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MOBILE PHONE LEARNING AND ACADEMIC PERFORMANCE: EXAMINING GENDER AS MODERATING FACTOR

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Abstract

Background: Mobile learning has emerged as a transformative tool in education, offering flexibility and accessibility for students. However, its role in enhancing academic performance remains underexplored, particularly in the context of gender dynamics. This study investigates the relationship between mobile learning, academic performance, and the moderating influence of gender, providing insights for leveraging mobile technologies in educational settings. **Methods:** This research employed a quantitative research approach using a cross-sectional survey to collect quantitative data from 156 students across three faculties at Shanker Dev Campus. A structured questionnaire measured mobile learning, academic performance, and gender. Data analysis was performed using SPSS, incorporating inferential statistical tools to analysis.

Results: The analysis revealed a significant positive correlation between mobile learning and academic performance. Regression results demonstrated that mobile learning accounts for 40.2% of the variance in academic performance, highlighting its substantial impact. Gender had a small yet significant independent effect on academic performance. However, moderation analysis indicated that gender does not significantly alter the relationship between mobile learning and academic outcomes. **Conclusion:** The

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findings underscore the effectiveness of mobile learning in improving academic performance, with gender differences playing a minimal role in this relationship. Integrating mobile learning into educational strategies can benefit students across diverse demographics. **Novelty:** This study uniquely explores gender's moderating role in mobile learning's impact on academic performance, offering new perspectives on equity and inclusivity in technology-driven education.

Keywords: Academic, Gender, Learning, Mobile, Performance

INTRODUCTION

It is impossible to overlook the fact that today's world is highly technological and constantly evolving. Technological progress has a significant influence on individuals' lives and the activities they engage in. Mobile phones, especially smartphones, have become widespread, and people commonly use them throughout the day in various settings, including walking on the street, on public transport, at home, or even in the classroom or workplace. These devices hold the potential to offer new educational experiences, with various advantages discussed globally for using mobile phones in education (Grimus, 2014). In Spain, for instance, 96% of the population uses smartphones to access the internet (Cachón-Zagalaz, Sanabrias-Moreno, Sánchez-Zafra, Zagalaz-Sánchez, & Lara-Sánchez, 2020). The high addiction levels to smartphones indicate their influence on students' academic performance (Kumar, Gupta, & Jaiswal, 2024), raising concerns about whether their use enhances or hinders students' overall performance. The impact of smartphones on academic outcomes or student learning is complex, as despite the remarkable benefits of mobile technology for education, it can also be considered a double-edged sword. Certain applications, such as WhatsApp, Facebook, and games, have a detrimental effect on students in Tanzania at all levels due to their addictive nature (Kibona & Mgaya, 2015). In response to the COVID-19 pandemic, schools and colleges were mandated by the government to switch to alternative modes of teaching rather than relying on physical instruction.

Smartphone use among university students is rapidly increasing (Ben, MiddletunAndrew, & Anne, 2012) and has become an essential part of daily and academic life. Observations show smartphones are used frequently across campus, even in classrooms (Hossain, 2019). Most previous research has focused on the direct impact of smartphone use on academic performance, with several studies exploring gender as a moderating factor in mobile

learning's influence. For example, the study " The Impact of Gender in Shaping the Factors Influencing the Intention to Adopt Mobile Learning found that gender significantly influences how factors like effort expectancy, performance expectancy, and social influence affect students' intention to adopt mobile learning (Izkair & Lakulu, 2023). Similarly, Ahmed et al. (2020) examined the effect of smartphone usage on the academic performance of university students in Pakistan.

Research into "The Impact of Mobile Phones on Focus and Educational Outcomes" suggests that limiting technology use during class lectures can significantly improve academic performance (Kuznekoff & Titsworth, 2013). Another study analyzes how often undergraduates use their smartphones for social interactions, sharing videos, and pictures within a blended learning class context (Evans, Hopper, Junes, & Knezek, 2013).

While students increasingly rely on smartphones for educational purposes, managing their schedules, and engaging in collaborative learning, the debate over their impact on academic performance continues. A study by Ng, Hassan, Nor, and Malek (2017) on "The Connection Between Smartphone Usage and Academic Achievement" examined how Malaysian university students use smartphones for school-related tasks and its correlation with their CGPA. The quantitative study showed that although smartphones were used for educational purposes, a significant yet weak inverse correlation indicated that smartphone use negatively affects academic performance despite supporting educational activities.

Mobile phones are essential tools in modern learning, offering students access to online resources, course materials, and digital interactions (Wedikandage & Zahir, 2024). Their study on the link between mobile phone usage and academic performance in secondary school students revealed a positive correlation between mobile phone use and academic success. However, no notable connection was found between parental occupation and students' academic outcomes related to mobile phone usage, underscoring the complex influence of mobile phones on academic performance and supporting the continued integration of technology in education.

