



eISSN 3032-601X & pISSN 3032-7105

Vol. 1, No. 3, 2024

MISTER

**Journal of Multidisciplinary Inquiry in Science,
Technology and Educational Research**

**Jurnal Penelitian Multidisiplin dalam Ilmu
Pengetahuan, Teknologi dan Pendidikan**

**UNIVERSITAS SERAMBI MEKKAH
KOTA BANDA ACEH**

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Journal of Multidisciplinary Inquiry in Science Technology
and Educational Research

Journal of MISTER

Vol. 1, No. 3, 2024

Pages: 298–304

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Article in Journal of MISTER

Available at	: https://jurnal.serambimekkah.ac.id/index.php/mister
DOI	: https://doi.org/10.32672/mister.v1i3.1264

How to Cite this Article

APA	: Izyan Wahida Binti Zainuddin. (2024). Factors Influencing Academic Achievement of Students in The Engineering Course at Sultan Abdul Halim Mu'adzam Shah Polytechnic. <i>MISTER: Journal of Multidisciplinary Inquiry in Science, Technology and Educational Research</i> , 1(3), 298 – 304. https://doi.org/10.32672/mister.v1i3.1264
Others Visit	: https://jurnal.serambimekkah.ac.id/index.php/mister

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Received: 03 15, 2024 | Accepted: 04 23, 2024 | Published: 05 01, 2024

ABSTRACT

This study aims to examine the factors influencing the academic achievement of students in the Diploma in Building Services Engineering course at Sultan Abdul Halim Mu'adzam Shah Polytechnic. The identified factors include attitudes, interests, and teaching methods of lecturers in the classroom. The study involved 40 respondents comprising fifth-semester students. The research instrument used was a questionnaire, and the data were analyzed using IBM Statistical Package for Social Science (SPSS) 20 to obtain frequency values, percentage means, and standard deviations. The Cronbach's alpha value obtained was 0.88. The study found that the highest mean score for the factors influencing student achievement was lecturer teaching (mean score = 4.37) in the classroom. This was followed by student attitudes (mean score 4.34), and the last factor was student interest with a score of 4.27. In conclusion, all the factors studied showed a significant relationship in influencing the academic achievement of students in the engineering course. However, improvement measures should be implemented to ensure the continued excellence in students' academic performance.

Keywords: Student Achievement; Attitudes; Interests; Lecturer Teaching

INTRODUCTION

Education plays a crucial role in the development of quality human capital in every country. It is one of the main pillars in realizing the mission of a nation. Education and society are inseparable, whether in developed countries, developing nations, or those facing challenges. According to Samian & Awang (2017), numerous studies indicate that good education is capable of preparing a cultured and wise society in managing life and making decisions. The National Education Philosophy asserts that education is also based on faith and obedience to God, unity, responsibility, trustworthiness, motivation, and determination to achieve personal well-being and aspire towards the prosperity of both society and the nation.

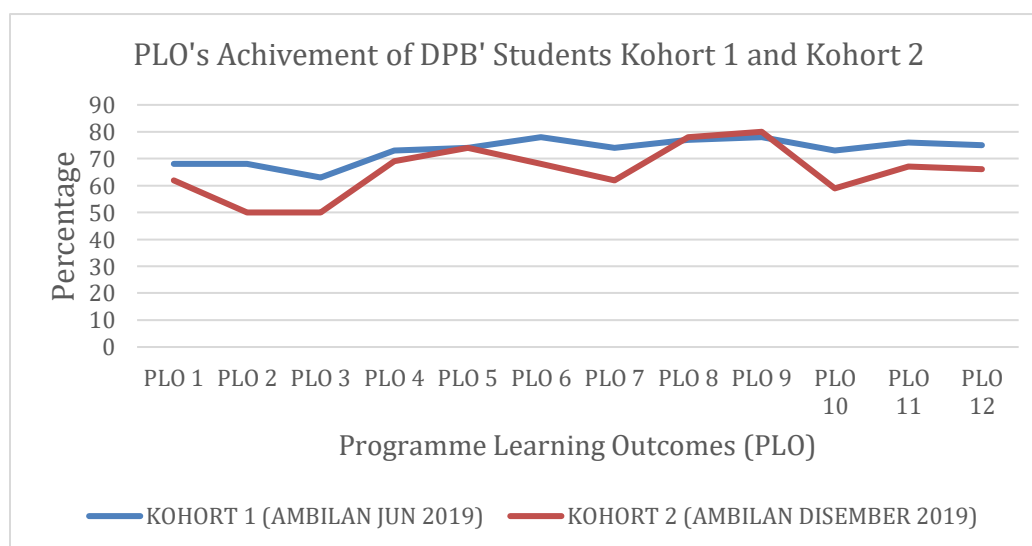
The aim of any higher education institution is clear, namely to produce successful graduates in both academic achievement and character development (Mohd Razali & Abdol Raop, 2018). The academic achievement of students is measured through the results or scores obtained in examinations, graded according to a system that allows for measurable distinctions in the levels achieved (Mukhtar et al., 2017).

