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Original Research Article

Correlation between academic performance with self-directed learning, academic environment and self-esteem among undergraduate students

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ABSTRACT

Background: Academic performance could be affected by many factors, including external and internal factors. Limited studies have yet been conducted to correlate academic performance with other variables, especially in Malaysia. This study aimed to determine the relationship between academic achievement and self-directed learning, academic environment, and self-esteem among undergraduate students at Universiti Malaysia Sarawak.
Methods: 505 students participated in the cross-sectional-correlation study, and data were collected using a self-administered questionnaire. The collected data were analysed using Pearson's Moment Correlation and Multiple Linear Regression analysis.
Results: The results showed that perceived academic performance was significantly correlated with gender, self-directed learning, academic environment, and self-esteem ($p<0.05$) but not with age, family size, and time spent on social networking ($p>0.05$). The Multiple Linear Regression analysis identified perceived self-directed learning ($\beta=0.258$), gender ($\beta=0.323$) and perceived academic environment ($\beta=0.146$) as significant predictors of academic performance.
Conclusions: The study concludes that self-directed learning, academic environment, and self-esteem are interrelated with academic performance, but their individual impact needs further investigation. The findings suggest that universities should create a supportive academic environment and promote self-directed learning to enhance students' academic performance.

Keywords: Academic environment, Academic performance, Self-directed learning, Self-esteem

INTRODUCTION

Education institutions play a crucial role in society as they are the source of knowledge and a catalyst for social change and transformation.[1,2] A high-level educational institution that offers degree programs and academic research is vital in revamping society.[3] Academic performance is commonly measured through grades and Grade Point Average (GPA), which includes writing and critical thinking skills.[4] Personal characteristics such as mental ability, academic skills, motivation, goals, and the educational environment are essential to academic success.[5-7]

One of the factors that can affect academic performance is self-directed learning readiness (SDLR), a factor that can affect academic performance.[8,9] It measures how well an individual can learn independently, with the skills, attitudes, and personality traits needed for self-directed learning. Self-directed learning is when learners take charge of their learning process by finding out what they need to learn, setting goals, choosing resources, and

assessing their progress.[10-12] They can do this with or without the help of others. SDLR can have an impact on academic achievement and lifelong learning habits. Self-directed learning is important for learning methods that are based on problems (PBL) or students' interests. It fosters motivation and independence in learners who can learn at their own pace and style.[10,11]

Self-esteem is a key psychological factor that can influence academic performance.[13] It is the overall assessment of one's worth or value as a person. Self-esteem can affect how students approach learning, cope with challenges, and perceive their abilities.[14,15] Students with high self-esteem tend to have more positive emotions, higher self-efficacy, and more resilience. They are more likely to engage in learning activities, set realistic goals, and persist in facing difficulties.[16] On the other hand, students with low self-esteem tend to have more negative emotions, lower self-confidence, and more anxiety.[17] They are more likely to avoid learning tasks, have unrealistic expectations, and give up easily. Therefore, self-esteem can have a significant impact on academic outcomes and well-being.

The academic environment, both physical and social, plays a critical role in shaping the academic experiences and results of students.[18,19] A supportive and stimulating academic environment can lead to positive academic emotions, higher engagement, and better achievement.[20,21] On the other hand, an academic environment perceived as hostile, boring, or threatening can cause negative academic emotions, lower engagement, and poorer academic performance.[22,23] Therefore, academic institutions must ensure that their environment promotes a positive learning experience for students. An ideal academic setting should include aspects such as adequate resources, modern facilities, and competent teaching staff.[18] In addition, the home environment can also contribute to academic performance by providing a comfortable and motivating space for studying.[24] However, students' socioeconomic status can also influence their academic performance, as students from low socioeconomic backgrounds may face challenges due to insufficient resources and ineffective learning environments.[25] For example, they may lack access to quality educational resources, suitable study spaces, or even adequate nutrition. Therefore, it is important to address the inequalities in an academic environment to ensure that all students have an equal opportunity to achieve academic success. Overall, creating a conducive academic environment is crucial for students to maximise their potential and excel academically.

