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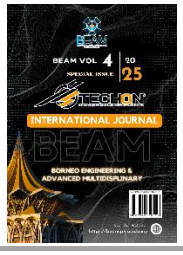

Alumni Survey on The Achievement of Program Educational Objective for The Diploma in Electronics (Instrumentation) at Kolej Komuniti Seberang Jaya

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Abstract

The Program Educational Objective (PEO) statement refers to the capabilities and skills of the graduates that should be achieved in their career and professional development in the initial years after graduation. Achievement of PEO is one of the factors in obtaining program accreditation for a diploma program offered by the educational institution. This study employs an alumni survey approach to assess the Diploma in Electronics (Instrumentation) Program Educational Objectives (PEOs) at Kolej Komuniti Seberang Jaya. This is due to the absence of any research on the evaluation of the PEO of this program. The survey targeted alumni who graduated within the last three years, focusing on their career advancement, working field, skill development, and perceived preparation for their chosen field. Closed-ended and dichotomous as survey questions, to measure the alumni perceptions of the program's effectiveness in preparing them for professional careers. The survey achieved a good response rate, providing a representative sample of alumni who graduated in 2019 and 2020 with feedback. Findings indicate that all the PEO targets set during the meeting with the institution and other stakeholders have been successfully achieved. The study's results offer valuable insights into curriculum development and continuous improvement processes, ensuring that the program remains aligned with industry standards and meets the evolving needs of the job market.

Keywords: - Program Educational Objectives, alumni survey, curriculum accreditation

1. Introduction

Polytechnics and Community Colleges have played a pivotal role in the evolution of Technical and Vocational Education and Training (TVET) in Malaysia from 1969 to 2000. These institutions, under the administration of the Ministry of Higher Education Malaysia (MoHE), are committed to becoming leaders in superior TVET education. To ensure the success of TVET in achieving its objectives, the Malaysia Education Blueprint 2015-2025 outlines a national agenda with 10 strategic shifts designed to address systemic challenges, particularly those related to quality and efficiency (MEB, 2015). The blueprint emphasizes key objectives, including providing all students with access to high-quality education, meeting industry demands, and fostering personal and professional growth.

To fulfil this mission of delivering high educational standards, all programs offered by these institutions must align with the rigorous criteria set by accreditation bodies. These bodies, such as the Malaysian Qualifications Agency (MQA), the Engineering Technology Accreditation Council (ETAC), and the Malaysia Board of Technologists (TTAC), play a critical role in maintaining the quality and standards of higher education institutions

and their program (Alaraje, 2009 & Ab-Rahman et al., 2022). These accreditation boards recognize programs offered by polytechnics and community colleges, ensuring their relevance and credibility (Desai et al., 2018).

Kolej Komuniti Seberang Jaya is one of 106 community college institutions under Malaysia's Ministry of Higher Education. It provides full-time educational programs, consisting of two certificate programs and one diploma program. Situated in Penang, Malaysia, the college enjoys a strategic advantage due to its close to major industrial hubs.

The Diploma in Electronics (Instrumentation) program at Kolej Komuniti Seberang Jaya (KKSJ) is a full-time course spanning six semesters, comprising four semesters of academic study and two semesters of work-based learning in related industries. Graduates from community colleges and polytechnics are highly sought after, highlighting the crucial role of TVET institutions in boosting employability. The program's first intake was in 2016, featuring a work-based learning (WBL) internship during semesters 5 and 6. Initially, the program underwent an MQA audit but later transitioned to MBOT accreditation, and the audit section is scheduled for September 2024. As a result, Program Educational Objectives (PEO) reports derived from alumni surveys have become essential for accreditation and program evaluation.

Program Educational Objectives (PEOs) are broad statements that describe the career and professional accomplishments graduates are expected to achieve within a few years of graduation. PEOs are essential in the accreditation process as they reflect the program's effectiveness in aligning curriculum design with industry need (Sikarwar, 2022).

There are various methods to gather feedback or respond to the PEOs achievement by interviews or surveys to alumni and employers and graduate exit surveys (Alaraje, 2009; Eesley, 2018; Hong-Novotney, 2018 & Rosales et al., 2022).

To conclude, this study implements an alumni survey methodology to assess the fulfilment of the Program Educational Objectives (PEOs) for the Diploma in Electronics (Instrumentation) program at Kolej Komuniti Seberang Jaya. The objective of this research is to evaluate the effectiveness of the program in preparing its graduates for their professional endeavors by soliciting feedback from alumni. This research will offer valuable insights into the program's strengths and areas for development, thereby guiding future improvements and ensuring that the educational objectives remain pertinent and impactful.

