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REVIEW OF FACTORS DRIVING STUDENT ACHIEVEMENT: THE CONTEXT OF THE MECHANICS OF CIVIL ENGINEERING STRUCTURE COURSE AT SULTAN MIZAN ZAINAL ABIDIN POLYTECHNIC

Rosmida binti Ab Ghani[1]

[1] Department of Civil Engineering, Sultan Mizan Zainal Abidin Polytechnic, 23000 Dungun, Terengganu, Malaysia
(E-mail: rosmida5686@gmail.com)

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Abstract: *The mastery of the DCC 20053- Mechanics of Civil Engineering Structure course is closely related to mathematics and additional mathematics subjects in school. The course covers the knowledge, basic principles of force, material strength that requires problem-solving techniques using additional mathematical and mathematical skills. The course is considered difficult, complicated and many concepts to understand for some students who have a weak mathematical foundation and do not take extra math while in school. This presents a high challenge for students to master the course. Mastery of a course is closely linked to academic excellence, which significantly influences student achievement. Hence, this study was conducted to identify the key factors affecting student performance in the Mechanics of Civil Engineering Structure course at the Civil Engineering Department (JKA), Sultan Mizan Zainal Abidin Polytechnic (PSMZA). A questionnaire was administered to 99 students enrolled in this course during Session II 2023/2024 and Session I 2024/2025. The data collected was analyzed using descriptive statistics, T-Test, and Pearson Correlation through the Statistical Package for Social Sciences (SPSS) software, version 22. The results indicated that the 'lecturer' was the most influential factor in student performance, achieving the highest mean score of 4.76, surpassing other factors such as prior knowledge, interests, attitudes, peers, and environment. The T-Test analysis revealed no significant difference between attitude and gender, with a value of ($t = 1.07$) and $p > 0.05$ (0.29). Similarly, Pearson's correlation analysis identified a modest yet significant relationship between 'peers' and interests. These findings provide valuable insights into the factors influencing student achievement in the Mechanics of Civil Engineering Structure course at JKA, PSMZA. Furthermore, the study's outcomes can assist JKA in implementing Continuous Quality Improvement (CQI) initiatives to enhance student performance across all aspects of the course.*

Keywords: *Mechanics of Civil Engineering Structure, Achievements, Students.*

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Introduction

The education sector is a major investment in producing human capital that can contribute to economic progress and improve the socio-economic status of a country's society. In Malaysia, the quality of education is translated into the Sustainable Development Goal (SDG) through SDG 4, which is quality education which aims to ensure quality, inclusive, equitable education and promote lifelong learning opportunities to all levels of society. In the context of education, the Malaysian Education Development Plan (PPPM) 2013-2025 sets SDG 4 with the aim of producing students who are capable of being global players in line with global needs, Curriculum Development Division (2016).

Polytechnic Malaysia is one of the Public Institution of Higher Learning (IPTA) that plays the role of leader in Technical and Vocational Education and Training (TVET) also responds to the implementation of SDG 4 to produce graduates with high skills in line with the needs of today's industry. The study programs offered at polytechnics, especially in engineering, emphasize mastery in mathematics. All students pursuing a Diploma in Civil Engineering (DKA) are required to take the DCC 20053- Mechanics of Civil Engineering Structure course in semester two with three credit values. The excellence of a polytechnic student's performance, especially the DKA study program for this course, is assessed through a 50% coursework assessment (PKK) involving quizzes, tests, assignments and 50% final examinations (PA). Penns State University (2013) stated that engineering science is a program discipline that emphasizes the understanding and application of engineering and mathematics. Ayob, (2012) stated that the declining interest of students in science and mathematics is a phenomenon that occurs all over the world.

Problem Statement

Based on the observation from the lecturers who teach the Mechanics of Civil Engineering Structure course at the Sultan Mizan Zainal Abidin Polytechnic (PSMZA) and the findings on student achievement found that students were weak in calculations which are closely related to Topic 2: Equilibrium Forces, Shear Forces and Bending Moment, Topic 3: Direct Stress, Topic 4: Bending Stress in Beam, Topic 5: Shear Stress, Topic 6: Slope and Deflection of Beam due to Symmetrical Bending.