Academic performance is a critical indicator that contributes to the global ranking of universities.[26] While a robust educational framework is essential, students' individual skills and environmental factors significantly influence their academic outcomes.[20,21] Many students struggle with time management and often engage in activities that do not align with their academic goals, underscoring the need for fostering self-directed learning practices.[27] Moreover, various factors, such as gender, psychological stress, family background, late in-class sessions, and peer relationships, have been identified as determinants of academic performance.[18,24,25] The academic environment plays a pivotal role, as students' belief in their ability to succeed and their sense of achievement directly correlates with higher academic outcomes.[20,21,23] Self-esteem, which is closely linked to achievement goals and self-directed learning, is another crucial factor influencing academic success.[13,15] Despite the growing interest in understanding the interplay between these factors, minimal research has been conducted in Malaysia to examine their combined impact on academic performance. This study aims to bridge this gap by investigating the correlation and strength of the relationship between self-directed learning, the academic environment, and self-esteem with academic performance among undergraduate university students. The findings will provide valuable insights to inform institutional policies and strategies, ultimately enhancing the students' academic achievement.

METHODS

Setting, place and population

The study was conducted using a cross-sectional-correlational design with a quantitative research approach to assess the relationship between academic performance and self-directed learning, academic environment, and self-esteem among undergraduate students at Universiti Malaysia Sarawak (UNIMAS) in Kota Samarahan, Sarawak. The study aimed to determine whether these factors have an impact on the academic performance of undergraduate students. UNIMAS is Malaysia's eighth university and was established in 1992. It has ten faculties, and the study involved the entire undergraduate population, which includes 13,517 students from all faculties, regardless of gender and nationality. The inclusion criteria required students to give consent and be able to communicate in English, while the exclusion criteria excluded postgraduate students and those with known mental health problems.

Sample size determination and sampling procedure

The study assumes that the dependent variable, academic performance, and the independent variables, self-directed learning, self-esteem, and perceived academic environment, are continuous. The correlation coefficient was used to test the relationship between the variables.[28] To determine the required sample size, the formula $N = [(z\alpha+z\beta)\div C]+3$ was used, where α is the threshold probability for rejecting the null hypothesis, β is the probability of failing to reject the null hypothesis under the alternative hypothesis, and C is a constant. The expected correlation coefficient was set at 0.20, and the initial sample size was 194, which was later inflated to 388 after multiplying it by a design effect 2.0. After

adjusting for non-response rates, the final sample size was 505, as approximately 30% of students did not agree to participate in the study. The sample included undergraduate students from all faculties, with equal numbers selected systematically from each faculty. A multistage cluster sampling approach randomly selected faculties, departments, and years of students. Fifty students were selected from each faculty for a total of 10 faculties.

Data collection instrument and data collection procedure

The study collected data through a self-administered questionnaire from UNIMAS undergraduates to investigate the correlation between self-directed learning (SDL), academic environment, self-esteem, and academic performance. The academic performance was measured subjectively and objectively, and 17 questions were asked to assess students' perceived academic performance.[29] The SDL questionnaire had eight domains with 40 items, and the academic environment had six domains with 30 items.[30] The Rosenberg Self-esteem scale, a ten-item Likert scale, was used to measure self-esteem.[31] In addition, respondents were asked about their socio-demographic characteristics. The questionnaire was conducted in English. Before data collection, a reliability and validity analysis was conducted on 40 students from another university.

Measurement

Academic performance

Academic performance measures a student's performance in various educational criteria, including tests, essays, viva, and exams. The study measures academic performance subjectively, based on students' perceived activities, and objectively, based on CGPA obtained last semester.[29] The dependent variable was a standardised score from 17 subjective and objective assessments. The study used 17 questions to assess the students' perceived academic performance, including questions about their CGPA scores and grades.

Self-directed learning

The self-directed learning questionnaire is a validated tool adapted from Cadorin et al that assesses learners' motivation to learn and their sense of self about their learning process.[30] It is designed for higher education and is a self-rated tool that allows students to express their perspectives and views about their self-directed learning practices. The questionnaire consists of 40 items divided into eight domains: knowledge, attitude, motivation, learning method, learning strategies, learning activity, interpersonal skills, and constructing knowledge.

