designed. According to Puteh et al. (2009), any program established will result in graduates who have certain skills and capacities to suit the needs of stakeholders.

Every program must also have a plan for ongoing evaluations that includes recorded studies for program improvement. OBE adoption becomes a crucial pillar, and Malaysian education has grown stronger as a result. According to (Chowdhury, 2013), curriculum is one of the most important aspects of educational development, and it must be carefully planned and coordinated with what industry and academia require right now.

2.1 Curriculum Design and The Relationship Between Vision, Mission, and PEO

Any certificate program at a community college should focus on three main areas: determining the direction of TVET (technical and vocational education and training), the evaluation process (assessment), and continuous quality improvement (CQI). For instance, short-term and long-term aims are two of the goals that are set. The goal is students attain the essential proficiency after the program. The students able to pursue further education and employment after graduation. While the long-term target is purposefully set to require alumni to acquire particular competencies after three to five graduation years, the short-term targets aim to have students attain the essential proficiency after the program. Complementary and linked Program Educational Objective Targets (PEO) serve stakeholders' needs. It's important to assess and gauge the goals and results. PEO has a clear objective that is consistent with higher education institutions' vision and mission and that responds to expressed objectives from program stakeholders who describe what graduates should accomplish in their careers and professional lives three to five years after graduating. Standards for a good PEO comprise specific, unambiguous, quantifiable, doable, results-oriented, and time-bound elements (Shivakumar, 2015).

Each program determines its criteria to continuously monitor the academic progress of its graduates by measuring and evaluating it at various stages and through various exams throughout the program. PEOs integrate information and skills to be completed by graduates who meet a set of standard requirements to be semi-skilled workers or entrepreneurs in the sector. A clear path to outcome program (PO) and curriculum design should also be available to PEOs. All flaws must be remedied gradually using sound CQI planning.

2.2 PEO Statement

PEO is an overall mandate that describes what graduates ought to do for a number of years (often three to five years and beyond) following graduation, once they have completely engaged themselves in their chosen careers. Establishment PEOs are developed based on the requirements of the program, the stakeholders, and their expectations. PEOs are occasionally regarded as a peculiar quality that distinguishes the graduates of a specific institution from those of other universities. Sustainability, leadership, ethics, lifelong learning, Malaysia's goals, economic growth, efficiency, and entrepreneurship are some of the things that PEO statements often talk about. According to Abet (2009), instead of having a fixed domain, an institution's PEO statement should be determined by the institution itself through a methodical and structured process. For example, all PEOs must be written down, shared, and made known to all relevant people, institutions, and parties. Rashid (2012) recommends mapping the relationship between the PEO and the institution's mission using a matrix structure.

The institute's vision and goals are fixed for a set period of time, but PEOs are more adaptable and must be revised every three to five years after stakeholders have been consulted. It is also critical to ensure that the PEO statement's domain is relevant and consistent with its vision and goal. Annual meetings with stakeholders are planned, and meeting minutes must include the outcome of the debate. More stakeholders are preferable in an important area that represents the interests of many different groups.

The domain statement is an important part of every PEO because it sets the direction and future course of the program. Additionally, MQA advises that domains should be consistent with the current PO, but they are not limited to the mentioned framework. Moreover, the domain for PEOs needs to be timely, detailed, measurable, reachable, and reasonable. A PEO assessment is carried out through the evaluation of findings based on objective evidence.

PEOs are created and revised using a variety of methods, including employer questionnaires, industry training input, industry panel meetings, and alumni surveys (Juwairiyah A. R., 2016) As an illustration, one of the efficient technique for gauging the opinions of external stakeholders and employers is the evaluation of PEO statements using a five-level Likert scale. According to the questionnaire about PEO, the replies ranged from "irrelevant" to "extremely important" (Abdullah et al., 2008).

3. Methodology

3.1 Research Design

The methodology of this study is quantitative and uses a survey format. Quantitative techniques use descriptive analysis since this study can clarify anything by looking at numerous components and aspects.

3.2 Population and Sample

The sample size is controlled by the degree of confidence, the margin of acceptance of error, the types of statistical analyses and the total estimate of the population as most social science studies researchers assumed that the population attributes are about 3% ~ 5% margin error at 95% confidence level as referring to Table 1 (Krejcie & Morgan, 1970).

