

A study on the effects of different factors on Academic achievement among university students in Dinajpur District, Bangladesh: A Statistical Study

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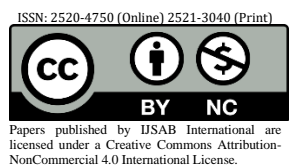
Abstract

Education is an important way for students to change their social status. Students' academic performance in tertiary education is determined by their Cumulative Grade Point Average (CGPA). There are many factors that contribute to determine whether the CGPA is excellent, moderate, or low. However, this study was carried out to determine the effect of different factors and academic achievement among university students of HSTU. For this study, A total of 500 students were involved in the study in which purposive or judgment sampling technique were used. In this study, ordinal logistic regression model is also applied to identify the factors that have impact more on academic achievement. From association test we have found that there was no association ($p > 0.05$) between stress and academic achievement (CGPA). There was also no association between involve in group study and CGPA ($p > 0.05$) and between extra curriculum activities, stress, mobile usages in study purpose, relationship status and CGPA ($p > 0.05$). There was significant relationship between family monthly income, sex of student, occupation of family head, politics, residence, lab facilities, income source and CGPA ($p < 0.05$). In ordinal logistic regression model of academic achievement in HSTU students' sex, political status, involve in group study, mobile use on study purpose and involve in extra curriculum activities as significant variables.



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Introduction

Performance outcomes that show how much an individual has achieved certain goals that were the focus of activities in instructional environments, particularly in high school, college, and university, are known as academic achievement (Steinmayr et al., 2014). According to Cao et al. (2024), academic accomplishment should be seen as a complex concept that includes several areas of learning. The term "academic achievement" can be defined differently depending on the metrics employed to quantify it due to the vastness of the area that encompasses many different types of educational outcomes. There are a variety of indicators that point to academic success. Some are broader, like the procedural and declarative knowledge that students gain from school (Steinmayr et al., 2014; Winne & Nesbit, 2010). Others are more specific, like grades or test scores, and still others are cumulative, like degrees and certificates. Every person's life in modern cultures is shaped by their academic achievement. Academic performance, as indicated by the grade point average. The ability to participate in higher education is thus defined by academic accomplishment, and this in turn is dependent on the degrees one obtains. In addition to personal significance, academic success is crucial to a country's wealth and development. Researching academic accomplishment on a global scale is important for several reasons, not the least of which is the significant correlation between high levels of education and prosperous societies. Educational policy decisions are informed by the findings of these studies, which offer data on various measures of a country's academic performance. This data is then used to assess the efficacy of a country's educational system. It is not unexpected that many scientists, particularly in fields like psychology and education, concentrate their research efforts on academic performance, considering its significance to both individuals and society. The educational system has been the subject of inquiry by a few scholars.

Many studies mentioned that which factors are more effective in academic achievement of university students' education. Some of them analyzed the academic achievement of university students in relation to the family monthly income, some researchers work with the relationship among the carrier status and some of them analyzed the relationship between income source in students' life and academic achievement. Our main interest is here that whether sociodemographic and economic factors have an impact of their academic achievement or not. Consequently, the specific objectives of the study are: (i) To examine the association between sociodemographic and economic factors and academic achievement (CGPA) of the students, & (ii) To find other determinants of academic performance of university students.

Literature review

An essential part of any research project is the literature review. Educational authorities are now allegedly fixated on students' poor academic performance (Fouladi, 2007). Many psychologists, sociologists, and educators have thought of academic attainment as the most significant issue in school, and he seemed to agree. In addition to being anti-egalitarian and discriminatory, Peelo and Wareham (2002) discovered that low academic achievement has been recognized as a social and economic waste problem. Contrarily, text-anxiety and academic performance were affected by numerous factors. The monthly income of the family is one of these. Monthly family income affects academic achievement, according to Thomas (2005). He made it clear that pupils whose families had a low monthly income tended to do poorly in school. Students' level of intrinsic motivation was the most important component in determining their academic success (Iksan et al., 2006). For students, this metric became the yardstick by which they would measure their own future contributions to the world at large. A more creative student body was found to be associated with intrinsic motivation, according to research by Buntat et al. (2011). Both sources agree that intrinsic motivation is characterized by a strong desire to do one's own work, an interest in one's own projects, and a willingness to

face challenges head-on. A highly motivated person is one who is enthusiastic about and engaged with the task at hand, whether at work or at school. Students' performance and attitudes toward the subject matter are both enhanced through cooperative learning, according to research by Zakaria, Chin, and Daud (2010). This was because there were more chances for students to contribute to class discussions and work together to solve problems. The teaching and learning process was found to be a highly significant element in students' academic progress. If professors want more student engagement in class, they need to work on their own teaching methods. Additionally, outcomes would be lower if the absenteeism rate was significant (Bavani & Sanjivee, 2015).

