Role of Student Engagement and Digital Maturity in Academic Performance of School Students

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ABSTRACT

With the rapid use of digital tools and emergence of the technology in education, students' academic growth is directly linked to a more careful use of these tools and technology. This paper attempts to examine the relationships between digital maturity, student engagement, and academic performance among school students. With the help of Purposive sampling in the urban areas, including Jhansi and Gwalior, the 70 female and 30 male participants were chosen. The questionnaires used are Digital Maturity Inventory (Laaber and Florack, 2023), Academic Performance Scale (McGregory et al., 2015), and Student Engagement Instrument (Appleton et al., 2006). The results indicate that digital maturity shows a significant relationship with student engagement and academic performance. Student engagement showed a strong correlation with academic performance. The results also showed that Male students were found to have lower levels of digital maturity compared to female student. The findings emphasise the strong role of digital maturity in improving both engagement and academic success, and they emphasise the need for targeted efforts to support male students in improving digital skills and classroom involvement.

Keywords: *Student engagement, Academic performance and Digital maturity*

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INTRODUCTION

Rapid digital transformation in education has changed how teaching and learning are conducted and highlighted how digital maturity affects academic results. Digital maturity refers to the skills and dispositions that allow people to use digital technologies in ways that promote both social integration and personal development (Laaber et al., 2023). It includes skills like critical thinking, digital literacy, and effective use of digital resources. Students are exposed to digital devices at an early age, which results in habitual use throughout all developmental stages. Although students are generally aware of Artificial Intelligence (AI) in their everyday lives, its effective integration into classroom learning with ethical concerns forming the basis for moral use of AI, devices like laptops, tablets, and smartphones give users access to a wealth of educational resources, their overuse and tendency towards addiction can divert students and make it more difficult for them to concentrate on their studies (Fazil et al., 2024).

The resources can either improve the educational experiences or if there is an improper use which is not suitable for academic growth can result in disengagement. The morals values in digital environments were moderate and lower significantly among those spending more than three hours online, indicating the need to strengthen moral values in digital environments to promote a more ethical and desirable digital behaviours (Altinsoy & Boyraz, 2024). Use of technology responsibly increase the academic performance and there is a need to strengthen students' digital maturity (Towndrow & Fareed, 2014). Laaber and Florack's (2023) Digital Maturity Inventory incorporates 10 aspects to assess a student's digital maturity (digital understanding and maturity), which are as follows:

1. Autonomous Choice to Use Mobile Devices – Using mobile devices freely,

than feeling pressured while using them.
2. Autonomy Within Digital Contexts - Making autonomous choices and setting goals, by their own personal values and interests.
3. Digital Literacy – Equipped with the technical skills to use the devices safely and effectively.
4. Individual Growth in Digital Context – Using mobile devices for one's personal growth and learning.
5. Digital Risk Awareness- Using mobile devices safely by staying alert to potential dangers and influences.
6. Support-Seeking Regarding Digital Problems – Taking help from others while facing issues in digital devices and online environment.
7. Regulation of Negative Emotions in Digital Contexts – The capability to handle and manage negative emotions while in digital contexts.
8. Regulation of Impulses in Digital Contexts – Managing and regulating one's own behaviour and holding back immediate emotional responses in digital contexts.
9. Respect Towards Others in Digital Contexts – Acting respectfully while in digital contexts towards others.
10. Digital Citizenship – Using mobile devices and digital contexts towards a meaningful civic involvement, for social, community, and environmental issues.

