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Impact of Digital Learning Platforms on Academic Performance Across Technical and Non-Technical Disciplines

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Abstract
This study examines the impact of digital learning platforms on academic outcomes in technical and non-technical fields within Indian higher education. It evaluates student perceptions, content relevance, and the influence of platforms like SWAYAM, Coursera, and BYJU'S on study habits and performance.
Using a structured questionnaire, data was gathered from diverse students to assess platform accessibility, usage, and academic impact. Findings show technical students prefer skill-based content, while non-technical students favour structured, theory-oriented material. Most reported better subject understanding, increased motivation, and improved academic scores.

Keywords: Online learning Platforms, academic performance, learning outcomes, technical education, and non-technical disciplines.

Introduction:

The rise of digital technologies has reshaped higher education, enabling flexible, interactive learning through tools like LMSs, MOOCs, and virtual classrooms. Technical fields benefit from platforms offering virtual labs and simulators, while non-technical fields use digital libraries and forums to enhance analysis and collaboration.
Despite widespread use, the impact of these tools on academic performance varies by discipline. This study examines how digital platforms influence student outcomes in technical and non-technical programs, aiming to guide more effective, discipline-specific integration.

Statement of the Problem

Despite the growing popularity of digital learning platforms, students often report mixed outcomes regarding their academic benefits. Some find them helpful for enhancing subject understanding, while others face challenges like lack of interactivity, technical issues, or irrelevant content. Furthermore, there is a lack of comparative insights on how students from technical and non-technical disciplines utilize these tools and how it affects their academic performance, leading to uncertainty about their effectiveness in different fields.

Objectives of the Study:

1. To find out how digital learning platforms affect student grades in technical courses.

2. To see how digital learning platforms impact grades in non-technical courses.
3. To compare how students in technical and non-technical fields use digital platforms.
4. To find any challenges faced by students in using digital platforms for both types of disciplines.

Scope and limitations of the study:

This study is limited to students who are pursuing technical (e.g., engineering, IT) or non-technical (e.g., commerce, arts, business) degrees. This Study focuses on the student's interaction and perception of digital platforms in relation to their academic performance, engagement levels, and learning efficiency. The scope excludes educators and administrative perspectives.

Review of Literature

1. **The Impact of Digital Tools on Higher Education (Rafiq et al., 2024):** Digital tools enhance student engagement and academic outcomes, but challenges like poor internet, rural tech gaps, and untrained faculty limit their effectiveness. The study recommends infrastructure upgrades and faculty training.
2. **Effectiveness of Digital Platforms in Education (Brugliera, 2024):** Academic performance improves with user-friendly platforms, customizable content, and active teacher presence. Support systems like tech assistance and adaptive structures are essential for success.
3. **Digital Tools and Student Performance: Makerere University Case (Wilbrod, 2025)**: Students using simulations, e-books, and forums showed better academic performance. The study calls for integrating digital literacy into curricula and education policy.
4. **Digital Technologies in Education: A Global Review (Haleem et al., 2022):** Digital technologies improve access and personalization but face implementation issues in developing countries due to weak policies, digital inequity, and poor monitoring.

Research Gap:

Most studies focus on the implementation of digital learning platforms from an institutional or faculty viewpoint. However, very few have explored how students, especially across different disciplines, interact with these platforms, what challenges they face, and whether these platforms improve their academic outcomes. This study attempts to fill this gap by analyzing platform impact purely from the students' perspective.

Research methodology

Research Design: Descriptive and Analytical Research

The study describes the use of digital learning platforms among students and analytically evaluates their impact on academic performance, distinguishing between technical (e.g., engineering, IT) and non-technical (e.g., arts, commerce) disciplines. Quantitative Inputs is collected through structured questionnaires to analyse and compare trends between the two disciplines. Qualitative Inputs is collected to understand subjective experiences or opinions on platform effectiveness.

Population and sample:

The study focuses on students enrolled in technical and non-technical degree programs, with a sample size of 100 participants and among all 92 responded for analysis.

Data Collection Methods:

- **Primary Data**: Collected from both Technical and Non- Technical Students through structured questionnaires and Google Forms circulated among students.
- **Secondary Data**: Sourced from academic journals, platform usage reports, case studies, and educational reports published by organizations like NITI Aayog, and UNESCO.

