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Factors Affecting Quality Education of Undergraduate Students: Evidence from Public Sector Institutions of Pakistan

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Abstract: This study focuses on the mediating function of institutional infrastructure (IIF). It examines how study hours (SH), students' financial status (FS), and parents' education (PE) impact students' cumulative grade point average (CGPA). According to a study using a sample of 274 students, a significant increase in student hours (SH) greatly improves the cumulative grade point average (CGPA), supporting strong hypotheses that address the issue of quality education for undergraduate students. The theoretical lens used for the research model is systems theory by Ludwig Von Bertalanffy from the 1930s. The study is quantitative and follows a positivist paradigm using a deductive approach. Primary data will be collected through a survey questionnaire from public sector institutions in the locality of Haripur city. The sample will be drawn using stratified probability sampling. Data analysis will be conducted using SPSS version 20. All model variables, including CGPA, institutional infrastructure, study hours, students' financial status, and their parents' qualifications, will be empirically tested through descriptive statistics, reliability analysis, correlation analysis, regression analysis, and mediation analysis using Andrew F. Hayes' Model 4. The findings will broaden our understanding by illustrating how IIF mediates the relationship between SH, FS, PE, and CGPA. Specifically, SH, FS, and PE significantly affect IIF, and IIF subsequently affects CGPA. This study offers valuable advice for educational institutions and policymakers.

Keywords: Academic Performance, CGPA, Students, Academic Success.

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INTRODUCTION

Education plays a pivotal role in individual and societal development. It fosters professional growth, shapes character, and contributes significantly to addressing social and economic challenges (Gallego et al, 2021). Moreover, education is crucial for economic development and individual well-being, enabling individuals to live fulfilling lives and build a better future. Essentially, education is a process of acquiring knowledge and understanding of the surrounding world (Molnar et al, 2021). A robust education system is fundamental for the progress and survival of any nation.

Students are the cornerstone of any educational institution (Rodriguez et al, 2021). This assertion is evident in the fact that educational institutions' revenue streams, primarily from teaching and non-teaching staff salaries, are directly linked to student enrollment. The absence of students would inevitably lead to the closure of these institutions (Sellei et al, 2021). Consequently, providing high-quality education to students becomes paramount.

The quality of an educational institution is often evaluated by the caliber of its graduates. A well-educated individual possesses a distinct set of attributes and competencies (Osamika et al, 2021). Several factors have been identified as key determinants of student CGPA, including study hours, financial status, and parental education. Furthermore, institutional infrastructure is believed to mediate the relationship between these factors and student academic success. This study aims to investigate these factors and their influence on students' CGPA within the specific context of Haripur city. The objective of this study is to investigate the impact of determinants such as study hours, financial status, and parents' education, with the function of institutional infrastructure as a mediating

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variable, on the CGPA of undergraduate students. The current study will contribute extensive knowledge of the determinants influencing the academic success of undergraduate students, with the ultimate goal of providing helpful insights to educators, researchers, and students themselves. In educational discourse, the CGPA is a tool for measuring the performance of students. So, all the institutes try to take the necessary steps to improve the CGPA of their students. It has been observed that different factors are responsible for improving CGPA. Namely, study hours, financial status, and parents' education, with the mediating effect of institutional infrastructure. Therefore, it is crucial to focus on improving such factors to raise the CGPA.

Education is generally regarded as a requirement for human development. Education is also mainly about socialization and, secondly, about the process of imparting knowledge for the progress and development of both the individual and society. It is not just about literacy and enlightenment (Willems et al, 2021). It is about value formation, value generation, and orientation handed down to students, to enable him/her to fit well into a particular defined society and enable the individual to function as a social being. Oftentimes, the degree to which a student is educated is influenced by the student's academic achievement, which is determined by the student's class of graduation or CGPA that (s) he graduated with (Sellei et al, 2021). The question of what determines students' academic achievement has not yet been fully answered. Because of this, educators and researchers have long been interested in identifying and understanding the variables that contribute to student academic achievement (Molnar, 2024). Several studies have been conducted, and voluminous literature has documented factors that affect the student's academic performance (Osamika et al, 2021). The findings of some of these studies identified students' effort, previous schooling, parents' educational background, family income, self-motivation of students, age of students, learning preferences, and entry qualification of students as important factors that affect student academic performance. It is generally assumed that research findings may differ from one geographical setting to the other (Kocsis & Molnar, 2024).