Academic environment

The study focuses on the academic environment's impact on student's future professional and personal development. A questionnaire consisting of 30 items was used to assess students' perceived academic environment based on their academic performance over the past semester. Only the student's perspective was considered, and six domains were identified: learning perception, teacher perception, academic self-perception, physical facilities perception, social environment perception, and eLeap learning perception.[29]

Rosenberg self-esteem scale

Self-esteem is only one aspect of the self-concept, which Rosenberg describes as "*the entirety of the emotions and thoughts of the person with respect to himself as a subject*."[31] The scale is a ten-item Likert scale with items answered on a four-point scale-strongly agree to disagree strongly. Rosenberg's work examined how social and organisational positions, such as ethnic or religious status and institutional environments, such as schools or families, related to self-esteem.

Data entry and analysis

A reliability and validity study was conducted before the actual data collection. To validate the questionnaire, 40 data from different university with comparable characteristics were gathered. The data were examined for inconsistencies and missing values before the final analysis. Quantitative variables were presented using a number of statistical methods, and normal distributions and outliers were examined. IBM SPSS version 27.0 was used to examine the data, and a p value of less than 0.05 was regarded as statistically significant. A Pearson's moment correlation was done to determine the association between perceived academic performance, self-directed learning, perceived academic environment, and the self-esteem of the students. The age of the students, gender, family size, and time spent on social networking was also in the analysis. A latent variable score was calculated from perceived academic performance, self-directed learning, perceived academic environment and self-esteem using factor analysis.[32] Before the correlation test, exploratory data analysis was done to determine the skewed data. Fifty-four data were removed due to skewed data. Multiple linear regression analysis was done to ascertain the relationship between academic performance and other characteristics. Initially, age, year of study, gender, parental education, family size, time spent using social networking, self-directed learning, perceived academic environment and self-esteem score were included in the model. The model fitting model information revealed that the R^2 changes significantly from the previous model. The model R^2 values significantly changed from 0.117 ($p<0.001$) to 0.158 ($p<0.001$) in the final model.

Ethical issues and duration of study

This study followed ethical guidelines by obtaining voluntary participation from students and ensuring that their responses remained confidential. The research objectives were clearly communicated to participants, and their personal information was protected. Ethical clearance was obtained from the university authorities. The study was conducted over an 11-month and divided into four stages: proposal writing, questionnaire distribution, data collection, and report writing.

RESULTS

Characteristics of the students

This study involved 505 students from ten faculties of Universiti Malaysia Sarawak. The sample size of 505 represented a 100% response rate. The students' socio-demographic characteristics, including age, year of study, gender, ethnicity, nationality, religion, parental education, occupation, family size, living status, and social networking habits, were examined. Most students were female (72.3%) and aged 21-22 (57.4%). Most students were Malays (45.9%) and Malaysian (99.2%). More than half of the students were Muslim (54.5%). The fathers were more likely to have a university-level education, while the mothers were more likely to have a secondary education. Most mothers were not working (41.8%), while the fathers were primarily involved in government, private, or self-employed jobs. The students' median family size was 5.0, and the majority of the students lived in university colleges (70.9%). The average time students spend on social networking sites is 20 hours per week, with a minimum of one hour and a maximum of 112 hours (Table not shown).

Perceived self-directed learning

The students are better able to learn when they can control the flow of their experience or when their learning is "self-directed.". The analysis revealed that the overall Cronbach's alpha was 0.940, with a minimum coefficient in the learning method (Cronbach's alpha =0.741) and a maximum reliability coefficient of 0.875 in constructing knowledge. This indicated that domain-wise internal consistency and unidimensionality were fair (Table 1).

Table 1: Student's perception of the self-directed learning.

Domains	No. of items	Mean	SD	Median	Cronbach's alpha
Awareness	6	3.68	0.58	3.71	0.833
Attitude	8	3.75	0.55	3.75	0.826
Motivation	6	3.80	0.55	3.83	0.743
Learning method	4	3.48	0.71	3.50	0.741
Learning strategies	5	3.63	0.63	3.60	0.836
Learning activity	4	3.71	0.67	3.75	0.766
Interpersonal skill	4	3.95	0.62	4.00	0.765
Constructing knowledge	2	3.70	0.86	4.00	0.875
Self-directed learning (overall)	40	3.72	0.46	3.70	0.940

Table 2: Student's perceived academic environment.