2. Literature Review

2.1 Program Educational Objectives (PEOs)

Outcome-Based Education (OBE) is an approach to curriculum design. Instead of focusing on content coverage, OBE prioritizes what students can demonstrate 3-5 years after graduating (Deros et al., 2012 & Desai et al., 2018). All program stakeholders participate in the iterative process of developing the program's vision, mission, and PEO (see Fig. 1). The early stages involve developing the progressive Vision, Mission, and PEO statements using the Graduate Attributes (GA) as a foundation. In general, the OBE assessment includes three types of outcomes/objectives (Hairi et al., 2019 & Suhaimi et al., 2022):

i. The course learning outcome (CLO) – being assessed during the semester.
ii. The program learning outcome (PLO) – being assessed at the end of their three-year study and
iii. The program educational objectives (PEO) – are assessed after 3-5 years of their graduation date.

In higher education, Outcome-Based Education (OBE) requires that every program achieves clearly defined learning outcomes. These outcomes are specific statements outlining the knowledge, skills, and competencies students are expected to attain by the end of their studies, which are then assessed to determine their qualifications (Makinda et al., 2011). To ensure that program standards are met, alumni surveys are conducted to gather feedback on graduates' experiences and achievements.

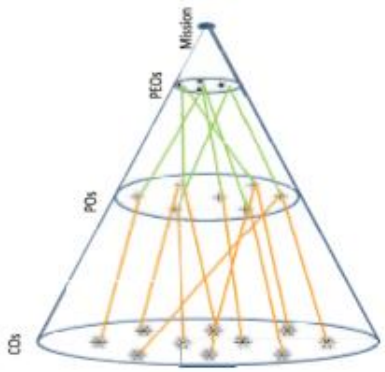

Fig. 1: Relationship between OBE and PEO (Subbaraman et al., 2013)

Alumni surveys are typically administered 3 to 5 years after graduation to provide meaningful insights into how well the program aligns with its long-term goals (Ghaly, 2020 & Hairi et al., 2019). Some studies (Rosales et al., 2022) utilize data from surveys conducted 4 to 5 years post-graduation, as this timeframe allows graduates sufficient time to establish their careers and apply the skills acquired during their studies. There is no significant difference in conducting alumni surveys between 3-5 years or 4-5 years when assessing Program Educational Objectives (PEOs), as PEOs focus on long-term career development and applying skills in professional settings. A one-year difference in the survey window is unlikely to produce substantially different results regarding graduates' achievement of these objectives, given the extended timeframe typically associated with PEOs.

There are three objectives of the Program Educational Objectives (PEO) of the Diploma in Electronics Instrumentation (DEI), Kolej Komuniti Seberang Jaya, as shown in Table 1.

Table 1: PEO

PEO	Description
PEO 1	Produce technical assistants or technician who are knowledgeable and skillful in-line with the current instrumentation field needs and National aspirations.
PEO 2	Demonstrate technical problem-solving ability in innovative, creative and manage information through lifelong learning.
PEO 3	Ability to communicate effectively, and work in team with groups based on working ethics as well as social responsibility.

The formulated PEOs align with the institution's vision and mission and have been designed to directly address the needs and expectations of key stakeholders, including industries, employers, alumni, students, and parents (Ab-Rahman et al., 2022). The PEOs will be reviewed after a period of three to five years to ensure their continued relevance and effectiveness (Sundaram, 2013).

2.2 Role of Alumni Surveys in Assessing Educational Outcomes

Their feedback provides critical insights into how well the program has prepared graduates for their careers and the extent to which the skills and knowledge gained during their studies are applied in the workplace (Ghaly, 2020).

Alumni's up-to-date industry knowledge plays a vital role in curriculum development and program enhancement. Research by (Beyerlein et al., 2017) highlights how alumni feedback can inform the creation of industry-relevant programs and strengthen graduate skill sets. Beyond their professional insights, alumni contribute to their alma mater through financial support, career guidance, industry connections, and constructive feedback, all of which shape the student experience and contribute to the institution's overall success. Successful alumni also act as ambassadors for their institutions. Research by Basri et al. (2023) & Deros et al. (2012) suggests that positive alumni testimonials significantly influence the decisions of prospective students. By fostering strong alumni relations and engagement, educational institutions can leverage this valuable resource for continued development and growth (Bieger, 2024).