Mobile learning has gained momentum, and higher education institutions are beginning to adopt mobile technology to meet student demands. Despite this, limited research has explored the factors that influence the adoption of mobile learning management systems (LMSs) and their impact on academic performance (Han & Shin, 2016). A study on the use of mobile LMSs demonstrated a positive effect on online students' academic achievement.

Pramana's (2018) research investigated the factors influencing university students' intentions to adopt mobile learning for academic activities. The study expanded the theoretical understanding of mobile learning adoption, offering practical guidance to university leaders for implementing mobile learning systems. It particularly explored the moderating effects of gender and mobile learning experience, revealing that perceived enjoyment and usefulness are key factors in adoption. Additionally, the study found that gender affects the direct relationship between learning autonomy and behavioral intention.

In his research on "The Link between Smartphone Usage, Addiction, Academic Performance, and Gender's Moderating Influence," Nayak (2018) examined how smartphone addiction affects academic performance, noting gender-based differences. The study found that female students had a higher usage rate, but smartphone addiction did not negatively impact their academic outcomes. In contrast, male students showed signs of neglecting their academic work and experiencing anxiety due to addiction.

The study "Gender Disparities in Mobile Phone Usage for Language Learning, Attitudes, and Academic Performance " compared male and female students' perceptions of mobile phones as language learning tools. The results indicated no significant difference between genders regarding their attitudes toward mobile phone use for language learning or their learning performance (Hilao & Wichadee, 2017).

Studying how mobile phone learning (MPL) affects academic performance with gender as a moderating variable in Nepal is crucial due to the country's rapid adoption of mobile technology and persistent gender disparities in education. Nepal's cultural context influences how MPL is utilized and perceived differently by males and females, impacting their educational outcomes. By exploring these dynamics, this research can provide insights into enhancing educational equity and effectiveness through tailored interventions and policies. Ultimately, this study contributes valuable knowledge to global discussions on leveraging technology for inclusive education, benefiting not only Nepal but also informing practices in similar socio-cultural contexts worldwide.

While numerous studies have investigated the impact of mobile phone on academic performance, there remains a significant research gap. This Study aims its research on the youths or students of Shanker Dev Campus as no any research have been conducted among the students of Shanker Dev Campus. To address this gap, it would be essential to carry out

research focused on gaining a deeper understanding of how mobile phone learning influences academic performance at Shanker Dev Campus.

Objective

To explore the relation between Learning Mobility influence learning efficiency and student academic performance.

To identify the effect of Gender as moderating between mobile phone learning and students' performance.

METHODS

This research aims to acquire the perceptions of students regarding mobile phone learning and to explore gender as a moderating variable between mobile phone learning and academic performance. A causal-comparative research design was used, employing a cross-sectional time horizon. The descriptive component portrays students' perceptions of mobile phone learning, while the causal-comparative aspect identifies and analyzes potential cause-and-effect relationships between mobile phone learning and academic performance. By adopting a cross-sectional approach, the research captures data at a single point in time, offering a snapshot of the current situation among students. As such, quantitative research methods were chosen for the study.

The population for this study comprised three faculties within Shanker Dev Campus: BBM, BBS, and BBA. From this population, a sample of 156 students was selected to represent the larger population, ensuring the findings could be generalized to a broader context. Data were collected via a survey method, using a structured questionnaire. SPSS software was used for data analysis, which included both descriptive and inferential statistical tools. Ethical principles were given utmost importance throughout the research process. Participation was completely voluntary, and strict measures were taken to ensure confidentiality, including anonymizing participants' identities and responses to safeguard their privacy. All necessary approvals were obtained from the relevant colleges prior to the commencement of the study, and informed consent was acquired from each participant, ensuring they comprehended the objectives and methodology of the research.

RESULTS

Table 1. Correlation Matrix

		Mobile learning
Academic Performance	Pearson's	0.634
	df	154
	p-value	<.001

The correlation matrix indicates a significant positive relationship between mobile learning and academic performance. The Pearson correlation coefficient (r=0.634) suggests a strong positive correlation, implying that as mobile learning usage increases, academic performance tends to improve. The degrees of freedom (df) is 154, and the p-value (p<0.001) indicates that the correlation is statistically significant at a very high confidence level.