In the current time the educational environments, digital literacy, digital maturity, student engagement, and academic achievement have are the interconnected factors that shape learning effectiveness. Due to the integration of technology into teaching and learning the skills, awareness, and behavioural readiness must be learned by the faculty and students needed to thrive in digital spaces (Khatib, 2023). Learning and adaptation is a key component of digital maturity is the acquired capacity to adjust to shifting conditions. This idea is similar to psychological maturity, which is the process by which people learn how to react to their environment. High digital maturity organisations exhibit the ability to learn and adapt continuously, which is crucial for prospering in quickly changing digital environments (Partners, 2023). In addition to digital maturity, student engagement has consistently been linked to academic performance. Behavioral engagement was the only one of the three aspects of involvement that significantly predicted performance; emotional and cognitive engagement had no discernible impact (Çali et al., 2024). One of the most important frameworks for comprehending student growth and the effects of involvement during college is known to be Alexander Astin's theory of student involvement. Student involvement refers to the degree of physical and psychological effort that a student invests in academic activities. Actively participating in coursework, forming bonds with peers and instructors, visiting campus, and participating in student organisations are all signs of an engaged student. Astin stresses that although motivation plays a part in engagement, involvement is really a behavioural term that can be seen and quantified through actions, asserts that student achievement, especially retention, is closely related to engagement (Astin, 1984).

Academic performance demonstrates a student's involvement, commitment, and effort in their studies in addition to assessing subject mastery. Strong] academic achievement gives students a sense of satisfaction and affirmation for their efforts, and it is frequently associated with motivation and personal recognition. It also lays the groundwork for long-term success, encouraging digital maturity and raising student participation are crucial tactics for raising academic performance. It was found that behavioural engagement and emotional engagement had a significant impact on reading performance (Lee, 2013). The finding reveals that improved

access to technology indirectly enhances academic performance, but excessive social media use reduces time for academic pursuits, potentially harming achievement (Rafael & Islas, 2013).

OBJECTIVES

- To study the relationship between digital maturity, student engagement and academic performance among learners.
- To examine gender differences on the levels of digital maturity, student engagement, and academic performance among learners.

HYPOTHESIS

H_1 - There is a significant relationship between digital maturity and student engagement.

H_2 - There is a significant relationship between digital maturity and academic performance.

H_3-There is a significant relationship between student engagement and academic performance.

H_4 - There is a significant difference between male and female learners on the levels of digital maturity.

H_5 - There is a significant difference between male and female learners on the levels of student engagement.

H_6 - There is a significant difference between male and female learners on the levels of academic performance.

TOOLS

The following scales were employed in this study:

1. The Digital Maturity Inventory (Laaber & Florack, 2023).
2. Academic Performance Scale (McGregory et al., 2015).
3. Student Engagement Instrument (Appleton et al., 2006).

SAMPLE

The sample of 100 students was taken, they aged between 15 to 18 years, comprising 70 females and 30 males with the help of Purposive sampling in the urban areas, including Jhansi and Gwalior. Participants were selected using both online and offline modes from urban locations. Participants were individually approached to confirm their willingness to complete the questionnaire. All personal information was kept strictly confidential to ensure privacy. The participants who were not engaged in formal schooling were excluded. The students not from the targeted geographic area were excluded. Participants who were less than 15 or older than 18 were excluded.

PROCEDURE

Participants were first asked whether they wished to participate in the study. Only those who agreed voluntarily were provided with the questionnaire. All participants were clearly instructed about the questionnaire and informed that all information would be kept with the utmost confidentiality. The study followed a quantitative research approach, and data were collected using the purposive sampling method.

RESULT AND DISCUSSION

RESULT

In the present study, data were collected from school-going students, including both male and female participants, by administering the Digital Maturity Inventory, Academic Performance Scale, and Student Engagement Instrument. The data were collected and their statistical characteristics were described.

Table 1: Descriptive Statistics of Digital Maturity, Academic Performance, and Student Engagement among students

Variable	N	Min	Max	Mean	SD
Digital Maturity	100	80	148	116.66	16.54
Academic performance	100	20	40	31.05	5.10
Student engagement	100	78	175	136.27	18.77

The data from 100 participants' mean digital maturity score, as determined by the

descriptive statistics, was 116.6 (SD = 16.54), scores ranged from 80 to 148, suggesting a typically high degree of digital competency. With a mean academic performance score of 31.05 (SD = 5.10), scores ranged from 20 to 40**,** students demonstrated a moderate and comparatively stable level of academic performance. Furthermore, students were extremely involved, although there was noticeable diversity in their involvement levels, as indicated by the mean student engagement score of 136.27 (SD = 18.77), scores ranged from 78 to 175.

