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A Strategic Analysis of Key Determinants for High CGPA among Commerce Students at Merlimau Polytechnic Malacca, Malaysia

Mohd Saiful Nizam Khalid^{1,*}, Kartini Che Ibrahim¹, Mohd Razali Hasam¹

¹ Department of Commerce, Merlimau Polytechnic Malacca, KM2.5, Jalan Jasin_Melimau, 77300 Merlimau, Malacca, Malaysia

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ABSTRACT

Achieving a high Cumulative Grade Point Average (CGPA) is pivotal for commerce students in polytechnics, as it enhances employability, access to further education, and alignment with national economic goals under Malaysia's Twelfth Malaysia Plan (2021-2025). This paper conducts a strategic analysis of key determinants influencing high CGPA among commerce students at Merlimau Polytechnic Malacca, Malaysia. Drawing on a mixed-methods approach, including surveys and imperical studied inspired by recent Malaysian studies, the analysis identifies self discipline, time management, intrinsic motivation, socioeconomic status, and learning strategies as primary factors. Findings reveal that strategic interventions, can elevate CGPA, fostering resilient graduates for the commerce sector. Recommendations emphasize institutional reforms to integrate these determinants into curriculum design, contributing to sustainable higher education outcomes in post-pandemic Malaysia.

1. Introduction

Student academic achievement is a key indicator that is often used to assess the effectiveness of the teaching and learning process in higher education institutions. In the context of polytechnics, the Cumulative Grade Point Average (CGPA) is an important measure to determine the level of student excellence throughout their studies. According to Chzin [6] students' ability to achieve high CGPA not only reflects mastery of course content, but also reflects the effectiveness of learning strategies, time management, level of motivation and the support of the learning environment received.

For Commerce students at Merlimau Polytechnic Malacca, the competition to achieve high HPNM is increasingly challenging due to the increasing complexity of the subject, the demands of project-based assignments and the need to master soft skills. Therefore, an analysis of strategic factors that influence students' academic success is very important to help administrators, lecturers and students devise more effective learning strategies. According to Azlin *et al.*, [10] this study focuses on the main determinants of high HPNM achievement among Commerce Department students through an

* Corresponding author.

E-mail address: saiful_kktj@yahoo.com.my

assessment of motivation, learning strategies, time management, lecturer support and learning environment factors.

1.1 Background of the study

Students' academic success in higher education institutions is influenced by various factors, whether it is student factors, learning environment, academic support or study skills used. Various educational theories such as Self-Determination Theory, Goal Orientation Theory and Cognitive Load Theory emphasize that academic achievement is the result of the interaction between intrinsic motivation, correct learning strategies and a conducive learning environment.

At Merlimau Polytechnic Malacca, the academic progress of students in the Department of Commerce is constantly monitored to ensure that they achieve the set learning standards. However, academic data shows that the level of achievement of students varies from one another. Some students consistently achieve a GPA of 3.50 and above, while others are only at an average or low level. This difference raises the question of which factors have the greatest impact on students' CGPA achievement.

Previous studies at other institutions have shown that important factors such as learning style, time management, self-discipline, and lecturer support play a major role in determining student academic performance. However, specific studies involving students of the Commerce Department at Merlimau Polytechnic Malacca are limited. Therefore, this study was conducted to identify the most significant strategic factors in helping students achieve high CGPA.

1.2 Problem Statement

Despite various initiatives and academic programs being carried out at Merlimau Polytechnic Malacca, there are still students in the Commerce Department who fail to achieve excellent CGPA. This phenomenon indicates that there are certain factors that influence their academic performance, but these factors have not been clearly and systematically identified.

Among the problems identified include lack of effective time management, low motivation to learn, use of inappropriate learning strategies, lack of academic support and a less conducive learning environment. If these factors are not accurately identified, it is difficult to design interventions that can help students improve their academic performance.