Statistics from the Examination Unit, PSMZA show that the percentage of students who fail in the course for the second session of 2023/2024 is 23.9% and the first session of 2024/2025 is 25%. Failure in the course unable students to take the DCC40163: Theory of Structure course and the DCC 50203: Reinforced Concrete Design Course as the course is a prerequisite to the Theory of Structure course in semester four and the Reinforced Concrete Design course in the fifth semester. As a result, the management of Civil Engineering Department (JKA) must open a repeat class because students who fail will retake the course in the following semester or withdraw if a conflict arises with the lecture schedule. Thus, this research was carried out to identify the factors influencing student performance, enabling lecturers to implement the most effective improvement strategies and teaching approaches. The results of this study are expected to help the JKA management get information and make more effective plans to implement Continuous Quality Improvement (CQI) to ensure that the performance of the Mechanics of Civil Engineering Structure course can be further improved and enhance quality in line with the needs and requirements of customers. Therefore, the researcher wants to conduct a study by focusing on the factors that affect the performance of the Mechanics of Civil Engineering Structure course from the aspects of existing knowledge, interests, attitudes, peers, environment and lecturers.

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Objectives of the Study

The objectives of this study are as follows:

i. Identify the factors that affect student performance in mastering the Mechanics of Civil Engineering Structure course.
ii. Identify the differences between students' attitudes and genders.
iii. Identify the relationship between peers, environment and lecturers towards students' interests.

Study Questions

i. What are the factors that influence student performance towards the Mechanics of Civil Engineering Structure course?
ii. Is there a difference between attitudes towards the gender of students?
iii. Is there a relationship between lecturers, peers and the environment towards students' interests?

Hypothesis

i. H0-1: There was no significant difference between mean attitudes and gender.
ii. H1-1: There is a significant difference between mean attitudes and gender.

i. H0-2: There is no relationship between lecturers, peers, and the environment to students' interests.
ii. H1-2: There is a relationship between lecturers, peers and the environment on students' interests

Scope of Study

The scope of this study is to identify the factors that affect the performance of the Mechanics of Civil Engineering Structure course. The sample of this study includes second-semester students who registered for the DCC 20053 Mechanics of Civil Engineering Structure course for session II 2023/2024 and session I 2024/2025.

Conceptual Framework

The researcher adapted the conceptual framework as depicted in Figure 1 below. Existing knowledge, interests, attitudes, environment, peers and lecturers are independent variables that influence student performance for the Mechanics of Civil Engineering Structure course in this study.

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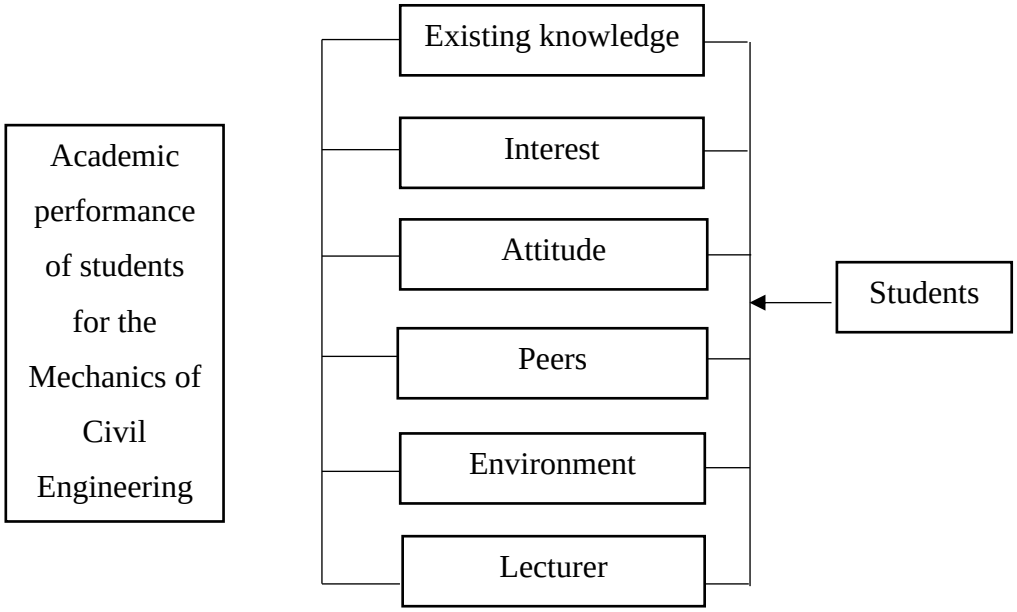