3. Methodology

3.1 Research Design

The methodology of this study is quantitative and uses a survey-based format. Descriptive analysis is utilized to interpret the data, allowing for a clear examination of various components and aspects.

3.2 Population and Sample

Data collection was conducted in March 2023 as part of the MBOT audit preparation scheduled for September 2024. The study focused on alumni of the DEI program who graduated in 2019 and 2020, with a total of 33 respondents identified as shown in Table 2. The first intake of this program was in 2016.

Table 2: Number of respondents by batch

Years of Graduation	2019	2020	Total
Numbers of Graduates	19	14	33

To maximize participation, the survey was distributed through multiple digital platforms, including the individual and KKSJ Alumni WhatsApp group, email, Telegram, and the college's official Facebook page. A cover letter as in Fig. 2 outlining the survey's objectives, the voluntary nature of participation, and confidentiality assurances were included. Due to a low initial response rate, the data collection process extended over approximately two months, requiring multiple follow-ups to encourage participation.

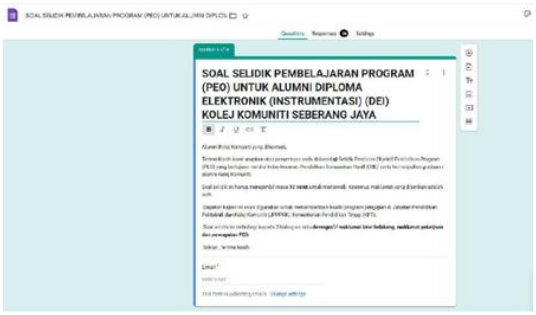

Fig. 2: Cover letter for the survey distributed via Google Forms

3.3 Instruments

A structured questionnaire was developed based on the *Garis Panduan Pelaksanaan Kajian Pencapaia*n *PEO* provided by the B*ahagian Kurikulum, Jabatan Pendidikan Politeknik dan Kolej Komuniti* (JPPKK) (Kamarudin et al., 2021). Referring to the research questions outlined in Table 3, the questionnaire was divided into three main sections and was designed in a bilingual format, incorporating both English and Bahasa Malaysia:

a. Section A: alumni demographic profile,
b. Section B: job description, and
c. Section C: statements related to the evaluation of PEOs.

To measure PEOs 1 to 3, the survey incorporated dichotomous (Yes/No) and closed-ended questions.

3.4 Instruments Validity

Face validity was conducted before data collection to ensure the clarity and relevance of the questionnaire items. The instrument, comprising close-ended "Yes/No" questions, underwent review by one current student and one alumnus, both sharing characteristics with the target respondents. These reviewers completed the questionnaire and provided feedback on the clarity, comprehensibility, and appropriateness of each item. Minor revisions were

implemented to refine phrasing and enhance question accessibility, ensuring alignment with the study's objectives. This process verified the items' comprehensibility and relevance.

Table 3: Item of research questions

PEO	Survey Instrument Items
PEO 1: Produce technical assistants or technician who are knowledgeable and skillful in-line with the current instrumentation field needs and National aspirations.	Are you working in the electrical and/or electronic field? Working sector: technology/ engineering, information technology. Transportation & logistics, services? Job position if employed.
PEO 2: Demonstrate technical problem-solving ability in innovative, creative and manage information through lifelong learning.	How confident are you in your ability to identify and define complex technical problems related to your work field? How often do you seek out new and unconventional solutions when facing technical challenges? Are you taking any courses to improve your skills? Have you continued your studies to the degree level? What is your achievement thus far?
PEO 3: Ability to communicate effectively, and work in team with groups based on working ethics as well as social responsibility.	Do you have experience in any of these activities? (e.g. report writing/ presentation/ being a panel/ speaker for a forum/ communication via email) Have you worked in a group or team at your workplace/ during your further studies? Have you ever led a team or group at your workplace/ during your further studies? (e.g.: demonstrate procedure/ give instruction to colleague)

4. Result and Discussion

The sample data from the students who graduated in 2019 and 2020 are considered to evaluate the PEO's achievement. In total, 24 respondents (72.7%) out of 33 graduates responded to the PEO's survey form. Data were collected from alumni with a Diploma in Electronics Instrumentation (DEI) graduates with 3 to 5 years of working experience after graduation.