In addition, the difference in achievement between excellent and average students raises the question of what strategies or factors are applied by high-performing students but not practiced by other students. Therefore, an empirical study is needed to assess the key determinants that contribute to high CGPA achievement among Commerce Department students.

1.3 Study Objectives

This study was conducted to achieve the following objectives:

1. Identify the internal factors that motivate students of the Commerce Department at Merlimau Polytechnic Malacca to achieve a CGPA of 3.0 or higher.
2. Identify the external factors that contribute to the achievement of students of the Commerce Department at Merlimau Polytechnic Malacca to achieve a CGPA of 3.0 or higher.
3. What are the main factors that are most significant in influencing the achievement of high CGPA.

1.4 Research questions

Based on the study objectives, the following research questions were formulated:

1. What are the internal factors that motivate students of the Commerce Department at Merlimau Polytechnic Malacca to achieve a CGPA of 3.0 or higher?
2. What are the external factors that contribute to the achievement of students of the Commerce Department at Merlimau Polytechnic Malacca to achieve a CGPA of 3.0 or higher?
3. What are the main factors that are most significant in influencing the achievement of high CGPA.

1.5 Importance of the Study

This study provides benefits to several parties:

a) To Students

Provides guidance on effective learning strategies to achieve high CGPA and improve time management skills and self-motivation.

b) To Lecturers

Helps understand student needs and improve teaching approaches and the provision of more effective academic support.

c) To Polytechnic Management

The results of the study can be used to design academic intervention programs and improve the quality of learning among Commerce students.

d) To Future Researchers

Provides references and opens up space for further research related to the factors determining the academic success of students in technical education institutions.

1.6 Scope of the Study

This study focuses on students of the Commerce Department at Merlimau Polytechnic Malacca, consisting of students from semester two to five. The study only assessed strategic factors such as motivation, time management, lecturer support, learning strategies and learning environment. The data collected was based on a quantitative questionnaire that assessed the relationship and influence of variables on students' CGPA achievement.

2. Literature Review

The literature review aims to describe theories, models and past research results related to strategic factors that influence the achievement of Cumulative Grade Point Average (CGPA) among students in higher education institutions. This chapter includes a discussion on academic achievement, educational theories that support this study, the main determinants of academic performance, and the development of previous studies both domestically and internationally. Aspects such as motivation, learning strategies, time management, lecturer support and learning environment will be systematically detailed based on the findings of previous researchers.

2.1 The Concept of Academic Achievement and CGPA

Academic achievement refers to student performance in mastering knowledge, skills and competencies through the formal learning process. In the context of polytechnics, academic achievement is measured using CGPA which shows the cumulative position of a student's performance throughout the study period. High CGPA is usually associated with students who have good study skills, effective time management and strong intrinsic motivation.

According to educational studies, CGPA is an important indicator in assessing student competence, graduate marketability, and curriculum effectiveness. Therefore, identifying factors that influence CGPA is necessary to improve student outcomes.

2.2 Related Theories and Models

2.2.1 Self-Determination Theory (SDT)

Self-Determination Theory by Deci & Ryan explains that student motivation is influenced by three basic psychological needs:

1. Autonomy – the freedom to make choices in learning.
2. Competence – confidence in one's ability to master a task.
3. Relatedness – social support from peers and lecture

In the context of this study, the motivation of students who are in a conducive learning environment and receive encouragement from lecturers will be more likely to achieve high CGPA.

2.2.2 Cognitive Load Theory (CLT)

Sweller's Cognitive Load Theory emphasizes that the learning process is influenced by the amount of information that can be processed by human working memory. Students who are able to use effective learning strategies will be able to reduce cognitive load and increase comprehension.

The implication of this study is that students who practice learning techniques such as repetition, effective note-taking, and mind mapping have more potential to achieve high achievement.

2.2.3 Goal Orientation Theory

Goal orientation theory explains that students have two main types of focus:

1. Learning goal orientation – focus on mastery of knowledge and self-improvement.
 2. Performance goal orientation – focused on grade achievement and social evaluation.
- Students with a learning orientation tend to achieve better academic results because they are intrinsically motivated.