The field of engineering is a crucial component of Technical and Vocational Education and Training (TVET) within the education sector (RMK-12, 2021). In Malaysia, graduates in the field of engineering are produced by various higher education institutions, including polytechnics. To meet the requirements and challenges of current technical education, students' mastery in this field must be solid, as quality engineering education will produce highly skilled and competitive engineering professionals (Mustafa et al., 2013).

Engineering is one of the branches in the field of technical education that contributes to enhancing the effectiveness of a country's development plans. Every development effort involves technical expertise. In fact, the success or pace of a country's development plan depends on the availability of an adequate technical workforce in that country.

Therefore, the academic achievement of students in the technical field at polytechnics is closely related to their ability to master courses based on engineering. Proficiency in calculations becomes a crucial requirement for determining the success of students in their chosen field (Wan Jusoh et al., 2020).

Figure 1: PLO's Achivement of DPB' Students Kohort 1 and Kohort 2



The graph illustrates the achievement of Programme Learning Outcomes (PLO) for Building Services Engineering Diploma students at Sultan Abdul Halim Mu'adzam Shah Polytechnic for two different cohorts. Cohort 1 consists of students enrolled in the June 2019 session and completed their studies in Session II 2021/2022. On the other hand, Cohort 2 comprises students enrolled in the December 2019 session and completed their studies in Session I 2022/2023. The percentages obtained are influenced by the performance of students in all courses, including engineering courses, from semester 1 to semester 6.

The learning outcomes for both cohorts in the second semester show a percentage decrease that could have implications for the unemployment of graduates who may struggle to master the skills and knowledge in their chosen field. Therefore, based on this issue, this study is conducted to identify the factors contributing to the achievement of Building Services Engineering Diploma students. The aim is to improve the attainment of PLO for the program in the future.

METHODS OF RESEARCH

This research adopts a quantitative approach using a survey questionnaire as the research instrument. The respondents consist of 5th-semester students in the Diploma in Building Services Engineering program at Sultan Abdul Halim Mu'adzam Shah Polytechnic. The total population of 5th-semester students selected for the study is 43 individuals, and according to Krejcie and Morgan's table (1970), the minimum required sample size is 40 individuals. A total of 40 respondents provided feedback on the distributed questionnaire.

Table 1 : Parts in Questionnaire

Part	Item
Part A	Demographic
Part B	Items related to student attitude
	Items related to student interest
	Items related to lecturer teaching

The survey questionnaire instrument used was adapted for the study based on questions developed by Madar A.R et al. (2005). This questionnaire consists of two parts, as shown in Table 1. The Likert scale used for items in Part B is represented by Scale 1 for 'Strongly Disagree,' Scale 2 for 'Disagree,' Scale 3 for 'Uncertain,' Scale 4 for 'Agree,' and Scale 5 for 'Strongly Agree.' Data from Part A were analyzed descriptively, while Part B data were analyzed by obtaining mean scores.

RESULT AND DISCUSSION

The demographic distribution of the total 40 samples revealed that 24 individuals (60%) were male students, while the remaining 16 individuals (40%) were female students. Table 2 displays the achievement of the Cumulative Grade Point Average (CGPA) for all the participating students.

Table 2 : Achievement of Cumulative Average Pointer of DPB Student

Student Achievement (CAP)	N	Percentage (%)
2.00 – 2.49	5	12.5
2.50 – 2.99	16	40
3.00 – 3.49	13	32.5
3.50 – 4.00	6	15

From Table 2 above, the statistics indicate that the academic achievement of the students is at a satisfactory level. This is because 32.5% of the Cumulative Grade Point Average (CGPA) of the students falls between 3.00 and 3.49. The highest CGPA achieved by the majority of the respondents is in the range of 2.50 to 2.99, with a total of 16 individuals or 40% of the overall sample.