Figure 1: Conceptual Framework of the Study

Literature Review

Examinations in schools, Higher Education Institutions (HEIs) play an important role as one of the forms of student performance measurement in the education system in Malaysia nowadays. Hanita & Norzaini, (2018) stated that student achievement is a ticket to further their education to institution of higher learning which serves as a touchstone for personal performance and future career success. The student's understanding in the learning session determines the achievement of student performance. To ensure good student achievement, contributing factors need to be identified and investigated. According to Muhamad Shafiq & Noraini (2018), various studies have stated that the factors contributing to the achievement of students' academic performance stem from learning methods, teachers' teaching approaches, and students' attitudes.

Existing knowledge

The existing knowledge factor is one of the factors that helps and influences a student's readiness to understand and master learning in the classroom more easily. A study by Sapar, Salim, Husin, & Pa, (2013), stated that students' existing knowledge of a subject can influence a student's mastery. Ahmad & Abdul Muqsith (2013) stated that there is a significant relationship between existing knowledge and the academic performance of polytechnic diploma graduates.

Interests

A student's interest in something reflects their attractiveness, inclination and passion to learn something. Zebua & Harefa, (2022) stated that students are more diligent and active in class to understand a subject they are interested in compared to students who have low interest are more likely to get bored easily and act lethargic. The influence of interest in learning has a positive impact on students' concentration in class. A student's interest is also influenced by external factors such as peers, parents, and socioeconomics.

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Attitude

Attitude plays an important role and can be formed in arousing a person's interest in producing human capital with high potential and excellence in academic achievement. Attitude factors have an important influence on individuals who act as cause-and-effect behaviours as well as positive attitudes towards learning that can improve student achievement performance, Abu and Eu (2014). Attitude is an abstract that can be seen and felt through actions and is closely related to student achievement, Zaliza & Zaitul (2014).

Peers

Students who choose good and excellent friends will be motivated to excel together, but if they choose the wrong friends, they will also fall into failure, especially not being able to focus on learning, Yahya & Aliju (2010). Students who rely on their peers are more likely to follow what their peers are doing. Indirectly, peer influence can be a driver of student achievement. Nursuhaili (2010) stated that peers also influence the attitude and behaviour of an individual. If a student makes friends with a friend who is more interested in something, the tendency to be interested in something is greater. This is appropriate as stated about the impact of peers in individual development where each individual will tend to choose peers who have similar interests and tendencies. Peers are also seen as one of the factors that influence students' academic excellence and classroom involvement Ayub, Yunus & Mahmud (2018). According to Salleh (2020), peer influence is the strongest factor in helping students' self-development, changing their values and attitudes.

Environment

The conducive learning environment makes the teaching and learning atmosphere more fun, motivating, creative, safe and more focused. According to Ahmad, Osman, & Halim (2010), students' perception of the learning environment can provide useful information to improve the quality of the learning environment. A conducive environment can also improve concentration, facilitate understanding, encourage student engagement in class and student excellence. Shaari et al. (2012) stated that a conducive and fun learning atmosphere is needed in the learning and teaching process. The academic environment makes students' emotions more self-motivated because a comfortable learning atmosphere can be achieved.

Lecturers

Lecturers play the role of the main driving force in the implementation of learning activities, always generating knowledge and improving the quality of teaching so that students can master the knowledge they have learned. Sintayehu (2014) stated that lecturers are the main factor which includes aspects as mentors and triggers of interest among students. Highly motivated lecturers are needed in implementing teaching and learning to improve the success and achievement of students holistically, Amran, Majid & Ali (2019).

Study Methodology

Study Design

The methodology of this writing is focused on the application of quantitative style research which is geared towards survey methods by implementing questionnaire techniques based on rationality (Mohd Majid, 2000).

Population and Sampling

The respondents of the study were second-semester students who took the Mechanics of Civil Engineering Structure course involving JKA students. The study was using simple random

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sampling. This selection was made based on students who took the Mechanics of Civil Engineering Structure course for session II 2023/2024 and session I 2024/2025.

The total number of second-semester students who took the Mechanics of Civil Engineering Structure course in session II 2023/2024 and session I 2024/2025 was 99 students. According to Krejcie and Morgan, (1970), the minimum sample required to represent the population is 80 people as per Krejcie Morgan's Table.