Having armed themselves with this orientation and the fact that Deans of Faculties/Schools of the university would like to know the determinants of student academic performance, to enable them to provide appropriate orientation to students, the research deemed it fit to conduct this to investigate student academic performance using study hours, financial status, parents' education (Westrick et al, 2021).

Significance of the Study

First, in a highly competitive environment, the current study provides help to students to keep track of and improve their CGPA. Second, this study provides a platform for management to facilitate their students regarding the factors studied in this research.

Theoretical foundation based on existing studies

A high CGPA is a key objective for undergraduates, essential for academic and career advancement (Molnar et al, 2021). However, the factors influencing CGPA remain complex and require ongoing research. Kocsis & Molnar (2024), using regression analysis, found a positive correlation between study hours and quarterly CGPA among 93 Ohio State University agricultural economics students. Odefadehan (2024), using an ordered probability model, found that financial status significantly determines academic achievement among fourth-year students at Gaziosmanapasa University. Srairi (2022), using secondary data, found a significant predictive relationship between parental education levels and student CGPA through regression analysis. Naaman (2021) highlights school ownership, facilities, and resources as crucial structural components. Private schools, with superior funding and resource access, particularly in technology, often outperform public schools (Gallego et al, 2021). Increased study hours directly correlate with heightened infrastructure utilization, encompassing utilities and learning materials (Soares et al, 2021). Financial status, encompassing parental income and student earnings, directly impacts institutional infrastructure. Students with strong financial backgrounds can afford higher tuition, enabling institutions to develop and maintain professional facilities (Osamika et al, 2021). Educated parents prioritize institutions with professional infrastructure, actively scrutinizing facilities during enrollment (Molnar et al, 2021). Conversely, less-educated parents tend to place less emphasis on infrastructure quality (Willems et al, 2021). This highlights the crucial role of education in discerning factors that significantly impact human experience. Study hours, financial status, and parents' education positively influence CGPA, mediated by institutional infrastructure. Specifically, institutions with higher study hours, students from strong financial backgrounds, and educated parents

tend to have students with higher CGPAs (Sellei et al, 2021).

Research Gaps

First, this research is based on the international literature, academic performance is so complex, the cultural and political differences, as well as language barriers, make it impossible to build a universal model (Musso et al, 2020).

Second, considering that this research utilizes the longitudinal studies, it is suggested to involve more and more recent, cross-sectional studies on the academic achievement of undergraduates (Odefadehan, 2024).

LITERATURE REVIEW

Kocsis & Molnar (2024) used regression analysis to reveal that the SHM is positively correlated and significantly contributes to the CGPA of the students. The study applied an ordered probability model to determine financial status as a determinant that has an impact on the CGPA of students (Respondek et al, 2020). Srairi (2022) found that parents' education significantly predicted the influence on CGPA of undergraduate students. Naaman (2021) noticed that additional funding and access to resources such as computers in private schools enhance the academic performance, study hours, and educational attainment of their students. The study revealed that, beyond individual characteristics and learning strategies, institutional infrastructure also contributes to a student's CGPA (Rodriguez-Hernandez et al, 2020). Institutes utilize the amount of money to create and maintain a professional infrastructure (Osamika et al, 2021). Parents' education affects institutional infrastructure in a way that educated parents will observe the infrastructure of the institute where they want to admit their child (Pellagatti et al, 2021).

Theoretical Framework

This study utilizes systems theory, encompassing input, throughput, output, and feedback. Independent variables (study hours, financial status, and parents' education) serve as input, directly influencing output (CGPA). Institutional infrastructure acts as a throughput, mediating the process. Feedback mechanisms, based on CGPA results, inform adjustments to input. Systems theory effectively explains and supports the research model.