4.1 Demography

Table 4 shows the percentage of responses by batches. Alumni of batch 2020 have the highest percentage of responses 92.9%. All the information is summarized in Table 5.

Table 4: Percentage of responses by batch

Years of Graduation	Batch	
	2019	2020
No of forms	19	14
No of response	11	13
% Response	**57.9%**	**92.9%**

Table 5: Respondent demographic profile

Items	Frequency (N)	Percentage (%)
Gender		
Male	20	83.3%
Female	4	16.7%
Age		
25 – 29 years	23	95.8%
30 – 34 years	1	4.2%
Status of work		
Employed	23	95.8%
Further study	1	4.2%
Entrepreneurship	0	0%
Organization Type		
Private sector	24	100%
Government sector	0	0%
Monthly income		
Less than RM 2000	5	20.8%
RM 2001 – RM 3000	10	41.7%
RM 3001 – RM 4000	7	29.2%
More than RM 4000	2	8.3%

The study's findings showed that 83.3% of respondents were male, and most of them were employed. Only one respondent pursued further studies with sponsorship from their company. The primary motivation for pursuing additional education was to secure a promotion to a higher position within the company and achieve a higher salary. Furthermore, 41.7% of respondents reported a monthly income ranging between RM2001 and RM3000, consistent with the typical salary range for diploma-level positions.

4.2 PEO 1: Practice as A Technical Assistant in Electronics Instrumentation or a Related Field

Fig. 3 displays the percentage of graduates working in the electrical and/ or electronic field. The study's findings indicate that a significant majority of graduates (77.76%, N=19) are employed in the electrical and electronics field, demonstrating strong alignment with Program Educational Objective (PEO) 1, which emphasizes practicing as a technical assistant in electronics instrumentation or a related field.

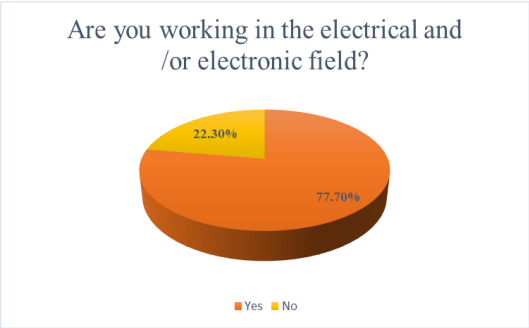

Fig. 3: Percentage of graduates working in the electrical and/ or electronic field

The various job positions in the field of electrical and/ or electronic are illustrated in Fig. 4. Specifically, 67% (N=16) of respondents hold positions such as Technician with a variety of job specifications, which reflects their

ability to apply technical knowledge and skills in professional roles.

Fig. 5 displays the percentage of graduates working in the electrical and/or electronic field and the working sectors in the electrical and/or electronic field. Additionally, 83.3%, N=20) of respondents reported working in sectors closely related to electronics instrumentation like technology or engineering field, further supporting the achievement of PEO 1.

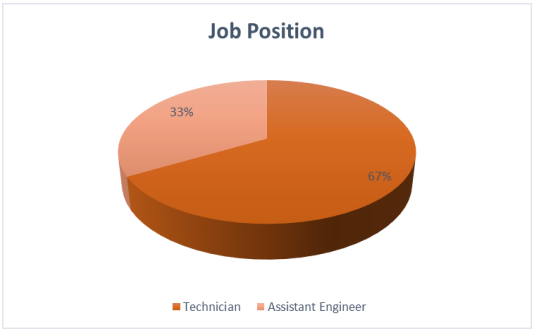

Fig. 4: Job position in the field of electrical and/ or electronic

The data indicates that the program successfully prepares graduates to enter and excel in technical roles within the electrical and electronics industry. This achievement aligns with the program's objective of equipping students with the essential competencies needed to make meaningful contributions to their field. Furthermore, the hands-on experience acquired during Work-Based Learning (WBL) training significantly boosts graduates' employability and supports the development of a robust career portfolio.

Based on the reported job positions and employer names, it can be summarized that the graduates have been hired by companies with diverse backgrounds, with the majority being in the engineering and technology sectors. Most of these companies are in Penang. Further details are provided in Table 6.