Instrument Forming Process

The following is the study procedure carried out in the process of obtaining study data.

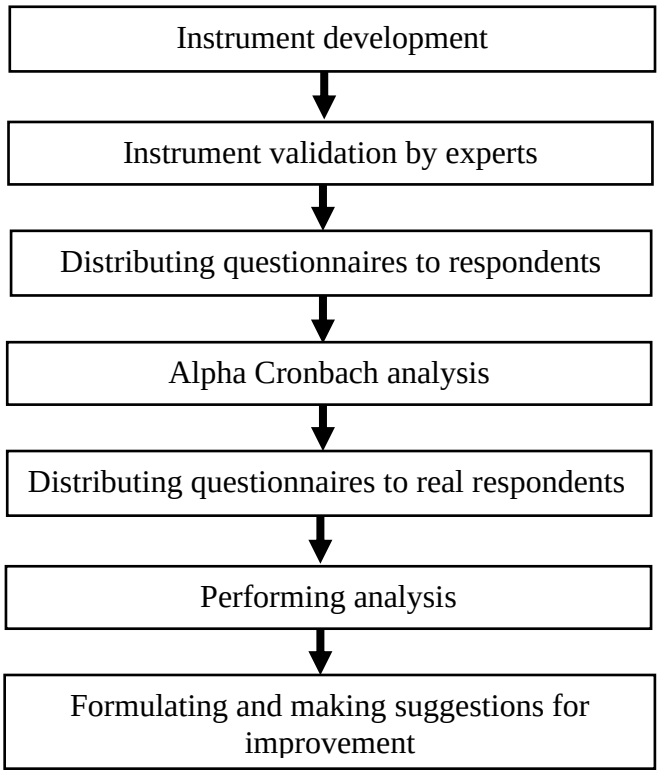

Figure 2: Study procedure

The researcher started the study by developing an instrument, that is questionnaire items to find out the factors that affect student performance for the Mechanics of Civil Engineering Structure course. In knowing the factors that influence student performance, researchers need to identify what makes up the main factors that influence students.

Therefore, the researcher divided the questionnaire instrument into two main sub-sections, namely, Part A: Demographics and Part B: which includes existing knowledge, interests, attitudes, lecturers, peers and environment. A total of 34 items were constructed for both parts. The construction of the instrument uses five Likert Scales as shown in Table 1.

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Table 1: Interpretation of Likert Scale Values for Study Instruments

Scale	Value
5	Strongly Agree
4	Agree
3	Slightly Disagree
2	Disagree
1	Strongly disagree

Review and confirmation from experts are needed to ensure that the research instrument can meet the needs of the researcher based on the objectives of the study that have been set after the construction of the instrument has been developed, Gay and Air Asian (2003). The selection of individuals as expert panels depends on the objectives that are built as research questions, Bunimin (2016). The review of these instruments should be carried out to ensure that the items built are adequate and balanced. The validity of the instrument involves the validity of the face, the validity of the content and the validity of the construct.

Based on expert review, Part A consists of 5 items, while Part B comprises 29 items categorized into sub-sections: existing knowledge, interests, attitudes, lecturers, peers, and environment. Some items have undergone sentence structure revisions to enhance clarity, improve comprehension, and facilitate easier responses from participants.

After obtaining experts approval, the study instrument covers two aspects, namely Part A (5 items), and Part B (29 items).

Table 2: Construct of Questionnaire Items

Construction	Number of Original Items	Number of Items
Demography	5	5
Existing knowledge	4	4
Interest	5	5
Attitude	5	5
Peers	5	5
Environment	5	5
Lecturer	5	5
Number of Items	34	34

After obtaining validation from experts, this study instrument was distributed to 10 respondents for the pilot study. According to Krejcie and Morgan (1970), a pilot study sample should be approximately 10% of the actual sample size. Therefore, for a total sample of 99 participants, a pilot study with 10 respondents is sufficient to confirm the reliability of the developed items. Table 3 presents the reliability coefficient values used as a benchmark for the Cronbach's Alpha test conducted by the researchers.