Table 3 : Mean and Standard Deviation for Attitude

No	Item	Mean	Standard Deviation
1	I enjoy attending engineering classes.	4.45	.639
2	I like interacting with the lecturer during engineering classes	4.27	.716
3	I always check the notes provided by my lecturer	4.25	.776
4	I am always eager to arrive early for engineering classes.	4.38	.740
5	I make an effort to complete assignments given in engineering subjects as quickly as possible.	4.35	.736
Average		4.34	.656

Referring to Table 3, the findings show mean score of 4.34 with a standard deviation of 0.656, representing a moderate value. Most students express a preference and willingness to attend lectures for engineering courses, with the highest mean score being 4.45. Students also exhibit an attitude of arriving early for classes, with a mean score of 4.27. On the other hand, the attitude of students towards regularly reviewing notes provided by lecturers records the lowest mean score of 4.25. These findings suggest that students have a relatively indifferent attitude towards the notes provided by lecturers for the course.

Table 4 : Mean and Standard Deviation for Interest

No	Item	Mean	Standard Deviation
1	I can complete every assignment given perfectly according to the assignment requirements.	4.27	.716
2	I always have the commitment to achieve high scores in every quiz, exam, and assignment given.	4.36	.770
3	I can consistently submit assignments on time.	4.17	.747
4	I strive to resolve issues on my own before seeking guidance from the lecturer.	4.25	.776
5	I am interested if engineering subjects are taught using illustrations rather than purely explanatory methods.	4.33	.747
Average		4.27	.695

The analysis findings from Table 4 indicate that the means core and standard deviation are 4.27 and 0.695, respectively. The interest shown by students in achieving high scores for assignments and assessments conducted by lecturers records the highest mean score of 4.36. This demonstrates the commitment of students to excel in the field of engineering. However, the lowest mean score is noted for students' inability to submit assignments within the specified timeframe, scoring only 4.17. This suggests that students may struggle with effective time management for the assignments given by the lecturers.

Table 5 : Mean and Standard Deviation for Lecturer Teaching

No	Item	Mean	Standard Deviation
1	My lecturer emphasizes exercises as a learning method for engineering subjects.	4.32	.616
2	My lecturer uses simple language to explain a topic to students.	4.40	.672
3	My lecturer provides sufficient explanations about the subject matter.	4.37	.667
4	My lecturer succeeds in making engineering subjects interesting and relevant.	4.37	.667
5	During lecture sessions, my lecturer employs various teaching methods.	4.40	.672
Average		4.37	.621

For the factor of Lecturer Teaching, Table 5 reveals an mean score of 4.37 with a standard deviation of 0.621. The data indicates that students agree that lecturers use various teaching and learning methods appropriate for the lecture sessions. The highest mean score recorded is 4.40. However, the lowest mean score is 4.32, indicating that lecturers may not emphasize exercises as an effective learning method for engineering courses. This highlights the need for students to receive tutorials or additional guidance to ensure better and outstanding academic achievement in engineering courses.

Table 6 : Correlation of All Factors That Influence

		SIKAP	MINAT	PENGAJARAN
SIKAP	Pearson Correlation	1	.904**	.833**
	Sig. (2-tailed)		<.001	<.001
	N	40	40	40
MINAT	Pearson Correlation	.904**	1	.888**
	Sig. (2-tailed)	<.001		<.001
	N	40	40	40
PENGAJARAN	Pearson Correlation	.833**	.888**	1
	Sig. (2-tailed)	<.001	<.001	
	N	40	40	40

** . Correlation is significant at the 0.01 level (2-tailed).

Overall, the study finds that respondents agree that all three variables studied - attitude, interest, and lecturer teaching - are factors contributing to the academic achievement of students in engineering courses. Pearson correlation analysis was used to assess the strength of the relationships between the

variables.

Table 6 above shows that all correlation coefficients (r values) fall within the large category, ranging between 0.5 - 1.00. These values indicate a strong relationship between attitude, interest, and lecturer teaching in determining the academic achievement of students in the studied engineering courses throughout the designated study period.

CONCLUSION

In conclusion, the academic achievement of Building Services Engineering Diploma students at POLIMAS in engineering courses is influenced by various factors. Fundamentally, key factors such as attitude, interest, and lecturer teaching contribute to good academic performance. Other factors like the learning environment and teaching aids also impact the teaching and learning sessions. This is crucial in ensuring that students remain focused and do not easily get bored in class. By further developing these key factors, stakeholders can identify appropriate measures to enhance performance at the program level and at the polytechnic level in general.

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