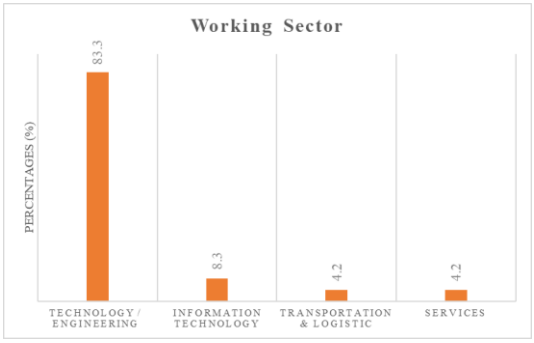

Fig. 5: Percentage of DEI Graduates working sectors in the field of electrical and/ or electronic.

4.3 PEO 2: Demonstrate Technical Problem-Solving Ability in Innovative, Creative and Manage Information Through Lifelong Learning

The PEO 2 assessment results are presented in Fig. 6 to Fig. 10. The study's findings reveal strong evidence of graduates' ability to demonstrate technical problem-solving skills, innovation, and a commitment to lifelong learning, aligning with Program Educational Objective (PEO) 2.

The elements in the ability to identify and define complex technical problems related to your work field are shown in Fig. 6. A significant majority of respondents, 72% (N = 17) expressed confidence in their ability to identify and define complex technical problems in their work field. This indicates that the program has effectively equipped graduates with the foundational skills needed to tackle technical challenges.

Table 6: The list of employed companies

No.	Company's Name	Classification of Industry Type	Number of Employees
1	Bizlink Technology Sdn Bhd	Technology, Electronics and Manufacturing Industry	1
2	Flextronics Technology Sdn. Bhd		4
3	Inari Integrated System Sdn. Bhd.		1
4	Intel Technology Sdn. Bhd.	Technology and Semiconductor Industry	3
5	Lam Research		1
6	TF AMD Microelectronics Sdn. Bhd		1
7	Daxiscomms Malaysia Sdn Bhd	Telecommunication and Security Industry	2
8	Motorola Solutions Malaysia Sdn. Bhd.		1
9	National Instruments Malaysia Sdn. Bhd	Technology, Instrumentation and Automation Industry	1
10	Sophie Automation Sdn. Bhd		1
11	Stratus Automation Sdn. Bhd.		1
12	TT Vision		1
13	Jinko Solar Sdn. Bhd.	Renewable Energy (Solar) Industry	1
14	Oriental Metal Industries (M) Sdn. Bhd	Metal Manufacturing Industry	1
15	Sime Darby Plantation Sdn Bhd	Agriculture and Plantation Industry	1
16	Thales	Defense and Technology Industry	1
17	Westports Malaysia Sdn. Bhd	Logistics and Port Industry	1
18	SCHOTT Glass Malaysian Sdn. Bhd	Glass and Special Materials Manufacturing Industry	1
		Total	**24**

Analysis of the data for problem-solving when facing technical challenges, as shown in Fig. 7, reveals that 43% (N=10) of respondents occasionally explore new and unconventional solutions, while 27% (N=6) consistently adopt such approaches.

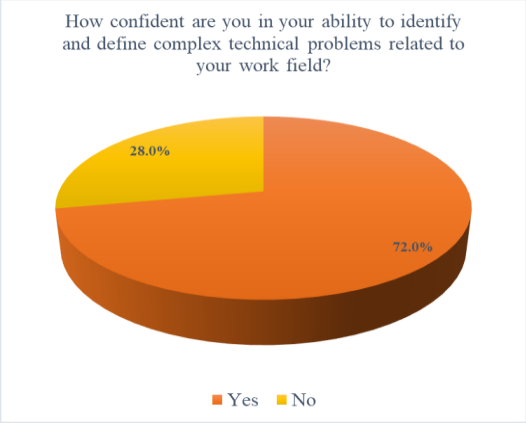

Fig. 6: Element on ability to identify and define complex technical problems related to your work field

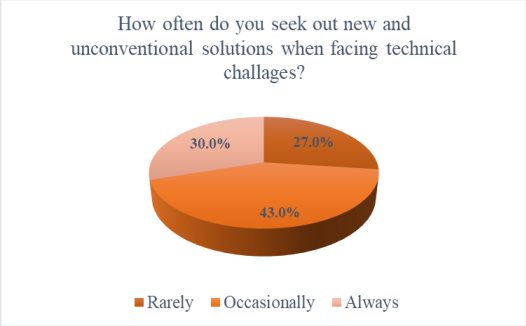

Fig. 7: Element in seeking out new and unconventional solutions when facing technical challenges.

