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Impact of internet connectivity speed on academic productivity of Students: A Mixed-method study

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Abstract:

This research examines the influence of internet connectivity speed on the academic productivity of students in a digital learning environment. With the growing dependence on online platforms, internet quality has become a key factor affecting student performance. The study uses a mixed-method approach by combining quantitative data such as internet speed and academic indicators with qualitative responses collected through surveys.

The findings suggest that students with high-speed and stable internet connections show improved academic performance, better engagement, and higher assignment completion rates. In contrast, slow or unstable internet leads to interruptions, reduced participation, and increased stress. The study highlights the importance of reliable internet infrastructure in ensuring equal academic opportunities.

Keywords — Internet Speed, Academic Productivity, Digital Learning, Connectivity, Online Education

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I. INTRODUCTION

In the modern education system, internet connectivity has become an essential component of learning. Students rely heavily on digital platforms for attending lectures, accessing study materials, and submitting assignments. Therefore, internet speed plays a significant role in determining academic efficiency.

The COVID-19 pandemic accelerated the shift toward online education, making internet access a necessity rather than a luxury. However, not all students have equal access to high-speed internet, leading to disparities in academic performance. This digital divide continues to affect students, particularly those in rural and underdeveloped areas.

This study aims to analyze how internet speed influences academic productivity and to identify challenges faced by students due to connectivity issues.

II. LITERATURE REVIEW

Previous research highlights the importance of internet connectivity in education. Ali et al. [1] found that poor connectivity reduces student

engagement. Kumar and Sharma [2] emphasized the digital divide.

Rahman et al. [3] established a strong correlation between internet speed and academic performance. Singh and Gupta [4] observed negative effects of unstable internet on online exams.

Johnson and Lee [5] highlighted the role of high-speed internet in collaborative learning. Patel and Reddy [6] confirmed that increased bandwidth improves productivity. Mehta and Roy [8] found that poor connectivity increases stress levels.

Recent studies also show that technological advancements such as 5G can enhance learning experiences, though accessibility remains a challenge.

III. METHODOLOGY

This study follows a mixed-method research design.

1) Quantitative Data

- Survey conducted among 200 students
- Data collected: internet speed, GPA, assignment completion

2) Qualitative Data

- Interviews conducted with selected students
- Focus on challenges and experiences

3) Tools Used

- Google Forms
- Statistical analysis

IV. RESULTS AND DISCUSSION

Table I: Internet Speed vs Academic Productivity

Speed (Mbps)	Students	GPA	Completion (%)	Participation (%)
<10	45	6.5	60%	55%
10–30	85	7.2	72%	68%
30–50	40	7.8	82%	75%
>50	30	8.4	90%	88%

Table II: Connectivity Issues

Issue	Percentage
Buffering	72%
Slow Download	65%
Disconnection	48%
Upload Failure	38%

Table III: Correlation

Variable	Value
Speed vs GPA	0.68
Speed vs Participation	0.72
Speed vs Completion	0.70

Table IV: Student Opinion

Response Category	Frequency	Percentage
Strongly Agree	60	30%
Agree	85	42.5%
Neutral	20	10%
Disagree	25	12.5%
Strongly Disagree	10	5%

Table V: Participation Impact

Response Category	Frequency	Percentage
Strongly Agree	70	35%
Agree	90	45%
Neutral	15	7.5%
Disagree	15	7.5%
Strongly Disagree	10	5%

V. THEORETICAL FRAMEWORK

This study is based on Connectivism, which explains that learning occurs through digital networks. Faster internet allows students to access resources quickly, enhancing learning efficiency.

VI. LIMITATIONS

- Limited sample size
- Self-reported data
- Device quality not considered

VII. FUTURE SCOPE

Future research can explore device impact, digital literacy, and long-term performance.

VIII. CONCLUSION

The study confirms that internet speed significantly affects academic productivity. Improving digital infrastructure is necessary to reduce the digital divide and support student success.

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