Domains	No. of items	Mean	SD	Median	Cronbach's alpha
Perception of learning	5	5.40	0.83	5.60	0.877
Perception toward teacher	5	5.63	0.81	5.80	0.864
Academic self-perception	5	5.60	0.72	5.60	0.807
Perception of physical facilities	5	5.28	0.99	5.40	0.867
Perception of the social environment	5	5.35	0.82	5.40	0.736
Perception of online (eLeap) learning	5	5.52	0.89	5.60	0.840
Academic environment (mean)	30	5.46	0.65	5.60	0.937

Perceived academic environment

The learning environment encompasses the educational, physical, social and psychological context where students are engaged and play a significant role in professional and moral development. There was six domain used to assess the perceived academic learning environment. This study calculated the mean scores for various aspects of the academic environment, where students had the highest mean score of 5.63 for their perception towards teachers and the lowest score 5.28 for their perception towards physical facilities. The average mean score for the academic environment was found to be 5.46. The analysis revealed that the overall Cronbach's alpha was 0.937, with a minimum reliability coefficient in the perceived social environment (Cronbach's alpha =0.736) and a maximum coefficient of reliability of 0.877 in the domain of perception of learning. This indicated that domain-wise internal consistency and unidimensionality was fair (Table 2).

Perceived self-esteem of the students

Self-esteem and academic performance are important for the holistic development of students. Academic self-esteem is an evaluative appraisal of a student's experience capable of meeting academic challenges and making him happy. The present study assessed the student's perceived self-esteem using a ten-item Rosenberg self-esteem scale (Table 3). The Cronbach's alpha for the self-esteem scale was 0.748.

Table 3: Student's perceived self-esteem.

Statement	Mean	SD
On the whole, I am satisfied with myself	2.96	0.68
At times I think I am not good at all	2.17	0.78
I feel that I have a number of good qualities	2.99	0.57
I am able to do things as well as most other people	2.97	0.62
I feel I do not have much to be proud	2.35	0.80
I certainly feel useless at times	2.39	0.82
I feel that I'm a person of worth, at least on an equal level with others	2.96	0.60
I wish I could have more respect for myself	1.84	0.72
All in all, I am inclined to feel that I am a failure	2.53	0.83
I take a positive attitude toward myself	3.21	0.61

Note: Mean and the standard deviation was calculated after reversing. SD=Strongly disagree, D=Disagree, A=Agree, SA=Strongly agree

Academic performance

The academic performance in this study was assessed subjectively and objectively. The subjective assessment consisted of three domains-content grasping, quality of works, and completeness of works, while the objective assessment was the CGPA in the last semester. The reliability analysis showed that the overall Cronbach's alpha was 0.748, with a minimum coefficient of reliability for quality of work (0.717) and a maximum coefficient of reliability for completeness of work (0.881). This indicated that the internal consistency and unidimensionality of the domains were fair. The mean CGPA score was 3.20 (SD= 0.36), ranging from 2.0 to 4.0. The subjective and objective performance was then standardised into a single continuous variable (Table 4).

Correlation between perceived academic performance and selected variables

The analysis showed that perceived academic performance had a significant correlation with gender, self-directed learning, academic environment and self-esteem ($p<0.05$). However, no statistically significant correlation was found between perceived academic performance and age of the students, family size and time spent in social networking ($p>0.05$). The analysis revealed that self-directed learning appeared to be an important variable correlated with academic performance ($r=.342$, $p<.01$) followed by perceived academic environment ($r=.282$, $p<.01$), gender ($r=.147$, $p<.01$) and self-esteem ($r=.147$, $p<.01$) (Table 5).

Table 4: Perceived academic performance.

Domains	No. of items	Mean	SD	Median	Cronbach's alpha
Content grasping	11	3.45	0.46	3.36	0.731
Quality of work	3	3.57	0.70	3.67	0.717
Completeness of work	3	3.85	0.83	4.00	0.881
Academic performance (mean)	17	3.54	0.40	3.53	0.748
Objective assessment (CGPA)	-	3.20	0.36	3.20	-

Table 5: Correlation matrix of academic performance and selected variables.

Parameters	1	2	3	4	5	6	7	8
Age in years	-							
Gender	-0.050	-						
Family size	0.027	0.057	-					
Social networking	0.003	0.015	0.021	-				
Self-directed learning	-0.057	0.009	0.024	-0.037	-			
Academic environment	-0.035	-0.040	0.051	-0.053	0.547**	-		
Self-esteem	-0.029	-0.081	-0.014	-0.094*	0.322**	0.213**	-	
Academic performance	0.048	0.147**	-0.052	-0.065	0.342**	0.282**	0.147**	-

p value reached from Pearson's Moment correlation; *p<.05, **p<.01, ***p<.001; N=451

Table 6: Factors affecting student's academic performance: stepwise multiple linear regression analysis.