Table 2. Descriptive Normality

	Mobile learning	Academic performance	Gender
N	156	156	156
Mean	3.97	3.73	2.89
Median	4.00	3.72	3.00
Standard Deviation	0.538	0.573	0.842
Skewness	-0.633	-0.362	0.102
Std.error skewness	0.194	0.194	0.194
Kurtosis	1.40	0.376	-0.305
Std. error kurtosis	0.386	0.386	0.386

The descriptive normality analysis of Likert-scale data for mobile learning, academic performance, and gender demonstrates that the values for skewness and kurtosis are well within acceptable limits (less than 5), confirming that the data distribution is approximately normal. For mobile learning, the skewness is 0.633, showing a slight concentration of responses toward higher values, while the kurtosis is 1.40, indicating a sharper peak than a normal distribution. Similarly, academic performance has a skewness of 0.362, reflecting a balanced distribution with responses leaning slightly higher, and a kurtosis of 0.376, which is

close to normal. Gender has minimal skewness (0.102) and a kurtosis of 0.305, suggesting a fairly symmetrical and flat distribution. These results affirm that the data is appropriate for parametric statistical tests and reflects the ordinal nature of Likert-scale measurements.

Table 3. Model fit measures

Model	R	R^2
1	0.634	0.402

The model fit statistics indicate a strong positive relationship between the independent and dependent variables, with a correlation coefficient (R) of 0.634. The coefficient of determination ($R^2 = 0.402$) reveals that the independent variables account for 40.2% of the variance in the dependent variable. This indicates that the model provides a reasonable fit to the data, explaining a significant portion of the variability. However, the unexplained 59.8% of the variance implies that other factors, not considered in the model, might contribute to the dependent variable.

Table 4. Moderating Effect

	Estimate	SE	Lower	Upper	Z	p
Mobile learning on Academic performance	0.6755	0.0726	0.5293	0.822	9.309	<.001
Gender on Academic performance	0.1110	0.0473	0.0121	0.206	2.347	0.019
Gender between ML and AP	0.0193	0.0919	-0.1762	0.178	0.210	0.834
Moderation Estimates			95% Confidence Interval			

The moderation analysis examines the impact of mobile learning and gender on academic performance, as well as the potential moderating effect of gender on the relationship between mobile learning and academic performance. The results show that mobile learning has a strong positive effect on academic performance, with an estimate of **0.6755** ($p<0.001$), indicating a highly significant relationship. Gender also has a positive effect on academic performance, with an estimate of **0.1110** ($p=0.019$), showing a smaller but statistically significant contribution. However, the interaction effect of gender between mobile learning and academic performance is not statistically significant ($p=0.834$), with an estimate of

0.0193 and a confidence interval (−0.1762 to 0.178) that includes zero. This suggests that gender does not significantly moderate the relationship between mobile learning and academic performance. In summary, while mobile learning and gender independently influence academic performance, gender does not alter the strength or direction of the relationship between mobile learning and academic performance.

Table 5. Simple slope estimates

	Estimate	SE	95%c0nfidence interval			
			Lower	upper	Z	p
Average	0.676	0.0724	0.535	O.825	9.33	<.001
Low(-1SD)	0.659	0.1099	0.447	0.874	6.00	<.001
High(+1SD)	0.692	0.1009	0.469	0.869	6.85	<.001