Table 1. Determination of sample size from known population (Krejcie & Morgan, 1970)

Population (n)	Sample (s)	Population (n)	Sample (s)	Population (n)	Sample (s)
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10 000	370
150	108	750	254	15 000	375
160	113	800	260	20 000	377
170	118	850	265	30 000	379
180	123	900	269	40 000	380
190	127	950	274	50 000	381
200	132	1000	278	75 000	382
210	136	1100	285	1 000 000	384

The selection of the research sample is based to population of community college graduates in the fields of civil engineering and the built environment who graduated between 2014 and 2018. The sample for this study consisted of 365.

3.3 Instrument

The study's instrument was a collection of questionnaires that a group of specialists from polytechnics, community colleges, and public universities created. The questionnaire items were changed to make sure that the instrument would measure what it was supposed to measure in this study.

According to Price et al. (2015), validity refers to the degree to which the measurement scores that come from an instrument (questionnaire) reflect the variable to which they aim. Besides that, validity is the ability of an instrument to measure what it is designed to measure (Kumar, 2011). Meanwhile, Sekaran (2003) defined reliability is a testing, or measurement to illustrate on what degree it is without prejudice and accurately measured over

time and at some other point in time. In other words, the answer should not change over time to ensure that any measurement is correct at any point in time. If a measurement has strong test-retest reliability and internal consistency, the researchers should be more confident that the results indicate what they are supposed to be (Hair et al., 2010).

A Likert scale is used to evaluate this research tool. Pandey & Pandey (2015) suggested that the distribution of sample attitudes can be represented in the form of the distribution of frequencies on a specific subject. The employed Likert scales are 1 - Strongly disagree; 2 - Do not agree; 3- Not sure; 4 – Agreed; 5 - Strongly agree.

This research tool is split into two sections.

a. Section A

Respondents' demographic profile includes gender, race, employment status, age, career field, year of job experience, and monthly income.

b. Section B

PEO opinions from community college graduates with a focus on civil engineering and the built environment (Refer to Table 2)

Table 2. Item of research

PEO	Sample Measurement Items
PEO 1: Knowledgeable and technically adept in the areas of building upkeep, construction technology, site supervision, and furniture design by standards set by the industry	Q1: Experts in their field of study and ready to meet the needs of the field
	Q2: Able to address issues involving knowledge from the topic of study
	Q3: Possess technical expertise in the topic of study
PEO 2: Capable of solving problems, communicating well, being committed, and having good ethics to provide good services in an organization	Q4: Critical thinking skills for problem-solving
	Q5: Effectively communicate in a work context
	Q6: Always adhere to ethics, morals, and relevant rules in completing assignments and providing services
PEO 3: Able to pursue a career in business through entrepreneurship and other forms of continuous learning	Q7: Utilizing entrepreneurial abilities on the job
	Q8: Willing to enrol in higher education to further their education and keep current with market trends
	Q9: Capable of managing a team in an industrial setting

3.4 Population and Sample

To facilitate data collection, this research instrument was distributed to respondents via Google Forms. The data collected after the respondents completed the questionnaire was used to assess the reliability of the research tool in this study. A pilot test will be performed before the actual survey. The questionnaires were structured and designed to avoid confusions in the easiest way possible. The expert studied the questions in this area and went through multiple clarification rounds to achieve greater clarity and prevent misinterpretation of the questions. Since the questionnaires did not identify individual companies or goods, a framework was provided to direct the respondents towards the survey's objectives. The aim of doing so was to ensure that respondents were able to fully interpret the questions and provide the expected answers. It has defined and developed ambiguous words and questions for better comprehension. A pilot test will be conducted using 50 sets of questionnaires and will be distributing for the validity analysis purpose and reliability test was conducted by SPSS version 26.0 software.

Cronbach's Alpha is the most commonly used measure of consistency reliability (Sekaran, 2003; Hair et al., 2010). Cronbach's Alpha coefficient is essential for measuring multipoint-scaled products, as shown in Table 2. The higher the coefficients, the better the reliability. Cronbach's Alpha is widely used because questionnaires contained several Likert-type items that were aggregated to form a composite ranking (Leech et al., 2015).