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Table 3: Alpha Cronbach Reliability Coefficient Values

Reliability Coefficient	Reliability Level
0.90 or more	Very good
0.80 – 0.89	Good
0.60 – 0.79	Simple
0.40 – 0.59	Doubtful
0.00 – 0.39	Rejected

The results of the pilot study conducted found that the value of the Alpha Cronbach coefficient for the entire construct was 0.80 as shown in Table 4. Hair et al. (2010), Cronbach's alpha coefficient value that reached more than 0.70 shows good reliability. With that, the conclusion can be made that the entire built item is at a good level of reliability.

Table 4: Alpha Cronbach reliability index for each section in the study instrument

Construction	Number of Items	*Alpha Cronbach*
Existing knowledge, interests, attitudes, lecturers, peers and environment	29	0.80

Data Collection

The study instrument used to collect data was using a set of questionnaires. Therefore, the questionnaires were distributed to 99 respondents who registered for the Mechanics of Civil Engineering Structure course. The distribution of these questionnaires are carried out within a certain period directly to students using google forms through WhatsApp application. Feedback from respondents is the primary data for this study.

Data Analysis

The statistical analysis for this study involved descriptive analysis, which examined frequency, mean, and standard deviation values. The data was processed using SPSS Software version 23. Table 5 presents the mean score acceptance levels established by Mohamed Najib (1999), which served as a reference for this study.

Table 5: Acceptance Level of Mean Score

Mean Score Range	Min Score Level
1.00 – 1.49	Very Low
1.50 – 2.49	Low
2.50 – 3.49	Simple
3.50 – 4.49	High
4.50 – 5.00	Very High

A T-test was conducted to determine whether there is a difference in performance levels between male and female students enrolled in the Mechanics of Civil Engineering Structure course. Additionally, Pearson's correlation analysis was performed to address the research question by examining the relationship between lecturer-related factors, peers, and the environment on students' interests. The analysis utilized a relationship strength scale based on the correlation coefficient values proposed by Cohen, Manion, and Morrison (2011), as presented in Table 6.

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Table 6: Relationship Strength by Correlation Coefficient Value

Size of Correlation Coefficient (r)	Correlation Strength
±.81 to 1.00	Very powerful
±.51 to .80	Strong
±.31 to .50	Simple
±.21 to .30	Weak
±.01 to .20	Very weak

Decisions and Discussions

Survey respondents

Table 7 presents the study, which show that 65% (52 individual) are male, while 35% (28 individual) are female. This indicates that the number of males is higher than females.

Table 7: Respondents' Backgrounds by Gender

Gender	No	Percentage (%)
Men	52	65
Women	28	35
Sum	68	100

Table 8 shows the respondents background based on age. A total of 57 respondents (71.3%) are aged 18 to 20 years, while 23 respondents (28.7%) are between 21 to 23 years. The highest percentage of respondents falls within the 18 to 20 age group compared to those aged 21 to 23.

Table 8: Respondents' Backgrounds by Age

Age	No	Percentage (%)
18-20 years old	57	71.3
21-23 years old	23	28.7
Sum	68	100

Table 9 presents the respondents' backgrounds based on race. The study findings show that 79 respondents (98.8%) are Malay and 1 respondent (1.2%) is Indian. The percentage of Malay respondents is significantly higher than that of Indian respondents.

Table 9: Respondents' Backgrounds by Race

Race	No	Percentage (%)
Malay	79	98.8
Indian	1	1.2
Sum	80	100

Table 10 presents the respondents' background based on their academic stream during SPM. The findings indicate that 3.8% of respondents were in the engineering stream, 12.5% in the accounting stream, 21.3% in the science stream, and 22.5% in the business stream. Meanwhile, 16.3% were in the arts stream, 12.5% in the literature stream, and 11.3% in other streams.

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In conclusion, 62.4% of respondents did not take Additional Mathematics, compared to 37.6% who did during their schooling years.

Table 10: Respondents' Backgrounds According to SPM Current Trends

Respondents' Backgrounds	No	Percentage (%)
Engineering	3	3.8
Accounting	10	12.5
Science	17	21.3
Business	18	22.5
art	13	16.3
Arts	10	12.5
Others	9	11.3
Sum	80	100

Study Question 1: What are the factors that affect students' performance towards the Mechanics of Civil Engineering Structure?