Parameters	B	SE	Beta	95% CI		Part	R^2
				LL	UL		
Constant	0.037	0.042		-0.046	0.120		
Self-directed learning	0.338***	0.044	0.342	0.252	0.424	0.342	0.117***
Constant	-0.190	0.081		-0.348	-0.031		
Self-directed learning	0.337***	0.043	0.341	0.252	0.422	0.340	0.138**
Gender	0.309**	0.094	0.144	0.124	0.494	0.144	
Constant	-0.205	0.080		-0.363	-0.047		
Self-directed learning	0.258***	0.051	0.261	0.157	0.359	0.218	0.158**
Gender	0.323**	0.094	0.150	0.139	0.507	0.150	
Academic environment	0.146*	0.052	0.146	0.044	0.249	0.122	

*p<0.05, **p<0.01, ***p<0.001; N=451

Factors affecting student's academic performance: multiple linear regression analysis

After stepwise multiple linear regression analysis, perceived self-directed learning (β=0.258, 21.8% contribution), gender (β=0.323, 15% contribution) and perceived academic environment (β=0.146, 12.2% contribution) appeared to be significant predictors of academic performance (Table 6).

DISCUSSION

Our study found a significant correlation between self-directed learning, academic environment, and self-esteem. A good academic environment, such as a silent and conducive place, can increase student concentration, while a noisy environment can disrupt their concentration.[20,21] A good academic environment enhances student focus, motivation, confidence, and discipline. Students with high self-confidence and self-esteem tend to have high goals and put effort into studying through self-directed learning.[13,15] We examined the correlation between academic performance and the academic environment, including teachers' perceptions, physical facilities, and online learning. The results are consistent with Closs et al and Malik and Rizvi.[19,18] Our analysis showed that the perception towards teachers had the highest mean score, indicating that good student-teacher relationships are crucial in creating a comfortable and productive learning environment.[2] However, the perception of physical facilities had the lowest mean score, suggesting that improvement is necessary to motivate students to learn. These findings are consistent with Wu et al and Zhao et al, although Lawrence & Vimala argued that the school environment has no significant impact on academic performance.[20,21,33]

Our analysis combined subjective and objective academic performance assessments, offering a more comprehensive evaluation of a student's academic performance. Multiple linear regression analysis revealed that self-directed learning was the most significant predictor of academic achievement. This finding is consistent with previous studies.[34-36] Gender also predicted academic achievement, with female students performing better than male students in our analysis. This finding is consistent with previous studies and suggests that girls focus on understanding the materials while boys focus on final grades.[37,38] The study also found that academic environment and self-esteem impact academic achievement, and a good academic climate can promote effective teaching and enhance self-directed learning. The study's findings have significant implications for universities, particularly those in developing countries, where various factors, including inadequate resources and cultural barriers, often challenge students' academic performance.

There were some limitations to this study. Firstly, the data was collected only from undergraduate students at one university, which may not be representative of the entire student population. Additionally, the study was limited to undergraduate students due to time constraints. Secondly, the data was collected through self-administered questionnaires, which may be subject to memory bias and underreporting. Thirdly, the study was conducted only at one university and may not be generalisable to other universities or the general population. Finally, due to the cross-sectional design, it was impossible to establish a causal relationship between the variables. Future research is needed to determine the weightage of each sub-variable of academic performance to the variable itself.

CONCLUSION

In conclusion, this study highlights the importance of using subjective and objective assessments to evaluate academic performance comprehensively. Self-directed learning, academic environment, gender, and self-esteem were found to be significant predictors of academic achievement. Universities should provide students with a conducive academic environment that enhances their self-directed learning and self-esteem. Additionally, they should address gender disparities and ensure that female students have equal opportunities and support to excel academically. These measures will help universities produce competent and competitive graduates in the job market.

Recommendations

There are misbeliefs and lack of knowledge related to management of dog bite cases. As rabies is 100% preventable disease health education activity for the rural population to be taken for creating awareness about management of dog bite to prevent deaths occurring due to rabies.

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