Cronbach's Alpha was the average correlation of an item on the scale with others (Price et al., 2015). A reliability coefficient of 0.70 or higher is considered good in social science research (Zikmund et al., 2013). According to Andale (2014), a high Cronbach's Alpha value indicates that the questions are redundant. A low Cronbach's Alpha value, on the other hand, may indicate a lack of test questions.

Table 3. Cronbach's Alpha coefficient range

Cronbach's Alpha value	Internal Consistent
> 0.9	Excellent
0.80 to 0.90	Very good
0.70 to 0.80	Good
0.60 to 0.70	Fair/ Moderate
< 0.60	Poor

4. Results

4.1 Demographics

Gender, race, employment status, age, career field, year of job experience, and monthly income are among the demographic information provided by respondents. The following information is summarised in Table 4.

Table 4. Respondents' demographic profile

Demographic Variables	Frequency (N)	Per cent (%)
Gender		
Male	250	68.5
Female	115	31.5
Race		
Malay	195	73.6
Chinese	15	5.7
Indian	20	7.5
Others	35	13.2
Status of work		
Employed	313	85.8
Further study	35	9.6
Unemployed	17	4.7
Age		
21 - 25 years	280	76.7
26 - 30 years	85	23.3
31 - 35 years	0	0.0
> 35 years	0	0.0
Work in field		
Yes	278	76.2
No	87	23.8
Working experience		
< 1 year	67	18.4
1 - 2 years	245	67.1
> 2 years	53	14.5
Monthly income		
< RM 1,000.00	98	26.8
RM 1,000.00 - RM 2,000.00	198	54.2
> RM 2,000.00	69	18.9
Working experience		
< 1 year	67	18.4
1 - 2 years	245	67.1
> 2 years	53	14.5
Monthly income		
< RM 1,000.00	98	26.8
RM 1,000.00 - RM 2,000.00	198	54.2
> RM 2,000.00	69	18.9

According to the study's findings, 85.8% of graduates have jobs, 9.6% are pursuing further education, and only 4.7% are still looking for work. Even though most graduates work in civil engineering or built environment, only 23.8% of graduates do not work in those fields. 18.9% of graduates earn RM 2,000 or more per month on average.

4.2 Descriptive Analysis

a) Data Analysis

Descriptive statistical analysis describes the data as it is analysed without drawing broad generalisations or conclusions. The data were analysed using the Statistical Package for the Social Sciences. Using this software, the researcher applies the data gathered for the description in the form of frequency, percentage, and mean score. The obtained data were analysed using descriptive statistics. The interpretation from Zaihan and Hilmun (2016) in Table 5 will be used to interpret the mean score analysis.

Table 5. Mean score interpretation (Zaihan & Hilmu, 2016)

Mean score	Interpretation
1.00 – 1.89	Poor
1.90 – 2.69	Fair/ Moderate
2.70 – 3.49	Good
3.50 – 4.29	Very good
4.30 – 5.00	Excellent

b) Reliability Test

The consistency of a scale can be determined using the reliability test. The Cronbach's Alpha coefficient (α) is used to measure consistency. Cronbach's Alpha coefficients on a scale are considered acceptable if they are greater than 0.6. (Zikmund et al., 2010). The scales used in this study passed the reliability test with a score greater than 0.6, indicating that they are more consistent and reliable. Table 6 summarises the reliability test.

Table 6. Cronbach's Alpha coefficient range (N=365)

Variables	No. of Items	Coefficient Alpha (α)
PEO	9	.837

Table 6 shows that this questionnaire instrument has strong internal consistency because it measures the overall accomplishment level of the Community College Certificate study programme in the subject of civil engineering and built environment with a value =.837.

4.4 PEO's Inference Statistics

a) PEO 1

PEO 1 of this study's research instrument consists of three question items. Table 7 shows the mean score and standard deviation for PEO 1.