Table 11 presents the factor of existing knowledge in the Mechanics of Civil Engineering Structures course. The findings indicate that the mean score for 'mastering basic mathematics' is 4.52 with a standard deviation of 0.50. The item 'mastering basic additional mathematics' has a mean score of 4.17 with a standard deviation of 0.71. For 'proficiency in basic unit conversion,' the mean score is 4.30 with a standard deviation of 0.68, while 'proficiency in using a calculator' records a mean score of 4.41 with a standard deviation of 0.56. According to the score acceptance level table, 'mastering basic mathematics' falls within the very high mean score category, whereas 'mastering basic additional mathematics', 'proficiency in basic unit conversion,' and 'proficiency in using a calculator' fall within the high mean score category. Overall, the total mean score of 4.35 indicates a strong level of existing knowledge among students.

Table 11: Existing Knowledge Factors Towards the Mechanics of Civil Engineering Structure Course.

No	Item	Min	Minimum score level	Standard Deviation
B1	Mastering basics mathematics	4.52	Very high	0.50
B2	Mastering basic additional mathematics	4.17	High	0.71
B4	Proficiency in basic unit conversion	4.30	High	0.68
B5	Proficiency in using calculator	4.41	High	0.56
	Overall Min	4.35	High	0.61

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Table 12 presents the interest factors in the Mechanics of Civil Engineering Structure Course. The findings show that the mean score for the item 'enjoy attending the Mechanics of Civil Engineering Structure classes' is 4.52 with a standard deviation of 0.65. The item 'enjoy learning the course' has a mean score of 4.46 with a standard deviation of 0.63. For the item 'practice daily,' the mean score is 4.15 with a standard deviation of 0.82, while 'early preparation before class' records a mean score of 4.07 with a standard deviation of 0.83. Lastly, the item 'always complete assignments' has a mean score of 4.42 with a standard deviation of 0.67. Based on the table, item C1 falls within the very high category, while items C2 to C5 are classified as high. The overall mean score of 4.32 suggests that students have a strong interest in enhancing their performance in the Mechanics of Civil Engineering Structure course.

Table 12: Factors of interest in the Mechanics of Civil Engineering Structure Course

No	Item	Min	Minimum score level	Standard Deviation
C1	Enjoy attending classes Mechanics of Civil Engineering Structure	4.52	Very High	0.65
C2	Enjoy learning the course Mechanics of Civil Engineering Structure	4.46	high	0.63
C3	Practice daily	4.15	high	0.82
C4	Early preparation before class	4.07	high	0.83
C5	Always complete assignments	4.42	high	0.67
	Overall Min	4.32	high	0.72

Table 13 shows the attitude factor towards the Mechanics of Civil Engineering Structure course. The results indicate that the mean score for items D1, D2, D3, D4, D5 falls very high with an overall mean score of 4.53 with a standard deviation of 0.58. The findings show that students have a very positive attitude towards Mechanics of Civil Engineering Structure course.

Table 13: Attitude Factors Towards the Mechanics of Civil Engineering Structure Course

No	Item	Min	Minimum score level	Standard Deviation
D1	Fully concentrate during the learning sessions of the Mechanics of Civil Engineering Structure course	4.51	Very High	0.65
D2	Understanding the Mechanics of Civil Engineering Structure course with ease	4.52	Very High	0.63
D3	Enjoys interacting with lecturers during learning sessions of the Mechanics of Civil Engineering Structure course	4.50	Very High	0.57
D4	Writing formulas during the learning sessions of the Mechanics of Civil Engineering Structure course	4.57	Very High	0.54

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D5	Always be prepared to attend the Mechanics of Civil Engineering Structure course class	4.53	Very High	0.53
	Overall Min	4.53	Very High	0.58

Table14 presents the peer factor in the Mechanics of Civil Engineering Structure course. The mean score for item E1 is 4.51 with a standard deviation of 0.55, while item E2 has a mean score of 4.61 with a standard deviation of 0.51. For item E3, the mean score is 4.62 with a standard deviation of 0.48, whereas item E4 records a mean score of 4.65 with a standard deviation of 0.48. Lastly, item E5 has a mean score of 4.52 with a standard deviation of 0.53. According to the score acceptance level table, all items fall within the high category, with an overall mean score of 4.58, classified as very high. These findings highlight that peers play a crucial role and have a positive impact on completing group assignments, contributing to better performance in the Mechanics of Civil Engineering Structure Course.