Table 2: Correlation between Digital Maturity, Academic Performance, and Student Engagement among students

Variable	Academic Performance	Student Engagement
Digital Maturity	0.26**	0.43**
Academic Performance		0.51**

** significant at 0.01 level

In this study, Pearson correlation analysis revealed a statistically significant positive relationship among all three variables. In particular, there was a greater link between digital maturity and student engagement (r =.43, p <.001) and a significant positive correlation with academic performance (r =.26, p =.010). According to this, students who are more digitally mature typically do better academically and are more involved in their studies. In addition, a positive correlation was found between students' academic performance and student engagement (r =.51, p <.001), indicating that students who participate more in academic activities tend to perform better academically.

H1 is accepted as there is a significant relationship between digital maturity and student engagement (r = .43, p < .001). H2 is accepted due to the significant correlation digital maturity and academic performance (r = .51, p < .001). H3 is also accepted, because a significant correlation was found between student engagement and academic performance (r = .26, p = .010).

Table 3: t-values for Digital Maturity, Academic Performance and Student Engagement for both male and female students.

Variable Compared	Group	N	Mean	SD	Std. error	t - value
Digital Maturity	Male Female	30 70	108.80 119.94	16.26 15.62	2.969 1.867	3.23*
Academic performance	Male Female	30 70	30.40 31.30	5.38 4.99	0.982 0.597	0.88
Student engagement	Male Female	30 70	130.30 138.80	18.66 18.35	3.407 2.193	2.13*

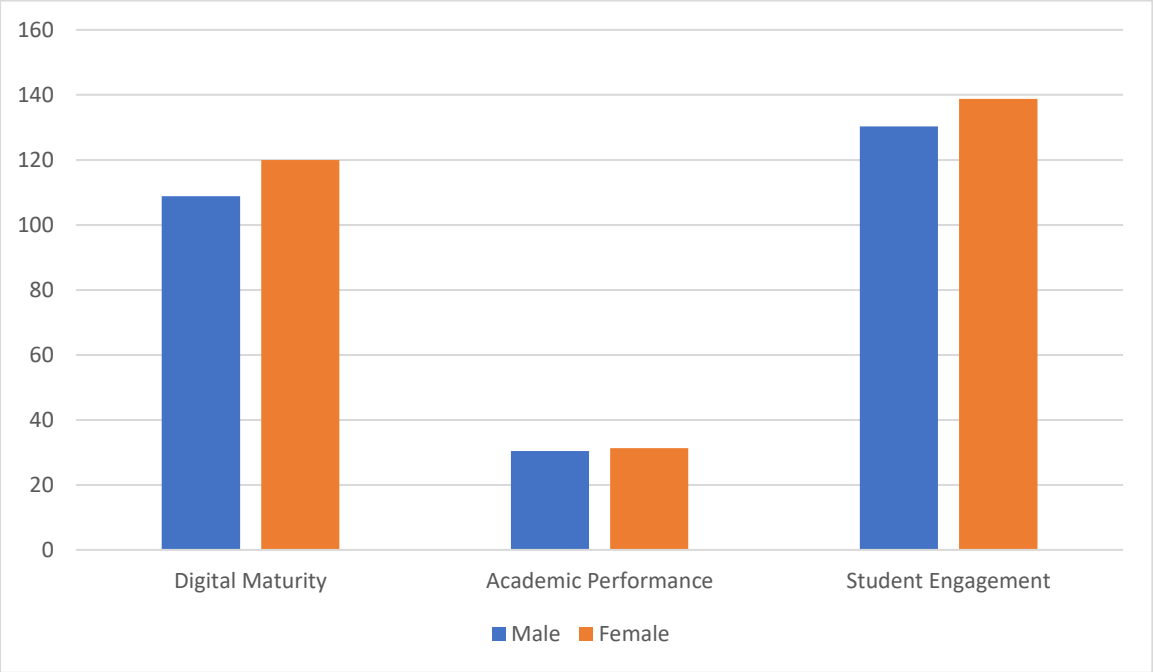
*significant at *0.05* level*

Table-3 shows t-value for Digital maturity, academic performance and student engagement between male and female students. The findings showed significant differences in digital maturity between male and female students. Female students (M = 119.94, SD = 15.62) had higher digital maturity scores than male students (M = 108.80, SD = 16.26), with a t-value of 3.23. This implies that female students might possess a higher level of digital maturity than male students. For academic performance, the t-value for male and female students (0.88), which does not indicate a significant difference, suggests that there is no significant difference in academic performance between male and female students. However, a slight difference is observed in the mean values of academic performance between male (M =