Fig. 8 and Fig. 9 data elements highlight a strong culture of continuous learning among graduates. According to the survey, 44% (N=11) of respondents are currently enrolled in courses to enhance their skills, demonstrating their proactive commitment to professional development. However, the findings in Fig. 9 also reveal that 78% (N=19) of respondents are not interested in pursuing further education at the degree level unless they gain more work experience or are offered a job promotion, refer to Fig. 10 below.

The results from the PEO 2 survey section were averaged and compared against the KPIs set during a collaborative meeting with industry advisors, alumni, and the academic institution. A summary of the findings is presented in Fig. 11.

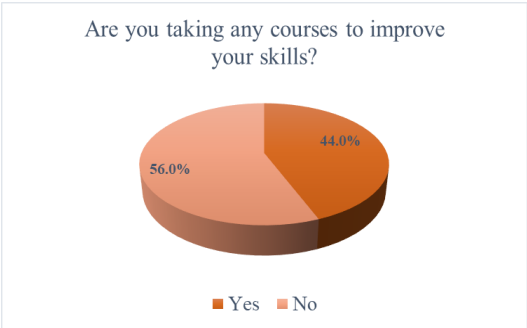

Fig. 8: Element on taking any courses to improve your skills

Fig. 9: Element on continuing your studies to the degree level

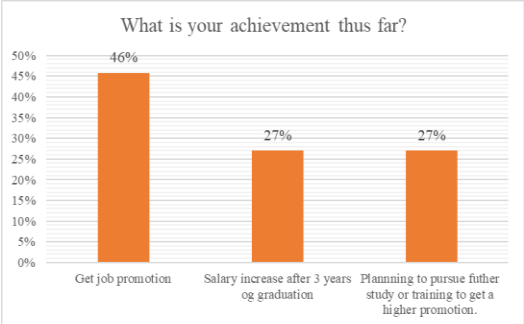

Fig. 10: Element on achievement thus far

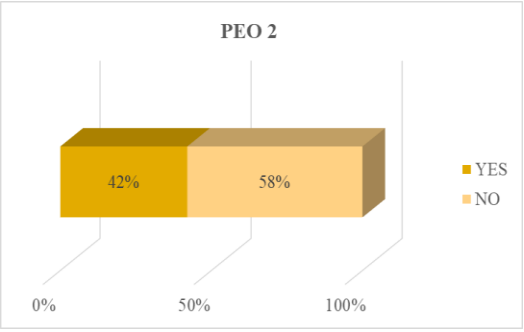

Fig 11: PEO 2 achievement summary

4.4 PEO 3: Ability to Communicate Effectively, And Work in Team with Group Based on Working Ethics as Well as Social Responsibility

PEO 3 evaluates graduates' ability to communicate effectively, collaborate in teams, and uphold professional ethics and social responsibility in the workplace. Effective communication plays a crucial role in ensuring that ideas are clearly conveyed, fostering efficient teamwork. Additionally, strong work ethics, including honesty, integrity, and commitment to high-quality output, contribute to a positive professional environment.

The survey findings, as illustrated in Fig. 12, highlight the following key achievements, which is 61% (N=15) of alumni have experience in report writing and presentations related to their work. Respectively in Fig. 13 and Fig. 14, 57% (N=14) of the graduates have worked in teams, demonstrating their ability to collaborate effectively in professional settings, and 37% (N=9) of the graduates have taken leadership roles, such as technicians and assistant engineers, showcasing their capability to lead teams and manage responsibilities.

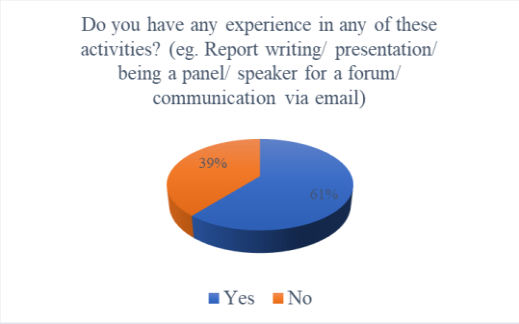

Fig. 12: Element on experiencing activities of report writing/ presentation/ being a panel/ speaker for a forum/ communication via email

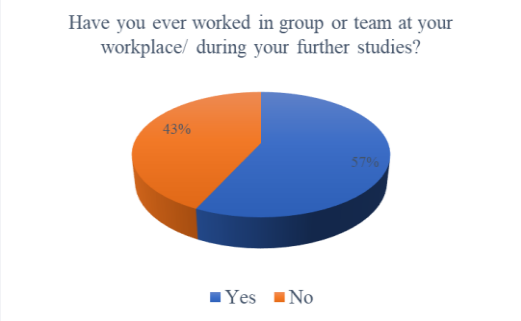

Fig. 13: Elements on have worked in a group or team at workplace/ during further studies.