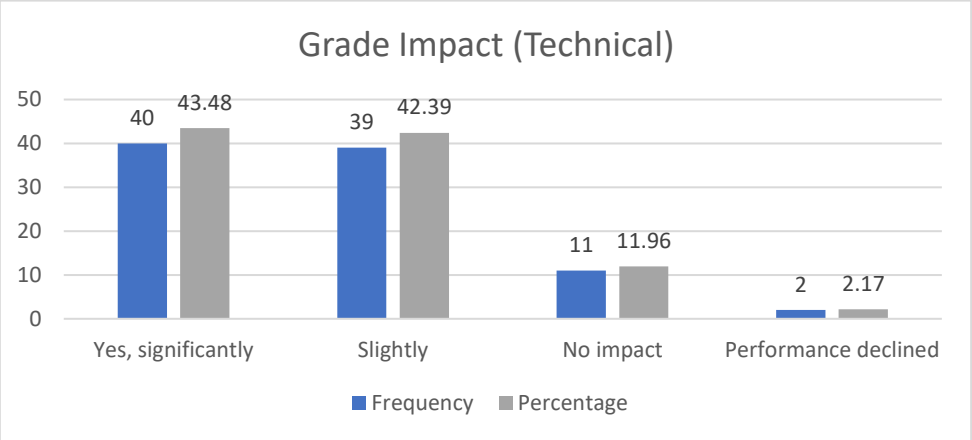
Data Analysis Techniques:

1. **Data Visualization Tools:** Microsoft Excel, percentages are employed to create graphs, charts, and dashboards that visually represent findings, making it easier to interpret data patterns.
2. **Statistical Techniques:** Techniques such as **Chi-square tests** is applied.

Data Analysis & Interpretation

1. **Have digital platforms helped improve your grades in technical subjects?**

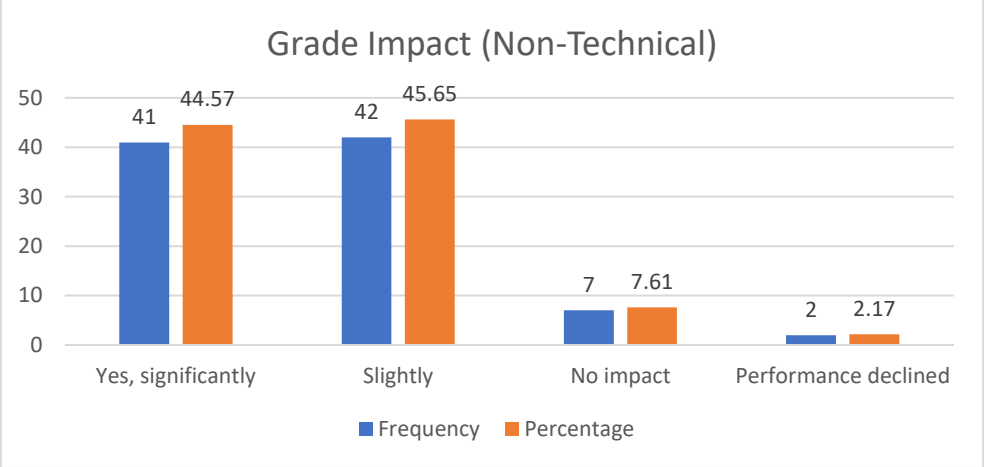
Grade Impact (Technical)	Frequency	Percentage
Yes, significantly	40	43.48
Slightly	39	42.39
No impact	11	11.96
Performance declined	2	2.17
Total	**92**	**100**



Interpretation: A total of 85.87% saw improvements (significantly or slightly). Only 11.96% noticed no impact, and 2.17% reported a decline.

2. **Have digital platforms helped improve your grades in non-technical subjects?**

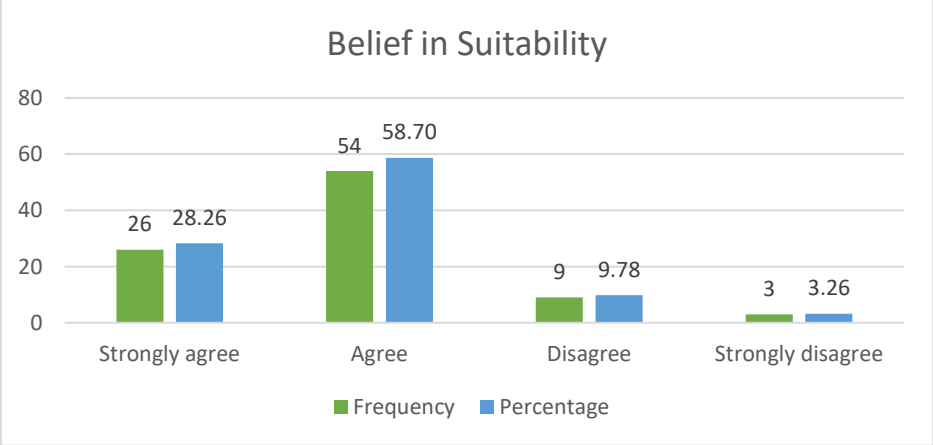
Grade Impact (Non-Technical)	Frequency	Percentage
Yes, significantly	41	44.57
Slightly	42	45.65
No impact	7	7.61
Performance declined	2	2.17
Total	**92**	**100**



Interpretation: Similar trend as technical: 90.22% saw improvements, while 7.61% saw no impact, and 2.17% observed a decline.