Another factor that affected students' cumulative grade point averages was their outlook on the class. Perceptions of instructors, course anxiety, social significance, self-concept, learning enthusiasm, and motivation are the six components that make up an individual's attitude toward a certain course (Buntat et al., 2011). Wong and Webb (2010) noted that students' performance improved in relation to the library's collection of books and audiovisual materials. A university or institution can use this as solid evidence to improve and manage the library. Students' performance improved when learning facilities were used to their maximum potential, according to research by Mushtaq and Khan (2012).

Data collection

In this study, use primary data and purposive or judgment sampling method have been used. The information is filling up by the Interview procedure. The population of our target was Science faculty students of HSTU. There were 4 departments (Statistics, Mathematics, Chemistry and Physics) have been collected. The data is collected from the structure questionnaires. To test association between different variables using the Pearson Chi-Square Test. Ordinal logistic regression were performed to identify the significant factors associated with academic achievement. To complete the study, the data was analyzed with statistical package for social sciences (SPSS) version 20.0. A value of $p < .05$ was regarded as statistically significant in the analysis.

Methodology

Chi-square test

To find out if there is a significant discrepancy in one or more categories between the expected and observed frequencies, the chi-square test is utilized. A chi-square test also written as, χ^2 . It is any statistical hypothesis test in which, in the event that the null hypothesis is true, the test statistic's sampling distribution has a chi-squared distribution. Chi-square tests are frequently created using the sample variance or the sum of squared errors. The central limit theorem makes the assumption of independent normally distributed data, which is valid in many situations and gives rise to test statistics with a chi-square distribution. To try to reject the null hypothesis—that the data are independent—a chi-square test might be utilized. A test in which this is asymptotically true is also regarded as a chi-square; that is, if the null hypothesis is true, the sampling distribution can be made to approximate a chi-squared distribution as closely as required by increasing the sample size.

Hypothesis of the study:

H_0 : There is no significant difference between different variables and Academic achievement (CGPA).

H_1 : There is significant difference between different variables and Academic achievement (CGPA).

Determine the test statistic's p-value, anticipated frequencies, degrees of freedom, and test statistic using sample data.

Degrees of freedom: The degrees of freedom (DF) is equal to

$$DF = (r-1) * (c-1)$$

Where r is the number of levels for one categorical variable, and c is the number of levels for the other categorical variable.

The expected frequency counts are computed separately for each level of one categorical variable at each level of the other categorical variable. Compute R*C expected frequencies, according to the following formula-

$$E_{ij} = \frac{R_i * C_j}{N}$$

Where,

E_{ij} = expected frequency for the ith row jth column.

R_i = total in the ith row

C_j = total in the jth column

N = table grand total

Test statistic: The test statistic is a Chi-square random variables defined by the following equation-

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where,

χ^2 = chi squared,

O_i = observed value

E_i = expected value.

P-value for chi-square statistic: The likelihood that the chi-square value would be the same as it is, or greater, if there were no association in the population, is known as the P-value for chi-square statistics. When the P-value for the chi-square test is less than α (usually $\alpha = 0.05$), an observed link is deemed statistically significant. If the null hypothesis is rejected in this instance, we can extrapolate that there is a relationship in the population and the variables are not independent.

Logistic Regression

Logistic regression model is most frequently used to describe statistical relationship between a dichotomous dependent variable and a number of independent variables. Let Y is dichotomous dependent variable taking values 0 and 1 and suppose that

$$Y_i = \begin{cases} 1, & \text{if a specific survival event develop during the study period} \\ 0, & \text{otherwise} \end{cases}$$