2.2.4 Tinto's Model of academic performance

Tinto's model of academic engagement emphasizes that academic achievement is influenced by academic integration, social interaction, and institutional support. This study is in line with the concept of lecturer support and learning environment as determinants of student performance.

2.3 Strategic Determinants of CGPA Achievement

2.3.1 Learning motivation

Motivation is one of the important factors that influence students' academic achievement. According to Ryan and Deci [3], intrinsic motivation encourages students to actively engage in the learning process due to internal interest and satisfaction. A study by Pintrich [1] found that students with high levels of motivation were more likely to use effective learning strategies and show better academic performance.

2.3.2 learning strategies

Learning strategies refer to the techniques and approaches used by students to understand and master learning content. Zimmerman (2002) stated that students who practice self-directed learning such as planning, monitoring and self-assessment show higher academic achievement. In addition, a study by Biggs and Tang (2011) emphasized the importance of deep learning strategies over rote learning.

2.3.3 time management

Effective time management helps students balance academic demands and daily life. According to Macan et al. (1990), students who have good time management skills show lower levels of stress and better academic performance. Britton and Tesser's (1991) study also found that time management is a significant predictor of academic success of university students. According to Nur Saadah [7], this time management skill is a very important skill for every student in Malaysia, from primary school students to university. Meanwhile, according to Azura [8], it is explained that time management is a set of behaviors that are important in managing learning or courses and excellent academic achievement can be achieved by balancing time management and effective learning techniques.

2.3.4 Lecturer support

Lecturer support plays an important role in increasing student motivation and engagement. Ruhaznawati Md Rudzi [9] emphasized that positive interaction between lecturers and students can increase student commitment to learning. A study by Umbach and Wawrzynski [2] showed that academic support and constructive feedback from lecturers have a positive impact on students' academic development.

2.3.5 Learning environment

A conducive learning environment encompasses physical, social and psychological aspects. According to Fraser (2012), a positive learning environment can increase student engagement and achievement. A study by Moos (1979) also stated that a supportive and safe learning environment helps students adapt and increases learning effectiveness.

3. Research Methodology

This chapter outlines the research methodology adopted to examine the factors influencing the Cumulative Grade Point Average (CGPA) of students in the Department of Commerce at Merlimau Polytechnic Malacca. The chapter discusses the research design, population and sample, research instrument, data collection procedure, and data analysis techniques.

3.1 Research design

This study employed a quantitative survey research design with a descriptive approach. According to Creswell [5], quantitative descriptive research is appropriate for systematically describing characteristics of a population and examining relationships among variables using numerical data. In this study, data were collected using a structured questionnaire developed to identify factors influencing students' CGPA.

The descriptive approach was selected as it allows the researcher to present an objective overview of respondents' characteristics and to describe patterns of relationships between the studied factors and academic achievement.

3.2 Population and sample

The population of this study comprised all students from the Department of Commerce at Merlimau Polytechnic Malacca. A stratified random sampling technique was applied to ensure proportional representation across different semesters and academic programmes. This sampling method is recommended when the population consists of distinct subgroups that need to be adequately represented [17].

A total of 377 students were selected as respondents. This sample size is considered sufficient for quantitative analysis and supports the reliability and generalisability of the study findings within the research context.

3.3 Research instrument

The research instrument used in this study was a questionnaire consisting of items measuring factors such as student motivation, teaching methods, and academic support. The questionnaire items were developed based on previous studies related to academic performance and student achievement.

Prior to the main data collection, the instrument was tested for reliability. Reliability analysis using Cronbach's Alpha indicated values exceeding 0.70, which suggests acceptable internal consistency for research instruments in social science studies [15]. Therefore, the instrument was deemed reliable and suitable for use in this study.