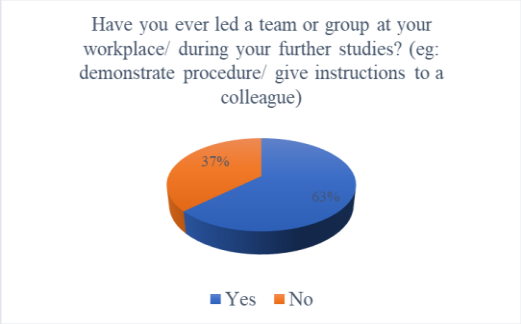

Fig. 14: Elements on having led a team or group at workplace/ during further studies.

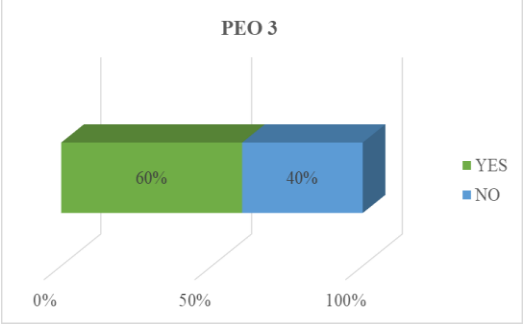

Fig. 15: PEO 3 achievement summary

Overall, the results indicate that most respondents feel well-prepared in communication, teamwork, and professional ethics. Many graduates attribute their skills in these areas to the collaborative projects and ethical discussions they engaged in during their studies at Kolej Komuniti Seberang Jaya. These experiences have equipped them with the necessary competencies to navigate workplace challenges with confidence and integrity.

4.5 Summary of PEO Achievement for the DEI Program

The achievement of each Program Educational Objective (PEO) was evaluated against the Key Performance Indicator (KPI) benchmarks, which were established through collaborative discussions with stakeholders, including industry representatives, alumni, and institutional representatives, during a meeting in May 2024. The findings reveal that all PEOs have successfully met the predefined KPI targets. The benchmark percentages for the PEOs' KPIs were determined using data collected from graduate tracer studies, conducted after each cohort completes their studies. The overall PEO achievement for graduates of the Diploma in Electronics (Instrumentation) (DEI) program is summarized in Table 7, which provides a comparison of achievement percentages against the established benchmarks.

Table 7: Summary of the PEOs achievement

PEO	PEO Indicator	KPI (%)	PEO (%)	PEO Indicator
PEO 1	Technical assistant in electronics instrumentation	50	78	Achieved
PEO 2	Problem-solving and life-long learning	30	42	Achieved
PEO 3	Communication and teamwork	30	60.33	Achieved

5. Conclusion and Recommendations

The survey conducted on the achievement of Program Educational Objectives (PEOs) for the Diploma in Electronics Instrumentation (DEI) at Kolej Komuniti Seberang Jaya, involving graduates from the 2019 and 2020 cohorts, has provided valuable insights into the program's effectiveness. Over a two-month data collection period, alumni feedback was gathered to assess their professional achievements, contributions, and growth in the workforce, as well as their attainment of the PEOs. The findings indicate that the alumni perceive the PEOs as highly important and relevant to their current roles in the industry.

This survey not only highlights the success of the DEI program in meeting its educational objectives as a part of accreditation but also plays a critical role in closing the Outcome-Based Education (OBE) loop. By validating the PEOs through direct feedback from alumni, the program demonstrates its commitment to continuous improvement and alignment with stakeholder expectations.

Moving forward, it is recommended to conduct similar surveys at regular intervals to ensure the PEOs remain relevant and responsive to industry changes. Additionally, further engagement with employers and industry partners could provide deeper insights into emerging skill requirements, enabling the program to refine its curriculum and enhance graduate employability. These steps will ensure the DEI program continues to produce graduates who are well-equipped to meet the challenges of the dynamic electrical and electronics industry.

Author Contributions: The research study was carried out successfully with contributions from all authors.

Conflicts of Interest: The authors declare no conflict of interest.