30.40, SD = 5.38) and female (M = 31.30, SD = 4.99) students. This suggests that the genders' levels of academic success were comparable. The results indicated a substantial difference in student participation, with female students scoring higher than male students (M = 130.30, SD = 18.66) (M = 138.80, SD = 18.35). The t-value was 2.13, suggesting that female students were more engaged than male students. These findings show that H4 was accepted, that significant difference was found in the level of digital maturity between male and female students. Similarly, H5 is accepted as there is a significant difference between male and female learners on the levels of student engagement. However, H6 was rejected because the t-value indicates that there is no significant difference between male and female students at the level of academic performance, even though females had slightly higher average scores.

The current study sought to investigate the relationship among 15–18-year-old teenagers between digital maturity, academic performance, and student engagement. In particular, Females in the research may have superior digital competencies as seen by the considerably higher digital maturity scores of female students (M = 119.94, SD = 15.62) compared to male students (M = 108.80, SD = 16.26). This is consistent with current trends that indicate female students have higher levels of digital maturity and accountability, maybe as a result of their increased use of digital platforms in the classroom. The results show that no gender difference was found in the scores of academic performances.

Graph I: Mean Scores of Digital Maturity, Academic Performance and Student Engagement Based on Genders



Graph I shows the mean scores between male and female students among three variables digital maturity, academic performance, and student engagement. It clearly shows that female students scored higher than male students in both digital maturity and student engagement. In terms of academic performance both genders, with female students demonstrating a slight superiority.

The relationship between the main variables of the study was analysed by the Pearson correlation analysis. Where digital maturity had a satisfactory correlation with

academic performance and a strong correlation with student engagement. This suggests that students who are more digitally literate are typically more involved and perform better academically. Additionally, a significant positive association has been identified between academic performance and student engagement, underscoring the critical role that engagement plays in students' performance in school.

The findings showed the similarity with the past studies that were conducted by Lee (2013) and Çali et al. (2024) that engagement has a strong association with academic performance. The study by Altinsoy and Boyraz (2024) indicates that there is a need for giving stress on raising digital maturity as digital awareness is moderate in the digital spaces, it not only refers on technical capability but also to the ethical values in the environment.

CONCLUSION

The findings of the paper show the interrelationships among digital maturity, student engagement, and academic performance. The results indicate that three hypotheses were supported. Both student engagement and academic performance were found to be significantly and positively connected with digital maturity, suggesting that students who have greater levels of technical competence and adaptability are more likely to engage actively in their education and achieve better academic outcomes. The findings of the independent samples t-tests show significant gender disparities as female students showed a considerably better level of digital maturity. The academic performance scores difference was not statistically significant. This implies that academic performance is comparable for both genders. Female students demonstrated higher levels of involvement than male students. The results indicate that female students typically have better levels of digital maturity and higher levels of involvement in class activities. Overall, the research emphasizes how crucial it is to promote digital literacy and teach children how to utilize technology in an ethical and efficient manner in order to help them succeed academically. The findings could help educational policymakers create frameworks for student participation and gender-responsive digital education strategies to develop curriculum and policy. The study underlies the need to prioritise digital maturity for both the educators' and students' knowledge of digital maturity.

The study only included the participants from urban areas, and the sample only included students aged 15 to 18, with no representation from semi-urban or rural locations. Additionally, the study conducted on a group of 100 students, with a significant gender disproportion, of 70 females and only 30 males.

Future research could focus more gender-balanced sample and a larger sample that would improve the generalizability and reliability of the findings. Additionally, conducting a longitudinal study would help observe changes in digital maturity, engagement, and academic performance, allowing researchers to identify possible cause-and-effect relationships.

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