3.4 Data collection procedure

Data were collected through an online questionnaire distributed with the assistance of academic advisors for each class. Respondents were informed about the purpose of the study and assured that their responses would remain confidential and be used solely for academic purposes. This ethical consideration is essential to encourage honest and voluntary participation [5].

The data collection process was conducted over a period of two weeks to allow sufficient time for respondents to complete the questionnaire.

3.5 Data Analysis

Data analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarise respondents' demographic characteristics and the levels of the factors examined (Pallant, 2020).

In addition, inferential analysis, specifically multiple regression analysis, was employed to examine the relationships between the independent variables and students' CGPA. Multiple regression analysis is appropriate for determining the predictive influence of multiple independent variables on a single dependent variable [16]. The results were presented in tables and figures in chapter 4 to facilitate clearer interpretation.

4. Analysis

This section presents the descriptive analysis of the respondents' demographic characteristics, which includes personal background (gender, race), academic background (program of study, semester). A total of 377 Commerce students from Merlimau Polytechnic Malacca participated in this study.

4.1 Personal and Academic Profile

The distribution of respondents based on gender, race, and the specific commerce program is shown in Table 1

Table 1

Distribution of respondents by gender, race, program of study and current semester

Demographic Variable	Category	Frequency (N)	Percentage (%)
Gender	Male	94	24.9%
	Female	283	75.1%
Race	Chinese	18	4.8%
	Iban	2	0.5%
	Indian	39	10.3%
	Others	3	0.8%
	Malay	315	83.6%
Program of Study	Diploma in Marketing	78	20.7%
	Diploma in Retail Management)	117	31.0%
	Diploma in Accountancy	182	48.2%
Current Semester	Semester 2	17	4.5%
	Semester 3	178	47.2%

Semester 4	51	13.5%
Semester 5	126	33.4%
Semester 6	3	0.8%
Semester 7	2	0.5%

The sample is predominantly Female (75.1%, N=283) and overwhelmingly Malay (83.6%, N=315). This reflects the typical demographic trend in commerce studies at Merlimau Polytechnic Malacca. Regarding the program of study, the largest group of respondents came from the Diploma in Accountancy (DAT & DAC) program, accounting for 48.2% (N=182) of the sample. This is followed by Diploma in Retail Management (DPR) at 31.0% (N=117) and Diploma in Marketing (DPM) at 20.7% (N=78). The majority of respondents were concentrated in the mid-to-senior levels of their diploma studies. Specifically, Semester 3 and Semester 5 collectively make up the vast majority of the sample at 47.2% (N=178) and 33.4% (N=126), respectively. The high representation from these semesters suggests the study focuses heavily on students who have already established a consistent academic track record.

4.2 Descriptive analysis of key determinants

This section presents the descriptive analysis of the six key determinants identified in this study that influence high CGPA among Commerce students at Merlimau Polytechnic Malacca. The analysis uses the Mean and Standard Deviation of the responses, based on a 7-point Likert Scale (where 1 = Strongly Disagree and 7 = Strongly Agree). The Mean score helps in identifying the students' overall level of agreement or perception regarding the importance or presence of these determinants. The Standard Deviation indicates the dispersion or variability of the students' responses.

4.2.1 Level of determinants

Table 2 shows the descriptive statistics that reveal all six key determinants were perceived by the Commerce students as being at a High level ($X > 5.60$). This uniformity indicates that the respondents generally agree that all these factors are important and or present in their efforts to achieve a high CGPA.

Table 2
 Mean and standard deviation of key determinants

Rank	Key Determinant	N	Mean X	Std. Deviation SD	Level of Acceptance
1	Family and Peer Support	377	6.2170	0.97802	High
2	Motivation and Attitude	377	6.0843	0.91304	High
3	Learning Environment	377	6.0127	0.98286	High
4	Mental & Physical Health	377	5.7513	1.07204	High
5	Time Management and Self-Discipline	377	5.7028	1.10579	High
6	Study Skills	377	5.6298	1.13945	High

The most dominant factor is Family and Peer Support, recording the highest mean score ($X = 6.2170$, $SD = 0.97802$) This suggests that the emotional, motivational, and practical support received from family and peers is the most highly valued and strongly perceived determinant among the students. The low SD indicates a high consensus among respondents on the importance of this factor.