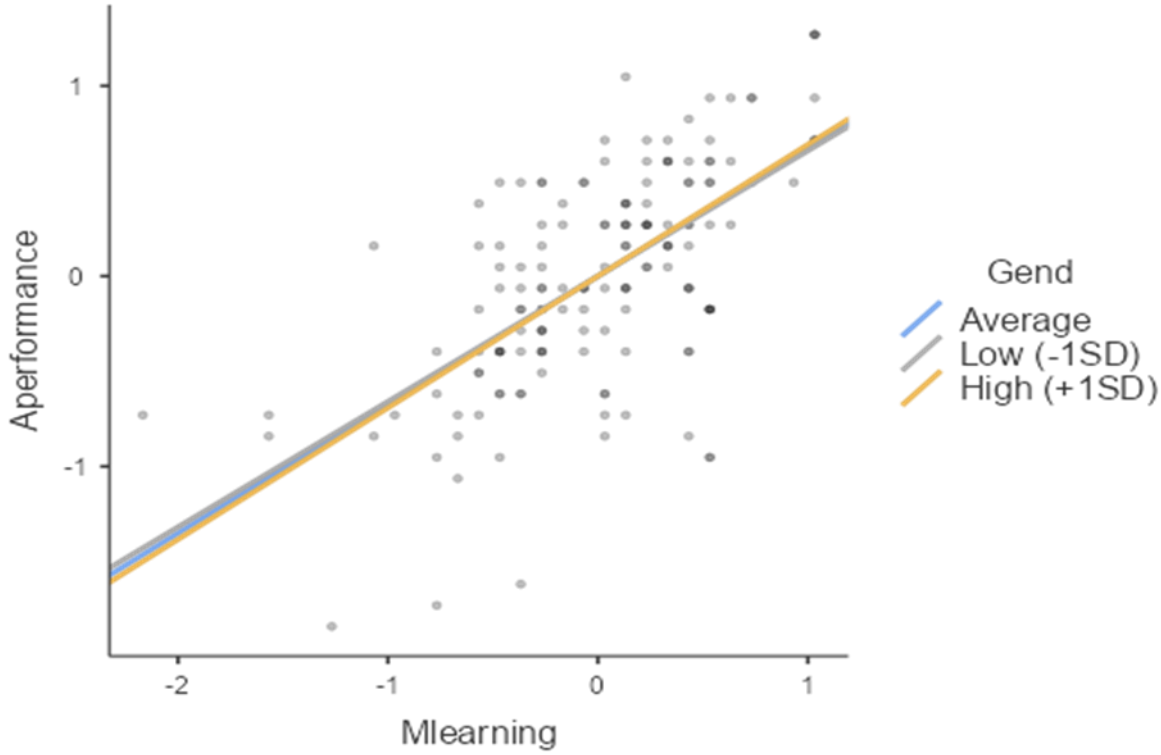


Figure 1 Simple Slope Estimates

The results from the simple slope estimates demonstrate the strength of the connection between the predictor and the outcome variable at different levels of the moderator: average, low (-1 SD), and high (+1 SD). At the average level, the estimate is 0.676 with a standard

error of 0.0724, and the 95% confidence interval spans from 0.535 to 0.825, showing a statistically significant relationship ($Z = 9.33$, $p < .001$). At the low level of the moderator (-1 SD), the estimate is slightly reduced to 0.659 with a standard error of 0.1099, and the confidence interval ranges from 0.447 to 0.874, maintaining a significant relationship ($Z = 6.00$, $p < .001$). At the high level of the moderator (+1 SD), the estimate rises to 0.692, with a standard error of 0.1009 and a confidence interval of 0.469 to 0.869, still significant ($Z = 6.85$, $p < .001$). These results suggest that the predictor has a positive influence on the outcome at all levels of the moderator, with the relationship being slightly stronger at higher levels.

DISCUSSION

The study's findings reveal a significant positive relationship between mobile learning and students' academic performance at Shanker Dev Campus, with a strong correlation ($r = 0.634$, $p < 0.001$). This suggests that increased utilization of mobile learning tools enhances learning efficiency and academic success. Regression analysis further supports this, indicating a robust positive effect of mobile learning on academic performance ($\beta = 0.6755$, $p < 0.001$). These results align with existing literature highlighting mobile learning's effectiveness in improving academic achievement through increased accessibility and engagement. For instance, a study examining the moderating effects of gender on factors affecting the intention to use mobile learning found that performance expectancy and effort expectancy significantly influenced students' intentions to adopt mobile learning, underscoring its potential to enhance educational outcomes (Izkair & Lakulu, 2023). However, the model fit ($R^2 = 0.402$) indicates that while mobile learning accounts for 40.2% of the variance in academic performance, other unexamined factors contribute to the remaining 59.8%.

The study revealed a statistically significant direct effect of gender on academic performance ($\beta = 0.1110$, $p = 0.019$), indicating that gender influences learning outcomes. However, gender does not moderate the relationship between mobile learning and academic performance ($\beta = 0.0193$, $p = 0.834$). This finding contrasts with previous research suggesting that demographic factors, such as gender, might moderate this relationship in similar contexts. For instance, a study on the moderating impact of gender on factors influencing the intention to adopt mobile learning in higher education institutions in Iraq found that gender moderated the influence of performance expectancy, effort expectancy,

and social pressure on the intention to use mobile learning (Izkair & Lakulu, 2023). These results imply that mobile learning strategies can be implemented universally, with no significant adjustments needed for gender differences in this context.

CONCLUSION

The study establishes a strong positive association between mobile learning and academic performance, affirming its potential to enhance learning efficiency among students. The quantitative analysis highlights that mobile learning significantly contributes to academic outcomes, although other unexamined factors account for a notable proportion of the variance. Additionally, while gender independently impacts academic performance, it does not moderate the relationship between mobile learning and student achievement. These findings suggest that mobile learning serves as a universally beneficial educational tool, irrespective of gender differences. By adopting mobile learning strategies, institutions can promote improved academic results through accessible, flexible, and engaging methods. However, future studies should investigate additional factors influencing academic performance to provide a more comprehensive understanding. These insights reinforce the critical role of technology in modern education while emphasizing the need for balanced and inclusive approaches in deploying mobile learning systems for maximum effectiveness.

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