Table 7. The mean score for PEO 1 (N=365)

No. of Item	Item Statement	Mean	SD
Q1	Experts in their field of study and ready to meet the needs of the field	4.14	.618
Q2	Able to address issues involving knowledge from the topic of study	4.25	.578
Q3	Possess technical expertise in the topic of study	4.41	.530

According to Table 7, the mean value of question item Q1 is 4.41, with a standard deviation of.618. The Q2 data, on the other hand, show a mean score of 4.25 and a standard deviation of.578. The average Q3 score is 4.41, with a standard deviation of .530. This shown the extremely high level of achievement of respondents in PEO 1.

b) PEO 2

The following three PEO 2 question items focus on the respondent's soft skills, such as communication and social responsibility. Table 8 shows the mean score and standard deviation for PEO 2.

Table 8 shows that the mean Q4 score is 4.29, with a standard deviation of.502. The mean score for Q5 was 4.31, with a standard deviation of .508. In comparison, the Q6 mean mark data is 4.37 with a .517 standard deviation. According to the mean mark data for the three items in this question, the respondents have a very high level of PEO 2 achievement.

Table 8. The mean score for PEO 2 (N=365)

No. of Item	Item Statement	Mean	SD
Q4	Critical thinking skills for problem-solving	4.29	.502
Q5	Effectively communicate in a work context	4.31	.508
Q6	Always adhere to ethics, morals, and relevant rules in completing assignments and providing services	4.37	.517

c) PEO 3

PEO 3 also includes three question items that assess respondents' soft skills using a lifelong learning approach. Table 9 shows the mean score and standard deviation for PEO 3.

Table 9 shows that the average S7 score is 4.14, with a standard deviation of .611. Following that, the S8 mean score is 4.28 with a standard deviation of .901. S9 has a standard deviation of .569 and a mean score of 4.31. The mean score data show that PEO 3 has achieved a lot.

Table 9. The mean score for PEO 3 (N=365)

No. of Item	Item Statement	Mean	SD
Q7	Utilizing entrepreneurial abilities on the job	4.14	.611
Q8	Willing to enrol in higher education to further their education and keep current with market trends	4.28	.901
Q9	Capable of managing a team in an industrial setting	4.31	.569

d) Overall Attainment of PEOs

The data analysis for the overall mean score for the three PEOs in this study shows that the respondents' level of achievement for PEO 1 to PEO 3 is high.

Table 10. The mean score for PEOs (N=365)

PEO	Item Statement	Mean	SD
1	Knowledgeable and technically adept in the areas of building upkeep, construction technology, site supervision, and furniture design following standards set by the industry	4.34	.575
2	Capable of solving problems, communicating well, being committed, and having good ethics to provide good services in an organization	4.33	.509
3	Able to pursue a career in business through entrepreneurship and other forms of continuous learning	4.24	.694
	Overall Mean Score	**4.30**	**.593**

Respondents who completed a certificate programme in civil engineering and built environment at a community college can be said to have achieved a very high level of programme objective achievement, with a mean score of 4.30 and a standard deviation of .539. As a result, the results of this data analysis met the JPPKK's target KPI for measuring the study's PEO achievement, which is a mean mark value of 3.80. Graduates of community college's Civil Engineering and Built Environment Program have demonstrated high levels of achievement in the program's operational and educational objectives.

5. Conclusion

In general, the study's data findings show that all study objectives were met with a mean score higher than the 3.80 KPI target and that programme objective achievement assessment was high (PEO). This is consistent with the role of Community College as one of the institutions used by the Ministry of Higher Education to provide public TVET (KPT). Community colleges play an important role in meeting the training and skill needs of people of all ages, as well as in providing educational opportunities for high school graduates before they enter the labour force or continue their studies at a higher level. This shows how JPPKK prioritised a balance between the application and evaluation of skills and curriculum when providing higher education services to graduates of the Community College Certificate programme in civil engineering and the built environment.

The findings of this analysis enable JPPKK and the institutions that host the programme to identify the necessary steps for improvement to ensure that the intended outcomes are met by the next graduating cohort. Of the possible improvement measures is a review or revision of the PEO statement, which can be coordinated at the department level. More Community College Certificate holders in civil engineering and built environment can be included in this study, increasing the number of respondents and allowing for a widening variety of opinions to be collected.

As a result, the study's findings are critical because graduates are one group that has the right to acquire information, practical abilities, and soft skills that will aid them in continuing their education at a community college.

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