Table 14: Peer Factors Against the Mechanics of Civil Engineering Structure Course

No	Item	Min	Minimum score level	Standard Deviation
E1	Learn a lot about the Mechanics of Civil Engineering Structure course through a friend	4.51	Very High	0.55
E2	Have friends who are always helpful in completing assignments given by lecturers	4.61	Very High	0.51
E3	Reviewing the Mechanics of Civil Engineering Structure course with friends	4.62	Very High	0.48
E4	Sharing problems with the Mechanics of Civil Engineering Structure course with a friend	4.65	Very High	0.48
E5	Always provide cooperation to colleagues when conducting experiments on the Mechanics of Civil Engineering Structure course	4.52	Very High	0.53
	Overall Min	4.58	Very High	0.51

Table 15 presents the environmental factor in the Mechanics of Civil Engineering Structure course. The mean score for item F1 is 4.70 with a standard deviation of 0.46, while item F2 has a mean score of 4.60 with a standard deviation of 0.56. Item F3 records a mean score of 4.62 with a standard deviation of 0.53, whereas item F4 has a mean score of 4.70 with a standard deviation of 0.53. Lastly, item F5 shows a mean score of 4.68 with a standard deviation of 0.54. The findings indicate an overall mean score of 4.66, which is considered very high. This suggests that a conducive and safe environment plays a crucial role in enhancing student performance.

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Table 15: Environmental Factors Towards the Mechanics of Civil Engineering Structure Course

No	Item	Min	Minimum score level	Standard Deviation
F1	Conducive lecture rooms/science laboratories	4.70	Very High	0.46
F2	Lighting of lecture rooms/science laboratories is ideal	4.60	Very High	0.56
F3	Clean and well-organized science lecture rooms/laboratories	4.62	Very High	0.53
F4	Sufficient Engineering Science laboratory equipment and requirements	4.70	Very High	0.53
F5	Safe lecture room/science lab environment	4.68	Very High	0.54
	Overall Min	4.66	Very High	0.52

Table 16 presents the lecturer factor in the Mechanics of Civil Engineering Structure course. The mean score for item G1 is 4.76 with a standard deviation of 0.42, while item G2 has a mean score of 4.73 with a standard deviation of 0.44. For item G3, the mean score is 4.77 with a standard deviation of 0.42. Meanwhile, item G4 records a mean score of 4.76 with a standard deviation of 0.43, and item G5 has the highest mean score of 4.78 with a standard deviation of 0.43. These findings indicate a very high overall mean score of 4.76, suggesting that lecturers consistently support students and provide attention to improving their performance in the Mechanics of Civil Engineering Structure course.

Table 16: Lecturer Factors for the Mechanics of Civil Engineering Structure Course

No	Item	Min	Minimum score level	Standard Deviation
G1	Always provide guidance in the classroom	4.76	Very High	0.42
G2	Provides clear and easy-to-understand illumination	4.73	Very High	0.44
G3	Use easy-to-understand language	4.77	Very High	0.42
G4	Always emphasize practice questions	4.76	Very High	0.43
G5	Provide positive encouragement in the classroom	4.78	Very High	0.42
	Overall Min	4.76	Very High	0.43

Study Question 2: Is there a significant difference between mean attitude and gender?

Table 17 shows the overall assessment of attitudes towards gender to determine whether there is a significant difference in mean scores between male (M = 4.56, SD = 0.40) and female (M = 4.46, SD = 0.41) respondents. The study findings indicate that there is no significant difference between mean attitude and gender, with a t-value of 1.07 and p>0.05 (0.29). Thus, it can be concluded that there is no significant difference between attitudes and genders. Both male and female respondents share similar perspectives. Therefore, Ho-1 is accepted.

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Table 17: T-Test: Differences in Attitudes between the Sexes of Students

Item	Jantina	N	Min	Standard Deviation	t	Sig. (2-tailed)
Attitude	Men	52	4.56	0.40	1.07	0.29
	Woman	28	4.46	0.41		

Study Question 3: Is there a relationship between lecturers, peers and the environment on students' interests?

Table 18 shows the p-value of the Sig.(2-tailed), indicating the relationship between peer and student interest (p = 0.004) and the environment (p = 0.018), which are below the alpha p < 0.05. This suggests a significant relationship between peers and the environment in shaping student interest. Therefore H_{1-2} is accepted. As for the lecturer's item, it does not show a significant relationship with the student's interest as its p-value = 0.361 above the alpha value of 0.05.