The next two highest-ranked determinants are motivation and attitude ($X = 6.0843$, $SD = 0.91304$) and Learning Environment ($X = 6.0127$, $SD = 0.98286$). These results show that internal factors (motivation and attitude) and external institutional factors (learning environment/ facilities) are also very strongly perceived as critical components for success.

The factors ranked lower were Mental & Physical Health ($X = 5.75134$), Time Management and Self-Discipline ($X = 5.7028$) and Study Skills ($X = 5.6298$).

While still rated highly, Study Skills received the lowest mean score and the highest $SD = 1.13945$. The higher SD suggests there is more disagreement or variation in students' self-perceptions regarding their study skills compared to the other determinants. This potentially highlights an area where focused intervention (such as workshops on study techniques) might be beneficial for improvement.

The fact that Time Management is rated lower than Support and Motivation, and has a high SD, suggests that while students understand its importance, their actual practice or discipline in this area might be inconsistent or a greater challenge for some compared to others.

4.3 Inferential Analysis

This section presents the results of the Multiple Regression analysis conducted to determine the significant relationship and predictive influence of the six key determinants (Time Management & Self-Discipline, Motivation & Attitude, Family & Peer Support, Learning Environment, Study Skills, and Mental & Physical Health) on students' CGPA.

4.3.1 Analysis of variance

Table 3
ANOVA results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.234	6	0.706	2.374	0.029
Residual	109.995	370	0.297		
Total	114.230	376			

The ANOVA results show that the model is statistically significant ($F(6, 370) = 2.374$, $p = 0.029$). Since the p-value (0.029) is less than the significance level = 0.05, the null hypothesis that the model has no predictive ability is rejected. This confirms that **at least one** of the six key determinants significantly contributes to the prediction of CGPA.

4.3.2 Coefficient analysis and hypothesis testing

The Coefficients table 4.3 details the unique contribution of each independent variable to the model and is used to test the individual hypotheses regarding the relationship between each determinant and CGPA.

By observing the Sig (p-value) column, we determine which predictors have a significant unique influence on CGPA (Sig < 0.05). Only one determinant was found to be a statistically significant predictor of CGPA which is motivation and attitude (p = 0.035).

The other five determinants which is Time Management & Self-Discipline (p = 0.997), Family & Peer Support (p = 0.631), Learning Environment (p = 0.883), study skills (p = 0.915), and Mental & Physical Health (p = 0.672) did **not** demonstrate a unique, statistically significant relationship with CGPA when controlling for the other variables in the model.

Table 4
 Multiple regression coefficients (= 0.05)

Determinant	Unstandardized Coeff. (B)	Std. Error	Standardized Coeff. (β)	t	Sig. (p-value)	Tolerance	VIF
(Constant)	2.569	0.205		12.533	<.001		
Time Management & Self - Discipline	0.000	0.036	0.000	-0.004	0.997	0.503	1.989
motivation and attitude	0.115	0.054	0.190	2.120	0.035*	0.324	3.088
Family & Peer Support	0.021	0.044	0.038	0.480	0.631	0.418	2.392
Learning Environment	0.007	0.047	0.012	0.148	0.883	0.371	2.699
Study skills	-0.005	0.044	-0.010	-0.106	0.915	0.312	3.206
Mental & Physical Health	-0.021	0.050	-0.041	-0.424	0.672	0.277	3.604

4.3.3 Direction and strength of significant predictor

The analysis of the regression coefficients in Table 4.3 reveals that only motivation and attitude made a statistically unique and significant contribution to the prediction of CGPA (= 0.190, p = 0.035). The positive sign of the Unstandardized Coefficient (B = 0.115) indicates a direct and positive relationship; for every one-unit increase in a student's motivation and attitude score, their predicted CGPA increases by 0.115 units, assuming all other factors remain constant. Furthermore, the Standardized Coefficient () of 0.190 is the largest absolute value among all six determinants, confirming that, within the context of this study, motivation and attitude is the strongest and most crucial determinant for achieving a high CGPA among Commerce students at Merlimau Polytechnic Malacca. This finding underscores the paramount importance of internal psychological and attitudinal factors over external or skill-based factors in driving academic success in this sample.