Also let, $x = (x_1, x_2, \dots, x_p)'$ be a vector of p known or suspected risk factor or covariates (independent variables). The basic form of logistic regression model is then

$$P(y = 1|x) = \pi(x_i) = \frac{\exp(x_i\beta)}{1 + \exp(x_i\beta)} = P(x)$$

Where, α is a scale parameter and β is a $p \times 1$ vector parameter. $P(x)$ represents the probability that given by

$$P(y = 0|x) = 1 - \pi(x_i) = \frac{1}{1 + \exp(x_i\beta)} = 1 - P(x)$$

Then a well-known transformation of $P(x)$ known as logit transformation is defined as

$$g(x_i) = \text{logit}[\pi(x_i)] = \log \left[\frac{\pi(x_i)}{1 - \pi(x_i)} \right] = x_i\beta$$

$$\text{Or, } g(x_i) = \beta_0 + \beta_1 x_{i1} + \dots + \beta_k x_{ik}$$

The logit transformation is very important in logistic regression analysis. It has many of the described properties of linear regression model. The logistic linear in its parameters, may be continuous and may range from depending on the range of x in this study, we use this basic model applied in case control study design.

Results and Discussion

In this study 500 (267 male and 233 female) science faculty students in HSTU were considered as participants. The percentages of male and female is 53.4% and 46.6%, the occupation of family head is farmer, businessman, government job and private job are respectively 26.8% ,47.4%, 23.6% and 2.2%. The percentages of stressful students is 50.6% and no stressful student is 49.4%, the student who involve in extra curriculum activities is 44.6% and who does not involve in the extra curriculum is 55.4%, the student who maintain group study is 54.6% and who does not maintain group study is 45.4%, the student who attached with the politics is 16.8% and who does not attached with the politics is 83.2%, the participate are live in Hall, Mess(Town), Mess (Basherhat) and Home is respectively 34.4% ,43.4%, 13% and 9.2%. The lab facilities of computer lab, seminar library and workshop room, chemical lab and lab is respectively 33.8% 24.2% 41.6% and 0.4%. Family monthly income of low, medium, and high income is respectively 37.2%, 46.0% and 16.8%. Mobile use on study purpose is 63.8% and not use mobile on study purpose is 36.2%. The participants who engaged with someone is 35.2% and who does not engage with someone 64.8%. The income source of students is tuition, freelancing online business scholarship and depend on family percentage is respectively 36%, 32.4%, 0.2% and 0.6%.

Table 1. Characteristics of the study subjects

Socio-demographic and economic variable	Description in categories	Frequency	Percentage	Cumulative Percent
Sex	Male	267	53.4	53.4
	Female	233	46.6	100.0
Occupation of family head	Farmer	134	26.8	26.8
	Businessman	237	47.4	74.2
	Govt. Job	118	23.6	97.8
	Private Job	11	2.2	100.0
Stress	Yes	253	50.6	50.6
	No	247	49.4	100.0
Involve in extra curriculum activities	Yes	223	44.6	44.6
	No	277	55.4	100.0
Involve in group study	Yes	273	54.6	54.6
	No	227	45.4	100.0
Political status	Yes	84	16.8	16.8
	No	416	83.2	100.0
Residence	Hall	172	34.4	34.4
	Mess(Town)	217	43.4	77.8
	Mess(Basherhat)	65	13.0	90.8
	Home	46	9.2	100.0
Lab Facilities	Computer Lab	169	33.8	33.8
	Seminar Library & Workshop Room	121	24.2	58.0
	Chemical Lab	208	41.6	99.6
	Lab	2	.4	100.0
Family Monthly Income	Low income	186	37.2	37.2
	Medium income	230	46.0	83.2
	High income	84	16.8	100.0
Mobile Use on Study	Yes	319	63.8	63.8
	No	181	36.2	100.0
Relationship Status	Yes	176	35.2	35.2
	No	324	64.8	100.0
Income Source	None	154	30.8	30.8
	Tuition	180	36.0	66.8
	Freelancing	162	32.4	99.2
	Online Business	1	.2	99.4
	Scholarship	3	.6	100.0