3. **Do you believe digital platforms are equally suitable for both technical and non-technical subjects?**

Belief in Suitability	Frequency	Percentage
Strongly agree	26	28.26
Agree	54	58.7
Disagree	9	9.78
Strongly disagree	3	3.26
Total	**92**	**100**

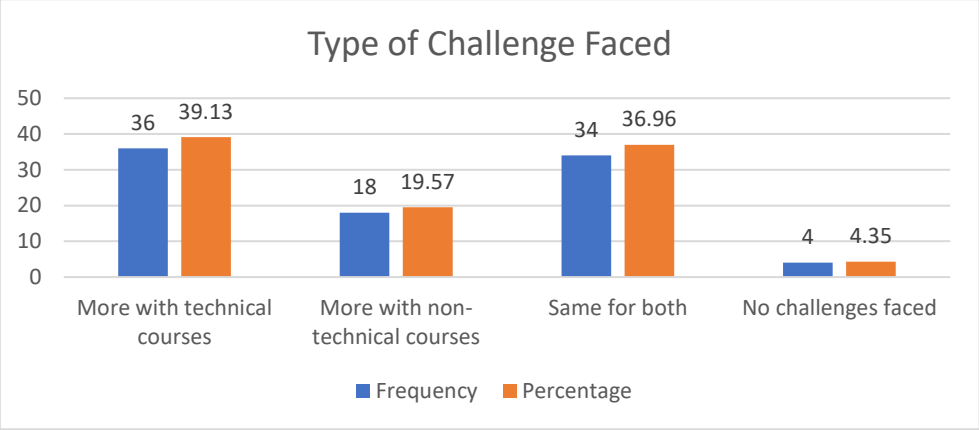


Interpretation: Most respondents agreed (58.7%) or strongly agreed (28.26%) that digital platforms suit both streams. Only 13.04% disagreed or strongly disagreed.

4. **Do the challenges you face differ depending on whether the course is technical or non-technical?**

Type of Challenge Faced	Frequency	Percentage
More with technical courses	36	39.13
More with non-technical courses	18	19.57
Same for both	34	36.96
No challenges faced	4	4.35

Total	92	100



Interpretation: 39.13% face more challenges with technical subjects, 36.96% feel challenges are the same, and 19.57% with non-technical. A small 4.35% face no challenges.

Chi-Square Calculation

Hypotheses:

H01- There is no significant difference in the usage of digital learning platforms between students in Technical and non-technical disciplines.

H11- There is a significant difference in the usage of digital learning platforms between students in technical and non-technical disciplines.

Converting the Data as a 2×2 Table:

- Positive Belief: "Strongly agree" + "Agree"
- Negative Belief: "Disagree" + "Strongly disagree"

1. **Do you believe digital platforms are equally suitable for both technical and non-technical subjects?**

Belief in Suitability	Frequency	Percentage
Strongly agree	26	28.26
Agree	54	58.7
Disagree	9	9.78
Strongly disagree	3	3.26
Total	**92**	**100**

Belief Category	Frequency
Positive (SA + A)	**26 + 54 = 80**
Negative (D + SD)	**9 + 3 = 12**
Total	**92**

2. Which stream are you currently studying in?

Stream	Frequency	Percentage
Technical	33	35.87
Non-Technical	44	47.83
Both	14	15.22
Not sure	1	1.09
Total	92	100

- Technical = 33
- Non-Technical = 44
- Total considered = 77 students

Proportionally Distribute Responses

Positive Responses (80 out of 92)

- Technical: 33/77×80≈34.29
- Non-Technical: 44/77×80≈45.71

Negative Responses (12 out of 92)

- Technical: 33/77×12≈5.14
- Non-Technical: 44/77×12≈6.86

Now round of:

Stream	Positive	Negative	Total
Technical	34	5	39
Non-Technical	46	7	53
Total	80	12	92

The chi-square statistic is 0.003. The *p*-value is .956559. *Not* significant at $p < .05$.