Prior to interpreting the final model, diagnostic checks were performed to ensure the reliability of the regression results. The Collinearity Statistics, particularly Tolerance and the Variance Inflation Factor (VIF), were examined to detect multicollinearity. The Tolerance values for all predictors ranged from 0.277 to 0.503, all significantly exceeding the threshold of 0.10. Similarly, all VIF values were found to be low, with the highest value being 3.604, which is substantially below the common threshold of 10. These results confirm that **no multicollinearity issues exist** among the independent variables. Consequently, the unique predictive contributions calculated for each determinant,

especially the significance found for motivation and attitude, are deemed reliable and valid for interpretation and hypothesis testing.

5. Discussion, Conclusion, and Recommendations

This chapter presents a comprehensive discussion of the findings derived from the analysis in Chapter 4, interpreting the quantitative data in relation to the study's objectives and the existing body of literature. The chapter concludes with a summary of the study, outlines the limitations encountered, and proposes practical recommendations for stakeholders at Merlimau Polytechnic Malacca, as well as suggestions for future research.

5.1 Discussion of Key Findings

5.1.1 Discussion on significant predictor: Motivation and attitude

The most crucial finding of this study is the significant positive relationship between motivation and attitude and CGPA. This factor was the only one that emerged as a unique, significant predictor in the Multiple Regression model.

This finding aligns with many established educational theories which posit that intrinsic factors play a more definitive role in sustained academic performance than external support or learned skills. While factors like support and environment are important, they act as precursors. It is the student's internal drive (motivation) and resilience (attitude) that translates resources into actual academic output. The high percentage of B40 students in the sample suggests that for students facing financial and socio-economic constraints, strong motivation and a determined attitude are essential psychological buffers required to overcome external challenges, making them the ultimate strategic determinant for success.

5.1.2 Discussion on non-significant predictors

Five determinants—Family and Peer Support, Learning Environment, Time Management and Self-Discipline, Study Skills, and Mental & Physical Health—were found to be non-significant unique predictors of CGPA in this model. This surprising result warrants critical discussion:

Family and Peer Support (Non-Significant Predictor): Although descriptively rated the highest by students, its predictive influence on CGPA was not significant in the regression. This suggests that while family support is a universal expectation and a necessary baseline condition (hygiene factor) in the Polytechnic setting, its presence does not sufficiently differentiate between high and low CGPA achievers. The effect of this support is likely moderated by the student's motivation; only students with high internal motivation can effectively leverage this support into high performance.

Study Skills and Time Management (Non-Significant Predictors): The lack of significant predictive power for Study Skills and Time Management, despite their logical importance, may indicate two possibilities. Firstly, these skills might be uniformly taught and acquired at a basic level, making differences in their mastery minimal across the student population. Secondly, the impact of these skills is likely absorbed by Motivation; a highly motivated student inherently applies better time management and study techniques, blurring the unique contribution of the skill itself.

6. Conclusion

This study successfully achieved its primary objective by identifying the key strategic determinants of high CGPA among Commerce students at Merlimau Polytechnic Malacca. In conclusion, the results strongly suggest that the path to academic success at the institution is fundamentally driven by intrinsic factors. While the learning ecosystem (support, environment) is important, the ultimate, non-substitutable driver is the student's Motivation and Attitude. Consequently, institutional strategies aiming to improve CGPA must pivot from merely providing external resources to nurturing psychological resilience and self-determination among the students.

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