From the table 2 it is seen that the calculated chi-square value is 16.229 and likelihood ratio is 16.674 and the p-value are .039 and .034 respectively which is less than 0.05. So, we may reject our null hypothesis at 5% level of significance with 8 df. Hence there is significant relationship between CGPA of student and family monthly income. Again, we see that the table 2 it is seen that the calculated chi-square value is 13.932 and likelihood ratio is 9.469 and the p-value are .008 and .006 respectively which is greater than 0.05. Hence There is no significant relationship between CGPA and sex of students. The calculated Pearson chi-square value is 37.321 and likelihood ratio is 39.647 and the p-value are .000 and .000 respectively. Hence there is significant relationship between occupation of family head and academic achievement of students. From the table 2 it is seen that the calculated chi-square value is 12.543 and likelihood ratio is 12.579 and the p-value are .014 and .014 respectively which is greater than 0.05. So, we may accept null hypothesis at 5% level of significance with 4df. Hence there is no significant relationship between students involve in extra curriculum activities and academic achievement. Chi-square value is 9.029 and likelihood ratio is 8.956 and the p-value are .060 and .062 respectively. Hence There is no significant relationship between mobile usages in study purpose and academic achievement. From table 2 it is seen that the calculated chi-square value is 6.957 and likelihood ratio is 6.988 and the p-value are .138 and .137 respectively. Hence there is no significant relationship between academic achievement and stress. The calculated chi-square value is 6.102 and likelihood ratio is 6.105 and the p-value are .198 and .191 respectively. There is no relationship between academic achievement and involve in group study. The calculated chi-square value is 20.420 and likelihood ratio is 20.186 the p-value are .000 and .000 respectively. Hence there is relationship between politics and academic achievement. So, we may conclude that there is no significant relationship between stress, in group study, extra curriculum activities, stress, mobile usages in study purpose, relationship status and CGPA ($p>0.05$). There is significant relationship between family monthly income, sex of student, occupation of family head, politics, residence, lab facilities, income source and CGPA ($p<0.05$).

Table 2: Association between Academic achievement (CGPA) and different factors.

Socio-demographic and economic variable	Test	Value	Df	Asymp. Sig. (2-sided)
family monthly income	Pearson Chi-Square	16.290 ^a	8	.039
	Likelihood Ratio	16.674	8	.034
sex of students	Pearson Chi-Square	13.932 ^a	4	.008
	Likelihood Ratio	9.469	4	.006
occupation of family head	Pearson Chi-Square	37.321 ^a	12	.000
	Likelihood Ratio	39.647	12	.000
involve in extra curriculum activities	Pearson Chi-Square	12.543 ^a	4	.014
	Likelihood Ratio	12.579	4	.014
mobile use on study purpose	Pearson Chi-Square	9.029 ^a	4	.060
	Likelihood Ratio	8.956	4	.062
stress	Pearson Chi-Square	6.957 ^a	4	.138
	Likelihood Ratio	6.988	4	.137
involve in group study	Pearson Chi-Square	6.102 ^a	4	.198
	Likelihood Ratio	6.105	4	.191
politics	Pearson Chi-Square	20.420 ^a	4	.000
	Likelihood Ratio	20.186	4	.000
residence	Pearson Chi-Square	31.154 ^a	12	.002
	Likelihood Ratio	30.880	12	.002
relationship status	Pearson Chi-Square	6.871 ^a	4	.143
	Likelihood Ratio	6.817	4	.146
lab facilities	Pearson Chi-Square	57.502 ^a	12	.000
	Likelihood Ratio	56.244	12	.000
income source	Pearson Chi-Square	27.779 ^a	16	.034
	Likelihood Ratio	29.814	16	.022

Note: **a indicates that Chi square test value.

In this study, ordinal logistic regression model is also applied to identify the factors that have impact more on academic achievement.

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + B_7X_7 + B_8X_8 + B_9X_9 + B_{10}X_{10} + B_{11}X_{11} + B_{12}X_{12} + \epsilon$$

Where, Y=Dependent variable academic achievement (CGPA),

X₁=Family monthly income, X₂= Sex, X₃= Residence, X₄=Extra curriculum activities, X₅=Group study, X₆=Occupation of family head, X₇= lab facilities, X₈=Purpose of mobile uses, X₉=Stress, X₁₀=Relationship status, X₁₁= Politics, X₁₂=Income source and ϵ =Error term.