References

Ab-Rahman, M. S., Hwang, I. S., Yusoff, A. R.M., Mohamad, A. W., Ihsan, A. K. A. M., Rahman, J. A., ... & Kaharudin, I. H. (2022). A Global Program-Educational-Objectives Comparative Study for Malaysian Electrical and Electronic Engineering Graduates. *Sustainability*, *14*(3), 1280.

Alaraje, N. (2009). The Electrical Engineering Technology Program Educational Objectives (Peos): Are They Measurable, And How?. In *2009 Annual Conference & Exposition* (pp. 14-1211).

Basri, M., & Sitorus, A. S. (2023). The Role of Alumni In Curriculum Development In Early Childhood Islamic Education Program (PIAUD) UIN Sumatra Utara Medan. *Edukasi Islami: Jurnal Pendidikan Islam*, *12*(01).

Beyerlein, M., Jones, T., & Peck Parrott, K. (2017). Redesigning an undergraduate HRD program with stakeholder guidance. *Advances in Developing Human Resources*, *19*(2), 138-156.

Bieger, T. (2024). The Role of Alumni in the Development of their University. In *Business School Internationalisation in a Changing World* (pp. 23-27). Routledge.

Deros, B. M., Mohamed, A., Mohamed, N., & Ihsan, A. K. A. M. (2012). A study of alumni feedback on outcome based education in the Faculty of Engineering & Built Environment, Universiti Kebangsaan Malaysia. *Procedia-Social and Behavioral Sciences*, *60*, 313-317.

Desai, S. R., Mane, P. K., Hegde, V. N., & MN, M. (2017, November). An approach for evaluating program educational objectives using indirect method. In *2017 5th IEEE International Conference on MOOCs, Innovation and Technology in Education (MITE)* (pp. 141-145). IEEE.

Eesley, C. E. (2018). Alumni surveys as a data collection methodology. *Available at SSRN 3128628*.

Ghaly, S. M. A. (2020). Indirect evaluation of program educational objectives and student outcomes for engineering programs: A case study. *Engineering, Technology & Applied Science Research*, *10*(5), 6209-6213.

Hairi, N., Affandi, H. M., & Nasri, N. M. (2019). Identifying instruments to measure programme educational objectives (PEO) achievement in Malaysia. *Universal Journal of Educational Research*, *7*(9A), 135-146.

Hong-Novotney, A. W. (2018). Listening to our graduate students' feedback: Graduate student exit and alumni surveys.

Kamarudin, N. binti, Amin, H. binti M., & Nor, R. binti M. (2021). Garis Panduan Pelaksanaan Kajian Pencapaian PEO. In *Bahagian Kurikulum, Jabatan Pendidikan Politeknik dan Kolej Komuniti*.

Makinda, J., Bolong, N., Gungat, L., & Sarman, A. (2011, December). Assessment of program educational objectives using alumni survey: The UMS experience. In *2011 3rd International Congress on Engineering Education (ICEED)* (pp. 14-17). IEEE.

MEB. (2015). *Malaysia Education Blueprint 2015-2025 (Higher Education) Malaysian Ministry of Education*. 01–240.

Rosales, P., Tinoco, O., Quispe, C., Tejada, G., Güere, F., & Agustini, L. (2022). Investigating the Fulfillment of Educational Objectives Increases Depending on the Number of Years of Graduation. In *2022 International Symposium on Accreditation of Engineering and*

Computing Education (ICACIT) (pp. 1-5). IEEE.

Sikarwar, M. (2022). Outcome-Based Learning: An Overview. *SSRN Electronic Journal*, 314–318. https://doi.org/10.2139/ssrn.4026986.

Subbaraman, S., Jagtap, R. R., & Shinde, S. S. (2013). Outcome based learning: A case study. In *2013 IEEE International Conference in MOOC, Innovation and Technology in Education (MITE)* (pp. 375-379). IEEE.

Suhaimi, M. S., Juwara, L. N. H., & Abdullah, N. (2022). Programmes Educational Objectives (PEO) Achievement for Diploma in Mechanical Engineering at Politeknik Muadzam Shah. *Borneo Engineering & Advanced Multidisciplinary International Journal*, *1*(2), 37-42.

Sundaram, R. (2013, October). Drafting program educational objectives for undergraduate engineering degree programs. In *2013 IEEE Frontiers in Education Conference (FIE)* (pp. 632-636). IEEE.