The chi-square statistic with Yates correction is 0.0669. The *p*-value is .795832. *Not* significant at $p < .05$.

	positive	Negative	*Marginal Row Totals*
Technical	34 (33.91) [0]	5 (5.09) [0]	39
Non-Technical	46 (46.09) [0]	7 (6.91) [0]	53
Marginal Column Totals	80	12	92 (Grand Total)

Results & Findings

Major Findings:

1. A total of 85.87% saw improvements (significantly or slightly). Only 11.96% noticed no impact, and 2.17% reported a decline.
2. Similar trend as technical: 90.22% saw improvements, while 7.61% saw no impact, and 2.17% observed a decline.

3. Most respondents agreed (58.7%) or strongly agreed (28.26%) that digital platforms suit both streams. Only 13.04% disagreed or strongly disagreed.
4. 39.13% face more challenges with technical subjects, 36.96% feel challenges are the same, and 19.57% with non-technical. A small 4.35% face no challenges.

Statistical Results:

Based on the chi-square test results, there is **no statistically significant association** between the type of stream (technical or non-technical) and the nature of challenges (positive or negative) faced while using digital learning platforms. The p-values, both with and without Yates correction **(0.956559 and 0.795832 respectively)**, are much greater than the standard significance level of 0.05. **Therefore, we fail to reject the null hypothesis (H_{02})** and conclude that students from technical and non-technical disciplines face **similar levels of challenges**, indicating that the type of stream does not significantly influence the challenges experienced with digital learning platforms.

Discussion

Interpretation of Results:

The survey reflects a clear transition in higher education toward digital learning, especially among young, tech-savvy postgraduate students. The strong preference for blended and online modes highlights evolving learning expectations in the post-pandemic context. Participation is highest from private institutions, indicating greater digital adoption, while government institutions lag due to infrastructural limitations.

Digital platforms such as Coursera, YouTube, and learning management systems are widely used and are associated with improved academic performance and learner motivation. The majority of students report content effectiveness, ease of use, and increased engagement, reinforcing the role of digital tools as essential components of education. However, challenges in technical subjects and occasional feedback delays point to areas needing attention. Overall, the findings affirm the normalization of digital learning and its growing impact on India's higher education landscape.

Limitations of the study:

1. **Limited Number of Participants:** The study involved only 92 students, so the results might not fully represent students from all colleges or regions.
2. **Opinion-Based Responses:** Findings are based on what students reported, which could be influenced by personal views or misjudgments.
3. **More Private Institution Responses:** Most participants were from private colleges, which may not reflect the experiences of students from government or deemed institutions.

Conclusion

Summary of key findings:

The study, comprising 92 respondents, reveals a predominantly young adult demographic, with the majority aged between 21–25 years and pursuing postgraduate education. Most respondents are affiliated with private institutions and represent both technical and non-technical academic streams, indicating a diverse educational background. Digital learning platforms are widely adopted, with the majority using them on a weekly or daily basis. Blended learning is the most preferred mode of instruction, followed by traditional and fully digital methods. Among digital tools, Coursera, EdX, LinkedIn Learning, and

YouTube emerged as the most utilized platforms, while college-specific LMS systems had lower usage. A significant proportion of respondents reported improvements in academic performance both in technical and non-technical subjects after using digital platforms. The content was largely rated as good or excellent, and the platforms were appreciated for enhancing practical exposure and learner engagement.

Key motivators for using digital platforms included flexible learning schedules, clearer explanations, and engaging visual content. Despite some challenges, particularly in technical subjects, the majority rarely or only occasionally faced issues while using these tools. Overall, the findings suggest a positive perception of digital learning, with most participants expressing satisfaction and a willingness to recommend these platforms for both academic streams.

Conclusion:

The study confirms that digital learning is now a key part of higher education, especially among young postgraduate students. Blended and online modes are widely preferred, driven by accessibility and effectiveness. Private institutions lead in adoption, highlighting a digital gap across sectors.

Platforms like Coursera and YouTube support improved academic outcomes and engagement, though technical challenges and feedback delays remain. Overall, digital platforms are well-accepted and increasingly essential in modern Indian education.

Suggestions for future research:

1. **Larger and More Diverse Sample**: Future studies should include a wider range of students from different regions, institutions (private, government, and deemed), and academic levels to improve the accuracy and generalizability of the findings.
2. **Longitudinal Study**: Conducting research over a longer period can help understand the long-term impact of digital learning platforms on academic performance.
3. **Platform-Specific Analysis**: Future research can compare the effectiveness of different digital platforms (e .g., Coursera vs. YouTube vs. College LMS) to identify which tools work best for various subjects.

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