From the table 3, we can see that respondent residence we categorized it into four classes as hall, mess(town), mess (basherhat), home and selected the residence home as the reference group. We found that the values of regression coefficients of them are respectively .145, .183, and .164 which shows positive association between them and academic achievement. And it is insignificant. We classified sex as male and female. Respondents sex female as the reference group. We found that the regression coefficient is -.357 which shows that negative association with academic achievement and it is significant (.046). For the variable respondent's relationship status, we also categorized it into two level. Here the value of regression coefficient is -.046 which indicates that there is negative association with academic achievement. The effect is insignificant (.802). We classified stress as yes and no. Respondent's stress no as the reference group. We found that the regression coefficient is -.330 which shows that negative association with academic achievement and it is insignificant (.062). Respondents' occupation of family head we categorized it into four classes as farmer, businessmen, Govt. job, private job and selected the private job as the reference group. We found that the values of regression coefficients of them are respectively .288, .134, and .259 which shows positive association between them and academic achievement. And it is insignificant. For the variable respondent's political status, we also categorized it into two level. Here the value of regression coefficient is -.319 which indicates that there is negative association with academic achievement. The effect is significant (.002). We classified the variable involve in group study as yes and no. Respondents involve in group study no as the reference group. We found that the regression coefficient is -.101 which shows that negative association with academic achievement and it is significant (.005). Similarly, we can see that the mobile use on study purpose and involve in extra curriculum activities are positive association with academic achievement and it is significant respectively (.011) and (.007). Respondents' lab facilities we categorized it into four classes as computer lab, computer lab& seminar, chemical lab, lab and selected the lab as the reference group. We found that the values of regression coefficients of them are respectively 3.120, 2.589 and 2.583 which shows positive association between them and academic achievement. And it is insignificant. So, we may say that in ordinal logistic regression model of academic achievement in HSTU with sex, political status, involve in group study, mobile use on study purpose and involve in extra curriculum activities as significant variables (table 3).

Table 3: Ordinal logistic regression estimates of the effects of different socio demographic and economic risk factors of academic achievement among the students.

Sociodemographic and economic factor		B	S.E	Sig.	95% confidence interval	
					Lower	Upper
CGPA	2 to 2.99 (Intercept)	.914	1.939	.637	-2.886	4.714
	3.00 to 3.24 (Intercept)	2.782	1.944	.152	-1.028	6.593
	3.25 to 3.49 (Intercept)	3.909	1.946	.045	.094	7.724
	3.5 to 3.74 (Intercept)	5.311	1.950	.006	1.489	9.133
	3.75 to 4 (Intercept)	4.213	1.965	.008	1.524	9.235
Residence	Hall	.145	.334	.663	-.509	.799
	Mess (Town)	.183	.317	.563	-.437	.803
	Mess (Basherhat)	.164	.365	.653	-.551	.879
	Home(Ref.)					
Sex	Male	-.357	.179	.046	-.708	-.006
	Female(Ref.)					
Relationship status	Yes	-.046	.184	.802	-.406	.314
	No(Ref.)					
Stress	Yes	-.330	.177	.062	-.677	.017
	No(Ref.)					
Occupation of family head	Farmer	.288	.580	.620	-.849	1.426
	Businessman	.134	.585	.819	-1.013	1.281
	Govt. job	.259	.588	.659	-.893	1.411
	Private job(Ref.)					
Family income	Low income	.379	.281	.177	-.172	.931
	Medium income	.303	.237	.201	-.161	.767
	High income(Ref.)					
Political status	Yes	-.319	.264	.002	-.837	.199
	No(Ref.)					
Involve in group study	Yes	-.101	.173	.005	-.441	.239
	No(Ref.)					
Mobile use on study purpose	Yes	.496	.196	.011	.112	.881
	No(Ref.)					
Involve in extra curriculum activities	Yes	.054	.181	.007	-.301	.409
	No(Ref.)					
Lab facilities	Computer lab	3.120	1.445	.031	.287	5.952
	Computer lab and seminar	2.589	1.455	.075	-.263	5.442
	chemical lab	2.583	1.442	.073	-.244	5.410
	Lab(Ref.)					
Income source	None	.198	1.080	.854	-1.918	2.314
	Tuition	-.118	1.085	.913	-2.244	2.007
	Freelancing	.189	1.090	.863	-1.948	2.325
	Online business	-.456	2.110	.829	-4.591	3.680
	Scholarship(Ref.)					

Conclusions

One of the major findings of this study we see that, some of the variables highly influences academic achievement such as their family monthly income, occupation of family head, political status, residence, income source of the students, lab facilities in HSTU. Most of the respondent’s father’s occupation is Businessman (47.4%) and lowest is private job (2.2%). Most of the students are involve in group study (54.6%), the maximum students are not interest in politics (83.2%), the most of the student’s residence is Mess (Town) (43.4%), and the maximum of the student’s family monthly income is medium income (46.0%). Most of respondent’s mobile use on study purpose (63.8%) and not use mobile on study purpose (36.2%). The participants who engaged with someone (35.2%) and who does not engage with someone (64.8%). Almost half of the total students are involved in extra curriculum activities (44.6%). From association test, we have found that academic achievement was no significant associated with stress, group study, extra curriculum activities, mobile uses on study purpose and relationship status. Also,