Meanwhile, there was a moderate correlation between peers and student interests with a significant value of p = .004 and a coefficient value, r = 0.315**. Additionally, the relationship between the last two items, namely the environmental factor (p = 0.018), the coefficient value, (r = 0.264*) and the lecturer factor (p = 0.103), the coefficient value (r = 0.36*) indicates a weak correlation. This shows that the peer factor has a moderate correlation relationship with students' interest in the learning process.

Table 18: Correlation between Lecturers, Peer Influence and Environment on Student Interests

	Min	Standard Deviation	Pearson Correlation (r)	Sig. (2-tailed) (p)
Peers	4.58	0.51	0.315**	0.004
Environment	4.66	0.52	0.264*	0.018
Lecturer	4.76	0.43	0.103	0.361

** Significant correlation at level P< 0.01
* Significant correlation at the level of P< 0.05

Discussion of Study Results

The results of the analysis conducted found that 99 respondents were enrolled in the Mechanics of Civil Engineering Structure course for session II 2023/2024 and session I 2024/2025. A total of 80 respondents completed the distributed questionnaire with 65% being male, 35% female. The highest percentage of respondents (71.3%) were aged 18 to 20 years old while 28.7% were between 21 to 23 years. Meanwhile, 98.8% were Malays and 1.2% were Indians. Regarding their academic background, 62.4% of the respondents did not take Additional Mathematics in the Sijil Pelajaran Malaysia (SPM) examination, compared to 37.6% who take Additional Mathematics.

The factors influencing student performance for the Mechanics of Civil Engineering Structure course examined in this study include existing knowledge, interest, attitude, peers, environment and lecturers. The mean score analysis of all factors revealed that the lecturer factor had the highest average mean score of 4.76, while the interest factor recorded the lowest at 3.32. This

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finding addresses the first research question, confirming that lecturers play the most significant role in influencing student performance at PSMZA, particularly in the Mechanics of Civil Engineering Structure course.

A T-test was conducted to answer the second research question. The analysis result showed indicate no significant difference between attitude and gender, with p=0.29 (p>0.05). This finding is supported by previous research, further reinforced by Nalah (2024) which also found no significant relationship between self-concept or attitude and academic performance of male and female students. These findings suggest that gender does not influence students' academic performance.

Regarding the third research question, Pearson correlation analysis indicated a moderate relationship between peers and student interest, with a coefficient value of r = 0.315. The peer factor exhibited a moderate and positive correlation with students' interest in academic performance, surpassing the influence of environmental and lecturer factors. These findings are consistent with the study by Mohd Jelas et al. (2014), which highlighted that peer learning support directly contributes to student achievement.

Conclusion

Recommendations

The analysis results indicated that all the identified factors played a role in enhancing students' academic performance. The lecturer factor showed the highest average mean value of 4.76 while the interest factor had the lowest mean value of 4.32. However, all factors remained within the high to very high mean score range. However, the interest factor had the lowest mean value probably because students' lack of interest and the perception that the course is difficult, as 62.4% of respondent did not come from a science stream. Students' readiness and diligence in studying the *Mechanics of Civil Engineering Structure* course should be commended. Although the lecturer factor contributed the highest rating, there is still room for improvement in terms of more creative teaching methods to make the learning process more engaging for students.

This study has several limitations. First, it focuses on second-semester students enrolled in the *Mechanics of Civil Engineering Structure* course. In the future, this study could be extended to respondents from polytechnic across Malaysia to identify comprehensive areas for improvement, ensuring students do not fail in vain in the course. Additionally, other factors influencing students' academic performance, whether positively or negatively, could be explored.

Second, future researchers could employ more detailed data analysis techniques. For instance, examining the relationship between students' academic performance in a course and other contributing factors could provide deeper insights into performance outcomes.

Formulation

As a public institution of higher learning (IPTA) equipped with various facilities, polytechnics have produced many successful graduates across diverse fields since their establishment. However, a small number of students fail to complete their studies. Although this percentage is minor, it could become significant if not addressed early. The polytechnic department management and lecturers play a crucial role in identifying the causes of student failure.

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Therefore, studies like this should be conducted continuously to refine opportunities and improvements, ensuring that students successfully complete their studies.

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