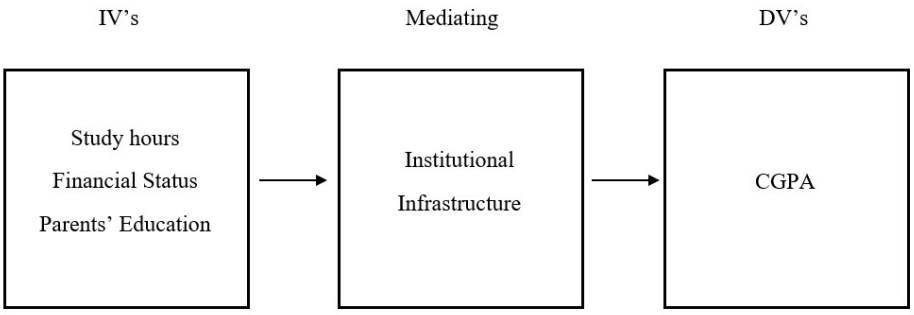

Figure 1: Research Model

Research Hypotheses

- There is no significant impact of study hours on the CGPA of students
- There is no significant impact of financial status on the CGPA of students
- There is no significant impact of parents' education on the CGPA of students
- There is no significant impact of institutional infrastructure on the CGPA of students
- There is no significant impact of study hours on institutional infrastructure
- There is no significant impact of financial status on institutional infrastructure
- There is no significant impact of parents' education on institutional infrastructure
- There is no significant impact of study hours, financial status, or parents' education on CGPA, with the mediating effect of institutional infrastructure

METHODOLOGY

In the current study, a deductive approach is used to examine the effect of various determinants on the CGPA of the students. The cause and effect research to find the effect of study hours, financial status, and parents' education on CGPA. Primary data were collected at once for this study using stratified random sampling. 274 responses to the questionnaire were returned, a total of 300 among the students. The current study analyzes the data using SPSS version 20, and a variety of techniques have been applied to analyze data and to test the hypotheses, such as regression analysis, mediation analysis.

RESULTS AND DISCUSSION

This study examined age, gender, department, and semester among 274 valid student entries, with no missing data. Age distribution revealed that 28.5% were 18-20 years old, 39.4% were 21-23, 23% were 24-26, and 9.5% were 27-29. The gender breakdown was 31.8% male and 68.2% female. Departmental representation included 19% Chemistry, 19% Information Technology, 49% Statistics, and 12.8% Psychology. Semester distribution showed 38% in the 8th semester, 26.3% in the 5th, 23% in the 7th, and 12.8% in the 6th.

Reliability Analysis

This study assessed the reliability of each variable's scale using Cronbach's Alpha. CGPA demonstrated acceptable reliability (= .743). However, parents' education displayed poor reliability (= .614) and financial status (= .743). However, parents' education displayed poor reliability (= .313), indicating an unreliable scale.

Table 1: . Cronbach's Alpha

S. NO	Variables	N	Cronbach's Alpha	No. of Items
1	CGPA	274	0.694	6
2	IIF	274	0.83	4
3	SH	274	0.614	6
4	FS	274	0.743	5
5	PE	274	0.313	5

Dependent variable: CGPA, Independent variable: SH, FS, PE, Mediating variable: IIF

Descriptive Analysis

This analysis presents descriptive statistics, including sample size (N), minimum and maximum values, mean, standard deviation, skewness, and kurtosis for each variable. Skewness and kurtosis values indicate that the data is normally distributed.

Table 2: . Descriptive Analysis

	N	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis
CGPAM	274	1.17	4.67	3.2105	0.85098	-0.443	-0.817
IIFM	274	1.25	4.75	3.24	1.13818	-0.499	-1.364
SHM	274	1.17	4.5	3.1776	0.80272	-0.315	-0.922
FSM	274	1.2	4.8	3.2723	0.95536	-0.402	-0.955
PEM	274	1.2	4.6	3.2759	0.70877	-0.374	-0.289
Valid N (listwise)	274						

Correlation Analysis

This analysis examined the relationships between CGPAM and several independent variables. Results indicated a strong positive correlation with SHM (88.3%), a high positive correlation with IIF (59.1%), a moderate positive correlation with FSM (33.5%), and a weak positive correlation with PEM (7.5%).