we have found that academic achievement was significant associated with family monthly income, occupation of family head, political status, residence, income source of the students, lab facilities in HSTU. In ordinal logistic regression model, we see that the variable residence, occupation of family head, family monthly income, mobile use on study purpose, involve in extra curriculum activities, lab facilities are positive association with academic achievement and the variable sex, relationship status, stress, political status, income source are negative association with academic achievement. Also, we can see that the variable residence, relationship status, stress, occupation of family head, family monthly income, lab facilities and income source as insignificant variables and the variable sex, political status, involve in group study, mobile use on study purpose and involve in extra curriculum activities as significant variables with academic achievement.

Every work or survey which we have done its some limitation, some are given below. Proper care should be taken in the planning and execution of the survey, otherwise the result obtained might be incorrect and misleading. This analysis is based on small sample. If we could take more samples, findings might be different and could be more accurate. Many respondents give the unrelated and erroneous information. Beside these, we have needed enough time, money and adequate skilled personal to conduct a survey.

Applications

The current study has several applications that can significantly impact educational policies, institutional practices, and student support services. Firstly, the findings offer valuable insights for policymakers in crafting evidence-based educational policies. By understanding the socio-demographic and economic factors that influence academic achievement, policymakers can develop targeted interventions to address disparities in educational outcomes. For example, initiatives aimed at providing financial aid or support services to students from low-income families can be prioritized to promote equitable access to higher education. Secondly, institutions can utilize the study's findings to enhance support services for students. By tailoring programs to address specific needs identified in the research, such as stress management, study habits, or access to resources, universities can create a conducive environment for academic success. Additionally, insights from the study can inform the design of mentorship programs or academic advising services to provide personalized guidance to students. Thirdly, the study opens avenues for international collaboration and comparisons in educational research. Researchers from other regions can leverage the findings to compare educational practices and outcomes, facilitating cross-cultural learning and the exchange of best practices. This collaboration can lead to innovative approaches to improving academic achievement globally. Furthermore, the findings can inform the development of targeted interventions to support student success. Initiatives focused on addressing factors identified in the study, such as promoting student engagement in extra-curricular activities or enhancing access to educational resources, can be implemented to foster academic achievement. Lastly, community engagement initiatives can be developed based on the study's findings to create a supportive ecosystem for student success. By collaborating with local stakeholders, such as parents, community leaders, and employers, interventions can be designed to provide holistic support to students both inside and outside the classroom.

Limitations and Future Research Directions

While the current study provides valuable insights into the factors influencing academic achievement among university students in Dinajpur District, Bangladesh, it is essential to acknowledge its limitations and identify areas for future research. Firstly, the study's sample size was relatively small, limiting the generalizability of the findings to a broader population.

Future research could employ larger and more diverse samples to ensure greater representativeness and robustness of the results. Secondly, the data collection method relied on self-report measures, which may be subject to biases such as social desirability or recall errors. Utilizing multiple data collection methods, such as interviews, observations, or objective assessments, could enhance the validity and reliability of the findings. Thirdly, the study focused primarily on socio-demographic and economic factors, overlooking other potential determinants of academic achievement such as psychological factors, teaching methodologies, or institutional support services. Future research could explore the interplay of these variables to provide a comprehensive understanding of academic success. Moreover, the study adopted a cross-sectional design, limiting the ability to establish causal relationships between variables. Longitudinal studies tracking students over time could elucidate the dynamic nature of academic achievement and identify factors influencing academic trajectories. Furthermore, the study was conducted in a specific geographic region, which may limit the generalizability of the findings to other contexts. Future research could adopt a multi-site or comparative approach to examine variations in academic achievement across different regions or educational systems.

In terms of future research directions, there is a need to explore the role of interventions in promoting academic achievement among university students. Evaluating the effectiveness of educational interventions, such as mentoring programs, academic support services, or financial aid initiatives, could provide valuable insights into strategies for enhancing student success. Additionally, investigating the impact of emerging trends, such as online learning or digital literacy, on academic achievement warrants further exploration. Understanding how technological advancements influence learning outcomes and educational practices could inform pedagogical approaches and institutional policies.

Moreover, while the current study sheds light on the factors influencing academic achievement among university students, it is imperative to address its limitations and pursue avenues for future research to advance our understanding of this complex phenomenon. By addressing these limitations and exploring new research avenues, scholars can contribute to the development of effective strategies to support student success in higher education.

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