Table 3: . Correlation Analysis

	CGPAM	IIFM	SHM	FSM	PEM
CGPAM	1	.591**	.883**	.335**	0.075
IIFM	.591**	1	.423**	.250**	0.074
SHM	.883**	.423**	1	.309**	0.07
FSM	.335**	.250**	.309**	1	.200**
PEM	0.075	0.074	0.07	.200**	1

Regression Analysis

Institutional infrastructure significantly predicted CGPA, accounting for 44.2% of the variance (t = 12.095). SHM is a strong predictor of CGPA, accounting for 93.6% of the variance (t = 30.961). FSM significantly predicted CGPA, accounting for 29.8% of the variance (t = 5.862). PEM significantly predicts CGPA (t = 14.847). Study hours significantly predicted institutional infrastructure, accounting for 59.9% of the variance (t = 7.690). Financial status significantly predicted institutional infrastructure, accounting for 29.8% of the variance (t = 4.267). Parents' education significantly predicts institutional infrastructure (t = 79.182).

Table 4: . Regression Analysis

H_o	IV	DV	β	R^2	f	t	Sig	Status
H_1	IIFM	CGPA	0.442	0.35	146.283	12.095	0	Rejected
H_2	SHM	CGPA	0.936	0.779	958.57	30.961	0	Rejected
H_3	FSM	CGPA	0.298	0.112	34.364	5.862	0	Rejected
H_4	PEM	CGPA	0.514	0.448	220.424	14.847	0	Rejected
H_5	SHM	IIF	0.599	0.179	59.136	7.69	0	Rejected
H_6	FSM	IIF	0.298	0.063	18.204	4.267	0	Rejected
H_7	PEM	IIF	1.006	0.958	6269.741	79.182	0	Rejected

IIFM: Institutional Infrastructure Major, SHM: Study Hours Major, CGPA: Cumulative Grade Point Average, FSM: Financial Status Major, PEM: Parents' Education Major

Mediation Analysis

This study employed Andrew F. Hayes' Model 4 to examine the direct and indirect effects of independent variables on CGPA with IIF as a mediating variable. According to the mediation analysis, the direct relationship of determinants of CGPA is 64.23%. The indirect effect of determinants of CGPA is 20.02%. The t-value is 9.4934, which ensures the variable model fitness. The significance value is .000, which means that the relationship is significant. The results showed that full mediation exists in the relationship between CGPA and the determinants of CGPA, with IIF as a mediating Variable.

Table 5: . Direct Effect of X on Y

Effect	SE	t	Sig	LLCI	ULCI
0.6423	0.0677	9.4934	0	0.5091	0.7755

Table 6: . Indirect Effect of X on Y

	Effect	Boot SE	Boot LLCI	Boot ULCI
IIFM	0.2001	0.0442	0.1164	0.2889

IMPLICATIONS

This study offers key managerial implications. The research model, grounded in theory and validated by both the literature review and data analysis, illustrates the relationships between CGPA (dependent variable), institutional infrastructure (mediating variable), study hours, financial status, and parents' education (independent variables).

These findings, consistent with the analysis, provide actionable insights for educational administrators, such as an increase in study hours.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

A limitation of the current study is that the sample population was selected from one university. Moreover, there are several determinants that influence the CGPA of students, but the current study utilizes only three of them. Therefore, further research needs to be conducted utilizing some of the determinants, such as curriculum design, teaching method, learning style, English fluency, and so on, that were left out in this research study.

CONCLUSION

This research confirms a strong positive correlation between CGPA and study hours, free from multicollinearity. Increased study hours directly lead to improved academic success. Consequently, students who dedicate more quality time to studying will likely achieve higher CGPAs, which are crucial for career prospects in today's competitive job market.

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